A Computable General Equilibrium Model of the Bangladesh Economy for Monitoring Poverty Consequences of Macroeconomic Policies

User’s Manual

March 1998
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This study is a component of the Monitoring Adjustment and Poverty (MAP) in Bangladesh Project. The Project is being implemented by CIRDAP to institutionalize mechanism for regular monitoring of poverty and impact of structural adjustment (SA) policies by relevant national institutions in Bangladesh.

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CIRDAP

Centre on Integrated Rural Development for Asia and the Pacific
Chameli House, 17 Topkhana Road, GPO Box No. 2883
Dhaka 1000, Bangladesh.
Tel : 9568379, 9558751, 9559686
Fax : 880-2-9562035
E-mail : rescir@citechco.net
This manual has been prepared by Dr. Bazlul Haque Khondker, Consultant, under the Monitoring Adjustment and Poverty (MAP) Project.
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2  Specifications of the Behavioural Equations of the CGE Model</td>
<td>2</td>
</tr>
<tr>
<td>2.1 Equations of the CGE Model</td>
<td>2</td>
</tr>
<tr>
<td>2.2 Variables and Parameters of the CGE Model</td>
<td>3</td>
</tr>
<tr>
<td>3  Model Implementation in GAMS</td>
<td>4</td>
</tr>
<tr>
<td>3.1 Declaration of Sets and Variables</td>
<td>4</td>
</tr>
<tr>
<td>3.2 Parameter Declaration</td>
<td>8</td>
</tr>
<tr>
<td>3.3 Delineation of Data</td>
<td>11</td>
</tr>
<tr>
<td>3.4 Specifications and Calibration of Parameters</td>
<td>17</td>
</tr>
<tr>
<td>4  An Example of Running the Model using GAMS Software</td>
<td>36</td>
</tr>
<tr>
<td>Appendix I: BANGLA.GMS Model in GAMS</td>
<td>40</td>
</tr>
<tr>
<td>Appendix II: Description of Function Keys for KEDIT</td>
<td>84</td>
</tr>
</tbody>
</table>
1. **Introduction**

This manual describes the implementation of the computable general equilibrium (CGE) model under the Monitoring Adjustment and Poverty (MAP) Project of CIRDAP using a software which is known as the “General Algebraic Modeling System (GAMS)”. The manual is written for users of the model prepared for the Bangladesh economy with 1992/93 as the base year. The manual describes the implementation of different steps before specifying the equations of the model. The sets to define sectors or activities, factors of production, and institutions are declared first along with variables, and parameters of the model. Then it shows the presentation of data in the form of tables and vectors. At this point, it also identifies data gaps and uses the calibration procedure to generate numerical values to bridge the data gaps. Then variables are initialized and the equations are specified. Specifications for model closures are then designed. When all the above steps are successfully completed, the model is ready to run to generate the base year values (for 1992/93). A successfully implemented model would then produce an optimal solution. The base model solution would reproduce the base year values. Once the model reproduces the base year values and generates an optimal solution, the model is ready for simulation exercises. The basic steps for implementing the model are the following:

**Step 1.** Designing of the model structure- Specification of behavioural equations to delineate characteristics of the agents (e.g. producers, consumers, government and corporation etc.) of the economy. The behaviour equations of the model are presented in Section 2.1. Implementation of the model is centred around the specification of the behavioural equations.

**Step 2.** Selection of a base year, identification of data sources, manipulation of data and generation of a consistent data framework. Consistent data set is best presented within a Social Accounting Matrix (SAM) framework.

**Step 3.** Selection of a software to implement and run the model. Among the available softwares, ´GAMS´ has been chosen. Hence GAMS procedures are followed to implement the model.

**Step 4.** Once the model is implemented and free of any syntax errors, the model can be run to reproduce the base year and an optimal solution.

**Step 5.** When the model reproduces the base year values and generates an optimal solution, the model is ready for simulation exercises.
2. Specifications of Behavioural Equations of the CGE Model

Specification of behavioural equations of the CGE model for the Bangladesh economy is presented in this section. It involves description of price equations, production and supply equations, exports and imports, income formation, final demand, savings and equilibrium conditions. Implementation of CGE model in 'GAMS' environment is based on the above specification. The model is numerically specified for 1992/93 financial year. Data are compiled in a SAM for 1992/93.

2.1 Equations of the CGE Model

Prices

\[ 4 \quad PV_i = PD_i - \sum_{j} \tau_{ji} \cdot P_j - td_i \]

\[ 5 \quad PK_i = \sum_{j} K_{ji} \cdot P_j \]

\[ 6 \quad PX_i = \frac{PD_i \cdot D_i + PE_i \cdot E_i}{X_i} \]

Production and Supply

\[ 9 \quad INT_y = \tau_{ji} \cdot X_j \]

Exports and Imports

\[ 14 \quad Q_i = AO_i \cdot [\delta \cdot M_i^{-\eta} + (1 - \delta) \cdot D_i^{-\eta}]^{-1/\eta} \]

\[ 15 \quad M_i = D_i \cdot \frac{PD_i \cdot \delta}{PM_i \cdot (1 - \delta)} Y_i \]

Incomes

\[ 17 \quad YF_h = \sum_{f} \Phi_{hf} \cdot Y_f \]

\[ 19 \quad YG = \sum_{h} \theta_h \cdot Y_h + \sum_{j} td_j \cdot X_j \cdot PX_j + t_c \cdot YC + \sum_{j} \theta_j \cdot PWM_j \cdot M_j \cdot ER + YFG \]

Final Demand

\[ 21 \quad YC = \zeta_y \cdot Y_f \]

\[ 24 \quad GD_i = \beta_i \cdot GTOT \]

\[ 25 \quad DST_i = \xi_i \cdot X_i \]

\[ 27 \quad I_D_j = \sum_{j} K_{ij} \cdot DK_j \]

\[ 1 \quad PM_i = PWM_i \cdot ER \cdot (1 + tm_i + st_i) \]

\[ 2 \quad PE_i = PWE_i \cdot ER \]

\[ 3 \quad P_i = \frac{PD_i \cdot D_i + PM_i \cdot M_i}{Q_i} \]

\[ 7 \quad PINDEX = \frac{GDPVA}{RGDP} \]

\[ 8 \quad X_j = A_i \prod_f FD_{ij}^{\alpha_f} \]

\[ 10 \quad W_f \cdot \omega_f = PV_i \cdot \alpha_f \frac{\partial X_i}{\partial FD_{ij}} \]

\[ 11 \quad X_i = AT_i \cdot [\gamma_i \cdot E_i + (1 - \gamma_i) \cdot D_i ^{1/\delta}]^{1/\delta} \]

\[ 12 \quad E_i = D_i \cdot \frac{PE_i \cdot (1 - \gamma_i)}{PD_i \cdot (1 - \delta)} \]

\[ 13 \quad E_i = E_i \cdot \frac{PWE_i \cdot Q_i}{PWSE_i} \]

\[ 16 \quad Y_f = \prod_i W_f \cdot \omega_f \cdot LD_{ij} \]

\[ 18 \quad Y_h = [FL_h + YK_h + RM_h \cdot ER + DV_h + GTR_h] \cdot (1 - th_h - x_h) \]

\[ 20 \quad YFG = \zeta_y \cdot Y_f \]

\[ 22 \quad CD_{ih} = (\beta_{ih} / P_i) \cdot Y_h \]

\[ 23 \quad INT_j = \sum_{j} INT_{ij} \]

\[ 26 \quad FIXDINV = 1 - \sum_{j} PQ_j \cdot DST_i \]

\[ 28 \quad PK_i \cdot DK_i = \lambda_i \cdot FIXDINV \]
29 \( S_{ih} = s_h \cdot Y_h \)

30 \( SC = YC - \sum_h D\bar{V}_h - t_C \cdot YC \)

33 \( GDPVA = \sum_i PV_i \cdot X_i + INDTAX + TARIFF \)

35 \( \sum_i FD_{iy} = FS_f \)

36 \( Q_i = INT_i + \sum_i CD_{ih} + GD_i + ID_i \)

31 \( SG = YG - \sum_i GD_i - \sum_h GTR_h \)

32 \( S = \sum_h S_{ih} + SG + SC + SF \cdot ER \)

34 \( RGDP = \sum_i (CD_i + GD_i + ID_i + DST_i) + \sum_i E_i - \sum_i (1 - T_i) \cdot M_i \)

37 \( \sum_i PWM_i = \sum_i PWM_i E_i + \sum_h RMB_h \cdot SF \)

38 \( I = S = \sum_h S_{ih} + SG + SC + SF \cdot ER \)

### 2.2 Variables and Parameters of the CGE Model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>( CD_{ih} )</td>
<td>( RM_h )</td>
</tr>
<tr>
<td>( D_i )</td>
<td>( S )</td>
</tr>
<tr>
<td>( DK_i )</td>
<td>( SH_h )</td>
</tr>
<tr>
<td>( DV_h )</td>
<td>( SG )</td>
</tr>
<tr>
<td>( E_i )</td>
<td>( SC )</td>
</tr>
<tr>
<td>( ER )</td>
<td>( SF )</td>
</tr>
<tr>
<td>( GD_i )</td>
<td>( Q_i )</td>
</tr>
<tr>
<td>( GTR_h )</td>
<td>( PINDEX )</td>
</tr>
<tr>
<td>( I )</td>
<td>( W_f )</td>
</tr>
<tr>
<td>( ID_i )</td>
<td>( X_i )</td>
</tr>
<tr>
<td>( INT_i )</td>
<td>( Y_f )</td>
</tr>
<tr>
<td>( FD_{iy} )</td>
<td>( YC )</td>
</tr>
<tr>
<td>( M_i )</td>
<td>( YFH_i )</td>
</tr>
<tr>
<td>( PDI )</td>
<td>( Y_h )</td>
</tr>
<tr>
<td>( PE_i )</td>
<td>( YFG )</td>
</tr>
<tr>
<td>( PK_i )</td>
<td>( YG )</td>
</tr>
<tr>
<td>( PM_i )</td>
<td>( RGDP )</td>
</tr>
<tr>
<td>( GDPVA )</td>
<td>( DST_i )</td>
</tr>
<tr>
<td>( PWE_i )</td>
<td>( FIXDINV )</td>
</tr>
<tr>
<td>( A_i )</td>
<td>( \zeta_f )</td>
</tr>
<tr>
<td>( \alpha_{ij} )</td>
<td>( \chi_f )</td>
</tr>
<tr>
<td>( \tau_{ij} )</td>
<td>( \beta_i )</td>
</tr>
<tr>
<td>( \tau_{i} )</td>
<td>( \beta_{hi} )</td>
</tr>
<tr>
<td>( \tau_{i} )</td>
<td>( \beta_{hi} )</td>
</tr>
<tr>
<td>( \sigma )</td>
<td>( \zeta_{hi} )</td>
</tr>
<tr>
<td>( \sigma )</td>
<td>( \kappa_{hi} )</td>
</tr>
<tr>
<td>( A_t )</td>
<td>( I_i )</td>
</tr>
<tr>
<td>( \delta_t )</td>
<td>( th_i )</td>
</tr>
<tr>
<td>( A_{T} )</td>
<td>( s_i )</td>
</tr>
<tr>
<td>( \gamma_t )</td>
<td>( GTOT )</td>
</tr>
<tr>
<td>( \psi_t )</td>
<td>( E_{i}^{0} )</td>
</tr>
<tr>
<td>( T )</td>
<td>( \eta_i )</td>
</tr>
<tr>
<td>( \Phi_{M} )</td>
<td>( PWM_i )</td>
</tr>
<tr>
<td>( PWSE_i )</td>
<td>( PWSE_i )</td>
</tr>
</tbody>
</table>
3. Model Implementation in GAMS

Implementation of the model presented in section 2 is described in this section. It involves the following:

3.1 Declaration of Sets and Variables

$TITLE 1992/93 BANGLA: BASE
$OFFSYMLIST OFFSYMREF OFFUPPER

To operationalise the CGE model in GAMS format, first classify sectors or activities of the economy along with factors and institutions. The number of sectors or activities are classified in the SAM or in the I-O table. Factors are also classified in SAM or in I-O table. Finally, institutions are classified either in the SAM or in Satellite accounts. In the Bangladesh CGE model these are classified in the SAM 1992/93. The GAMS specification of sectors, factors and institutions are presented below.

*######## SET DECLARATION (GAMS Notation for Set Declaration)########

The above declaration (i.e. set declaration or any other similar declaration) is not essential but it helps to identify or point out different sets of declaration. In the present model there are 3 types of sets. These are, I, F, HH and ISAM.

GAMS set declaration starts with

SETS

I SECTORS /
RICE WHEAT SGRCANE VGTABLE PULSES FRUITS TEA OTRCRPS LSTOCK FISH FOREST EDOIL
There are 35 sectors or activities under set I. That is, set I contains 35 sectors (which are same as in the SAM 1992/93). Set I can be reduced or enlarged to accommodate changes in number of sectors. According to GAMS format, a name (i.e. for sector, factor, institutions, variables) declaration must not exceed 8 characters. That is why we use SGRCANE for sugar cane (i.e. 7 characters).

F FACTORS OF PRODUCTION /

<table>
<thead>
<tr>
<th>CAPITAL</th>
<th>CAPITAL STOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADM</td>
<td>ADMINISTRATIVE</td>
</tr>
<tr>
<td>SERV</td>
<td>SERVICE</td>
</tr>
<tr>
<td>AGR-HL</td>
<td>AGRICULTURE HIRED LABOUR</td>
</tr>
<tr>
<td>AGR-FLSF</td>
<td>AGRICULTURE FAMILY LABOUR SMALL FARM</td>
</tr>
<tr>
<td>AGR-FLLF</td>
<td>AGRICULTURE FAMILY LABOUR LARGE FARM</td>
</tr>
<tr>
<td>PRTR-SK</td>
<td>WORKER SKILLED</td>
</tr>
<tr>
<td>PRTR-SS</td>
<td>WORKER SEMI SKILLED</td>
</tr>
<tr>
<td>PRTR-US</td>
<td>WORKER UNSKILLED</td>
</tr>
</tbody>
</table>

Set F describes factors of production. It contains 8 labour factors and 1 capital factor.
Note that there are 4 institutions in the SAM. They are government, corporation, rest of the world and households. Household accounts are further classified by 8 occupation categories and require a set to contain the 8 different types of households. Set declarations are not needed for the other 3 institutions as they are not classified into more than one type. A scalar declaration is suffice for them.

Note that I denotes sector classification. F refers to factors classification. HH shows household classification. All these 3 sets can be reduced and enlarged according to their classifications adopted in the SAM.

Sometimes it is relevant to sub-divide a particular set into 2 or more subsets. For instance, set I which contains all sectors may need to be separated into 2 subsets such as a subset that contains, all agricultural sectors (IAG(I)) and a subset that contains all non-agricultural sectors (IAGN(I)). Section below presents specification of different subsets:

*## SUBSETS DEFINED BELOW: "DEFINE INDEXES" (GAMS Notation)*

```plaintext
IAG(I)       AG SECTORS / RICE, WHEAT, SGRCANE, VGTABLE, PULSES, FRUITS, TEA, OTRCRPS, LSTOCK, FISH, FOREST /
IAGN(I)      NON AG SECTORS / EDOIL, OTRFOOD, TOBPROD, SGRGUR, SALT, YARN, CLOTH, RMGRMNT, JUTTEXT, CHEM, FETIZER, BMET, MACHINE, LEATHER, ENERGY, HOUSING, FINANCE, OTRIND, CONSTRUC, EDUC, HEALTH, MISCSERV, PUBAD, TRADE /
```
Separation of set I between agricultural and non-agricultural subsets (defined above) uses set application to specify the subsets. However, there is another alternative to define a subset. The alternative specification is based on “read in data”. It will be observed later that for indexing imports and exports no set indexing is used rather read in data indexing is used.

An Example of “Read in Data” Indexing

IE(I) denotes exportable sectors and IEN(I) shows non-export sectors. It is noted that not all the 35 production sectors (or activities) export their products. Some of them are purely non-traded sectors. According to GAMS format sectoral exports data are recorded in Table sector (x, I) as E0(I). Now using the E0(I) we can index set I into export sector and non-export sector. The “Read in Data” technique for subset indexing can be used as follows:

IE(I) = yes$EO(I); IED(I) = yes$ETA(I); IEDN(I) = not IED(I); IEN(I) = not IE(I); IM(I) = yes$MO(I); IMN(I) = not IM(I);

Above subsets of exports and imports are based on ‘Read in Data’ indexing.

ALIAS(I,J) ;

ALIAS (I,J) suggests that it is always possible to interchange I for J or J for I. This interchange command is very useful in matrix manipulation, summation, multiplication and aggregation.

*## for SAM (GAMS Notation)

This section shows the specifications of a set for the Social Accounting Matrix (SAM). The specifications are in line with “System of National Accounts (SNA) 1993 recommendation. The SAM set consists of 8 accounts. These are: Commodity Accounts (COMMDTY), Activity (ACTIVITY), Value-added (VALUAD), Corporation (CORP), Households (HHOLDS), Government (GOVT), Capital Account (KACCOUNT), Rest of the world (WORLD) accounts.
SET ISAM
/COMMDTY, ACTIVITY, VALUAD, CORP, HOUSEHOLDS, GOVT, KACCOUNT, WORLD, TOTAL/

ISAM1(isam) /TOTAL/
ISAM2(isam);
ALIAS(isam2,isam3);
PARAMETER SAM(isam,isam) SOCIAL ACCOUNTING MATRIX;
Isam2(isam) = NOT Isam1(isam);

Within the context of SAM framework ISAM1 and ISAM2 denote Row and Column Totals respectively. Again Alias (isam2, isam3) suggests that it is possible to interchange row for column and column for row.

3.2 Parameter Declaration

*################################################################ PARAMETER DECLARATION (GAMS Notation) ################################################################

As mentioned earlier, operationalization of equation requires calibration or estimation of parameters using data, elasticity values. The parameters that need to be estimated are declared here. This also reports initial values of the variables. Initial Values of the variables are assigned by adding 0 extension with a variable. For instance when 0 is added to E (exports) then it is said that variable E is given initial values. The property of the initial value is that the base year value of the variable will never change (even in a simulation exercise). This property of initial value stabilizes the values of the estimated parameters. Initial values of the variables are described below.

*### ###READ IN FOR INITIAL VALUES OF VARIABLES (GAMS Notation)####

EO(i) EXPORTS
EXRO EXCHANGE RATE
FSAVO NET FOREIGN SAVINGS
GDTOTO TOTAL VOLUME OF GOVERNMENT CONSUMPTION
GOVSAV0 GOVERNMENT SAVINGS
HHAO HOUSEHOLD SAVINGS
HHTAX0 HOUSEHOLD TAX REVENUE
CORTAXO CORPORATION TAX REVENUE
CORSAV0 SAVINGS BY CORPORATION
INVESTO TOTAL INVESTMENT
STOCKO TOTAL STOCK CHANGE
CTAXR RATE OF CORPORATION TAX
MO(i) IMPORTS
DKO(I) SECTORAL INVESTMENT
CDO(I) SECTORAL CONSUMPTION
SCO(I) CHANGE IN SECTORAL STOCKS
MPSO(hh) HOUSEHOLD MARGINAL PROPENSITY TO SAVE
PDO(i) DOMESTIC GOODS PRICE
PEO(i) DOMESTIC PRICE OF EXPORTS
SO(i) SCALE PARAMETER
PINDEXO GDP DEFLATOR
PMO(i) DOMESTIC PRICE OF IMPORTS
X0(i) DOMESTIC OUTPUT, VOLUME

Initial values of above variables are obtained from tables (containing base data values) presented in Data Section.

* READ IN PARAMETERS AS RATES, SHARES, ELASTICITIES (GAMS Notation)

This section presents list of parameters consisting of rates, shares and elasticity. Some of the parameters such as values of elasticity are generally adopted from secondary sources or are estimated outside the CGE model framework using time series data. The values of other parameters such as tax rates, shares are obtained from table (containing values of rate, shares) presented in Data section.

DEPR(i) DEPRECIATION RATES
DSTR(i) RATIO OF INVENTORY INVESTMENT TO GROSS OUTPUT
ETA(I) EXPORT DEMAND PRICE ELASTICITY
GLES(i) GOVERNMENT CONSUMPTION SHARES
KSHR(J) SHARES OF INVESTMENT BY SECTOR OF DESTINATION
RHOC(i) ARMINGTON FUNCTION EXPONENT
RHOT(i) CET FUNCTION EXPONENT
TE(i) EXPORT SUBSIDY RATES
ADH(HH) PARAMETERS FOR ADJUSTMENT
TH(hh) HOUSEHOLD TAX RATE
RSHR(hh) HOUSEHOLD SHARE OF REMITTANCE
TM(i) TARIFF RATES ON IMPORTS
TX(i) INDIRECT TAX RATES

*### COMPUTED PARAMETERS FROM READ IN DATA (CALIBRATION)###

This section shows declaration of parameters that are estimated using the calibration process. Data used in the calibration procedure are obtained from tables presented in Data section.

D0(i) DOMESTIC SALES, VOLUMNE
GD0(I) GOVERNMENT CONSUMPTION INITIAL VOLUME
CORY0 CORPORATION INCOME FROM CAPITAL
GOVY0 GOVERNMENT INCOME FROM CAPITAL
FD0(f) FACTOR DEMAND, AGGREGATE
Parameters that are estimated using the calibration process are presented here. It thus estimates values of data (generated through calibration procedure) to compute values of the rate and share parameters.

*## COMPUTED PARAMETERS AS RATES, SHARES##*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC(i)</td>
<td>ARMINGTON FUNCTION SHIFT PARAMETER</td>
</tr>
<tr>
<td>AD(i)</td>
<td>PRODUCTION FUNCTION SHIFT PARAMETER</td>
</tr>
<tr>
<td>ALPHA(i,f)</td>
<td>FACTOR SHARE PARAMETER-PRODUCTION FUNCTION</td>
</tr>
<tr>
<td>AT(i)</td>
<td>CET FUNCTION SHIFT PARAMETER</td>
</tr>
<tr>
<td>DELTA(i)</td>
<td>ARMINGTON FUNCTION SHARE PARAMETER</td>
</tr>
<tr>
<td>ECON(i)</td>
<td>EXPORT DEMAND CONSTANT</td>
</tr>
<tr>
<td>GAMMA(i)</td>
<td>CET FUNCTION SHARE PARAMETER</td>
</tr>
<tr>
<td>PWTS(i)</td>
<td>PRICE INDEX WEIGHTS</td>
</tr>
<tr>
<td>QD(i)</td>
<td>DUMMY VARIABLE FOR COMPUTING AD(i)</td>
</tr>
<tr>
<td>RMD(i)</td>
<td>RATIO OF IMPORTS TO DOMESTIC SALES</td>
</tr>
<tr>
<td>CDHH(HH)</td>
<td>INCOMCE AFTER TAX AND OTHER PAYMENTS</td>
</tr>
<tr>
<td>ADCH(HH)</td>
<td>ADJUSTED INCOME AFTER PAYMENTS</td>
</tr>
<tr>
<td>SUMSH</td>
<td>SUM OF SHARE CORRECTION PARAMETER</td>
</tr>
<tr>
<td>SUMHHSSH(hh)</td>
<td>SUM OF SHARE FOR HH CLES</td>
</tr>
<tr>
<td>SUMIMSH(i)</td>
<td>SUM OF SHARE FOR B</td>
</tr>
<tr>
<td>TMREAL(i)</td>
<td>REAL TARIFF RATE</td>
</tr>
</tbody>
</table>
3.3 Delineation of Data

This section describes the data required for implementation of the model. Except for values of elasticities, all data are obtained from the 1992/93 "Social Accounting Matrix (SAM)". Here the scalar formulation of data in tabular form is shown. Presentation of numerical values of data is provided in data section of Appendix I. One can easily verify the association between tabular formulation (a general format) with numerical formulation using table (a specific/numeric format).

Table A(I,j) 1992/93 (or any base year) I-O coefficients (unitless)

<table>
<thead>
<tr>
<th>Sectors (Rows)</th>
<th>I(1)</th>
<th>..........</th>
<th>N(35)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I(1)</td>
<td>.</td>
<td>..........</td>
<td>.......</td>
</tr>
<tr>
<td>.</td>
<td>.</td>
<td>..........</td>
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<tr>
<td>.</td>
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<td>..........</td>
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</tr>
<tr>
<td>.</td>
<td>.</td>
<td>..........</td>
<td>.......</td>
</tr>
<tr>
<td>N(35)</td>
<td>.</td>
<td>..........</td>
<td>.......</td>
</tr>
</tbody>
</table>

The input-output coefficient matrix for the base year (i.e. 1992/93) is shown above. The coefficient table is described as A(I,j) where I denote sectors (row) and j refers to sectors (columns). The A(I,j) can be of n x n dimension. In the present model it is 35x35. According to the Alias (I,j), the rows and columns are interchangable. Since the maximum width of a line specification can not exceed 80 columns, a large I-O matrix can not be presented in a single block, rather it is produced in several blocks each showing I-O coefficients for N rows and specific columns. For instance, 1992/93 I-O matrix is tabulated in five blocks, each showing I-O coefficients for 35 rows and 7 columns (see I-O matrix, Appendix-I).

Capital composition matrix is shown in table below:
TABLE B(I,J) CAPITAL COMPOSITION MATRIX (Unitless)

<table>
<thead>
<tr>
<th>Sectors (Row/origin)</th>
<th>I(1)</th>
<th>......</th>
<th>N(35)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I(1)</td>
<td></td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>.</td>
<td></td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>.</td>
<td></td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>.</td>
<td></td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>.</td>
<td></td>
<td>......</td>
<td></td>
</tr>
<tr>
<td>N(35)</td>
<td></td>
<td>......</td>
<td></td>
</tr>
</tbody>
</table>

Usually capital composition matrix is a square matrix suggesting that investment goods produced in small number of sectors (origin sectors) but are used by all sectors (use or destination). In case of present model, B(I,J) is a 3 x 35 matrix (see Appendix-I).

TABLE FCTRY (I,F) FACTOR INCOME BY SECTOR (BILL TAKA)

<table>
<thead>
<tr>
<th>Sector</th>
<th>F(1)</th>
<th>......</th>
<th>F(9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I(1)</td>
<td>.</td>
<td>......</td>
<td>......</td>
</tr>
<tr>
<td>.</td>
<td>.</td>
<td>......</td>
<td>......</td>
</tr>
<tr>
<td>.</td>
<td>.</td>
<td>......</td>
<td>......</td>
</tr>
<tr>
<td>N(35)</td>
<td>.</td>
<td>......</td>
<td>......</td>
</tr>
</tbody>
</table>

Factor income (or value added) data are presented in table FCTRY(I,F). It is a sector by factor table indicating sectors in rows and factors in columns. In the present case, FCTRY (I,F) is 35 x 9 matrix.

TABLE FCTRES 1 (I,F) FACTOR DEMAND BY SECTOR

<table>
<thead>
<tr>
<th>Sector</th>
<th>F(1)</th>
<th>......</th>
<th>F(9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I(1)</td>
<td>.</td>
<td>......</td>
<td>......</td>
</tr>
<tr>
<td>.</td>
<td>.</td>
<td>......</td>
<td>....</td>
</tr>
<tr>
<td>N(35)</td>
<td>.</td>
<td>......</td>
<td>......</td>
</tr>
</tbody>
</table>
Employment data and capital stock data are presented in table FCTRES 1 (I,F). Except the values of the corresponding cells, dimensions of this table exactly correspond to table FCTRY (I,F).

**TABLE CLES (HH,I) HOUSEHOLD CONSUMPTION SHARE**

<table>
<thead>
<tr>
<th>Household</th>
<th>I(1)</th>
<th>.......</th>
<th>N(35)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HH(1)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.......</td>
<td>.......</td>
</tr>
<tr>
<td>HH(8)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
</tr>
</tbody>
</table>

Consumption shares of different household groups by sectors are shown in table CLES (HH,I). Rows indicate household groups and columns show sectors. It is important to check that sum of consumption shares for each household group is 1 i.e.

\[ \sum \text{CLES (HH,I)} = 1; \]

In the present case, CLES(HH,I) is a 8 x 35 matrix (see Appendix-I).

**TABLE INSHS (HH,F) SHARES OF HOUSEHOLD INCOME FROM FACTORS**

<table>
<thead>
<tr>
<th>Household</th>
<th>F(1)</th>
<th>.......</th>
<th>F(9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HH(1)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.......</td>
<td>.......</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.......</td>
<td>.......</td>
</tr>
<tr>
<td></td>
<td>.</td>
<td>.......</td>
<td>.......</td>
</tr>
<tr>
<td>HH(8)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
</tr>
</tbody>
</table>

Shares of household income from factors are shown in table INSHS (HH,F). Rows indicate household groups and columns show factors. Sum of factor shares for each factor is 1, i.e. \[ \sum \text{INSHS (HH,I)} = 1; \]

In the present model, INSHS(HH,I) is a 8 x 9 matrix (see Appendix-I).
TABLE INIS (*,F) SHARES OF INSTITUTION INCOME FROM FACTORS

<table>
<thead>
<tr>
<th>Institution</th>
<th>F(1)</th>
<th>..........</th>
<th>F(9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*(GD)</td>
<td>.</td>
<td>..........</td>
<td>......</td>
</tr>
<tr>
<td>*(COR)</td>
<td>.</td>
<td>..........</td>
<td>......</td>
</tr>
</tbody>
</table>

Shares of institutions income (other than households) from factors are presented in table INIS(*,F). In the present model it is a 2x9 matrix envisaging government (GD) and corporation (COR) share of factor income.

TABLE HHPAR (*,HH) MISCELLANEOUS HOUSEHOLD PARAMETERS

<table>
<thead>
<tr>
<th>Other Parameters</th>
<th>HH(1)</th>
<th>..........</th>
<th>HH(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*(TH)</td>
<td>.</td>
<td>..........</td>
<td>......</td>
</tr>
<tr>
<td>*(MPS)</td>
<td>.</td>
<td>..........</td>
<td>......</td>
</tr>
</tbody>
</table>

Values of all other parameters related to household such as direct tax rate (TH), average propensity to save (MPS) and other parameter may be presented in tabular format shown in table HHPAR (*, HH). It’s number (dimension) of rows depends on numbers of other parameters need to be specified. In the present model, it is 2 x 8 matrix.

TABLE EXPAR (HH,*) OTHER INCOME OF HOUSEHOLD PARAMETERS

<table>
<thead>
<tr>
<th>Name of Other Income</th>
<th>HH(1)</th>
<th>..........</th>
<th>HH(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*(REMIT)</td>
<td>.</td>
<td>..........</td>
<td>......</td>
</tr>
<tr>
<td>*(GOVTR)</td>
<td>.</td>
<td>..........</td>
<td>......</td>
</tr>
</tbody>
</table>

Household’s income from other sources can be specified in a table as shown above. Number of rows is equal to household classification while number of column varies with sources of other income of the household. Potentially, the number of columns can vary from 1 to N. In the present model it is an 8x2 matrix.
### TABLE SECTRES (*,I) SECTORAL QUANTITIES AND PRICES

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Household</th>
<th>I(1)</th>
<th>.......</th>
<th>N(35)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*(M)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
<tr>
<td>*(E)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
<tr>
<td>*(X)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
<tr>
<td>*(DL)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
<tr>
<td>*(CD)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
<tr>
<td>*(GD)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
<tr>
<td>*(SC)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
<tr>
<td>*(PD)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
<tr>
<td>*(PX)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
<tr>
<td>*(PM)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
<tr>
<td>*(PK)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
<tr>
<td>*(PQ)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
<tr>
<td>*(PE)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
</tbody>
</table>

Values of the variables by each sector (specified in set I) are provided in table SECTRES (*,I). Rows of the table indicate names of the variables. Number of rows depends on the number of variables that needs to be provided with a numerical value. Again, the number of rows can vary from 1 to N. In the present model, it is a 13 x 35 matrix indicating that numerical values are provided for 13 variables for the 35 sectors (see Appendix-I).

### TABLE TAXR (*,I) SECTORAL TAXES (BILL TAKA)

<table>
<thead>
<tr>
<th>Sectors</th>
<th>TAXES</th>
<th>I(1)</th>
<th>.......</th>
<th>N(35)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*(TX)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
<tr>
<td>*(TM)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
<tr>
<td>*(TE)</td>
<td>.</td>
<td>.......</td>
<td>.......</td>
<td></td>
</tr>
</tbody>
</table>
**TABLE PARM (*,1) MISCELLNEOUS PARAMETERS**

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>I(1)</th>
<th>Sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>*(GLES)</td>
<td>.</td>
<td>..........</td>
</tr>
<tr>
<td>*(KSHR)</td>
<td>.</td>
<td>..........</td>
</tr>
<tr>
<td>*(DSTR)</td>
<td>.</td>
<td>..........</td>
</tr>
</tbody>
</table>

Table TAXR (*,1) contains tax data by the 35 sectors. On the other hand, table PARM (*,1) provides values of misc. parameters related to production sectors.

**PARAMETER SCALRES (*)**

###MACRO TOTALS
- *(EXR)*
- *(PINDEX)*
- *(GDTOT)*
- *(INVEST)*

###TAX
- *(HHTAX)*
- *(CTAXR)*
- *(CORTAX)*

###SAVINGS
- *(HHSAV)*
- *(GOVSAV)*
- *(FSAV)*
- *(CORSAV)*

Values of different variables, parameters and rate which are dimensionless can be provided in a vector as shown above. For example, it contains base year values of exchange rate (EXR), Government consumption (GDTOT) etc. (see Appendix-I)
TABLE ELASTICITY (*,1) SECTORAL ELASTICITY

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>I(1)</th>
<th>........</th>
<th>N(35)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*(RHOC)</td>
<td>.</td>
<td>..........</td>
<td>........</td>
</tr>
<tr>
<td>*(RHOT)</td>
<td>.</td>
<td>..........</td>
<td>........</td>
</tr>
<tr>
<td>*(ETA)</td>
<td>.</td>
<td>..........</td>
<td>........</td>
</tr>
</tbody>
</table>

Values of elasticity (obtained from other sources) may be provided in a table as specified above. Number of rows indicates name of elasticity - while columns shows the sectors. Number of rows varies depending on the number of elasticities provided in the table ELASTICITY. In the present model it is 3 x 35 matrix.

********** END OF PARAMETER ASSIGNMENT **********

3.4 Specification and Calibration of Parameters

******** SPECIFY PARAMETERS FROM TABLE VALUES ********

### PARAMETERS FROM SCALRES(*)

This section shows retrieval of numerical values for scalar variables and parameters. A scalar value suggests a single numerical value for a specific variable or parameter. In line with calibration of parameters, all the scalars are specified with a zero (0) extension. Such as initial value of exchange rate is expressed as EXRO. The numerical values are provided under the table SCALRES. Initial values for all the scalars are readable from the table SCALRES in the following forms. For instance, the initial value for nominal exchange rate (EXRO) is readable from SCALRES table from the head specified in that table as EXR (i.e. nominal exchange rate). According to the GAMS language, the numerical values from a table must be assigned within “-----”:

```plaintext
EXRO = SCALRES("EXR");
FSAV0 = SCALRES("FSAV");
GDTOT0 = SCALRES("GDTOT");
GOVSAV0 = SCALRES("GOVSAV");
HHSAV0 = SCALRES("HHSAV");
HHTAX0 = SCALRES("HHTAX");
CORSAV0 = SCALRES("CORSAV");
CORTAX0 = SCALRES("CORTAX");
CTAXR = SCALRES("CTAXR");
INVEST0 = SCALRES("INVEST");
PINDEX0 = SCALRES("PINDEX");
```
*## OTHER TABLE VALUES OF PARAMETERS

Calibration of parameters also requires labelling of initial values for variables. Like the labeling of scalar values, the initial values for variables are also readable from the table representing numerical values of different variables by the input-output sectors or activities. The table is essentially a two dimensional one representing sectors in the rows (or in the columns) and different variables in the rows (when sector are shown in the columns). Design of such a table is discussed below:

Table SECTRES (*, I)

<table>
<thead>
<tr>
<th>Variables</th>
<th>I(1)</th>
<th>..........</th>
<th>I(N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*(M)</td>
<td>xxxxx</td>
<td>xxxxx</td>
<td>xxxxx</td>
</tr>
<tr>
<td>....</td>
<td>xxxxx</td>
<td>xxxxx</td>
<td>xxxxx</td>
</tr>
<tr>
<td>*(PE)</td>
<td>xxxxx</td>
<td>xxxxx</td>
<td>xxxxx</td>
</tr>
</tbody>
</table>

The general expression for data read for variables from such tables is Name of variable (Table Name ("Name for variable", Symbol used to define sectors). According to GAMS, the typical way of presenting the data readable from above table is VARIABLE(I) = SECTRES ("VARIABLE", I). Where VARIABLE notation is used in the table for variable, SECTRES denotes table name, and I refers to set I used to define sectors or activities. This specification then provides base year data for variable by the input-output sectors or activities. Using the above procedure data readable forms for variables are assigned below:

EO(I) = SECTRES("E",I);  
ECON(I) = SECTRES("E",I);  
MO(I) = SECTRES("M",I);  
SCO(I) = SECTRES("SC",I);  
DKO(I) = SECTRES("DK",I);  
CDO(I) = SECTRES("CD",I);  
GDO(I) = SECTRES("GD",I);  
PDO(I) = SECTRES("PD",I);  
PEO(I) = SECTRES("PE",I);  
PKO(I) = SECTRES("PK",I);  
PPO(I) = SECTRES("PM",I);  
PQO(I) = SECTRES("PQ",I);  
PXO(I) = SECTRES("PX",I);  
XO(I) = SECTRES("X",I);
Initial values for parameters related to Households are retrieved from table HHPAR (*, HH) which contains values of parameters by household categories. This is also a two dimensional table. Although the potential size of the table can range from 1 to N, the size of table depends on parameter requirements and number of households classified in the SAM data base or in the model. Design of such a table is shown below (also in section 3.3):

<table>
<thead>
<tr>
<th>Household Groups</th>
<th>HH(1)</th>
<th>.........</th>
<th>HH(N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*(TH)</td>
<td>xxxxx</td>
<td>xxxxx</td>
<td>xxxxx</td>
</tr>
<tr>
<td>....</td>
<td>xxxxx</td>
<td>xxxxx</td>
<td>xxxxx</td>
</tr>
<tr>
<td>*(MPS)</td>
<td>xxxxx</td>
<td>xxxxx</td>
<td>xxxxx</td>
</tr>
</tbody>
</table>

On the basis of such a table data readable forms for household parameters are assigned below:

\[
\text{TH}(hh) = \text{HHPAR("TH",hh)} ; \\
\text{MPSO}(hh) = \text{HHPAR("MPS",hh)} ;
\]

Values for Government transfer data are read from table EXPAR(HH,*). Remittances data are also read from this table.

\[
\text{GOVTRO}(HH) = \text{EXPAR(HH, "GOVTR")} \\
\text{REMIT}(HH) = \text{EXPAR(HH,"REMIT")};
\]

Similarly initial values for parameters based on SAM data base but related to input-output sectors are obtained from table PARM (*, I) which contains values of parameters by sectors. This is also a two dimensional table. Although the potential size of the table can range from 1 to N column, the size of table depends on parameter requirements and number of sectors classified in the SAM data base or in the model. Design of such a table is shown below:
Table PARM (*, l)

<table>
<thead>
<tr>
<th>Sectors</th>
<th>I(1)</th>
<th>..........</th>
<th>I(N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*( GLES)</td>
<td>xxxxxx</td>
<td>xxxxxx</td>
<td>xxxxxx</td>
</tr>
<tr>
<td>*( KSHR)</td>
<td>xxxxxx</td>
<td>xxxxxx</td>
<td>xxxxxx</td>
</tr>
<tr>
<td>*( DSTR)</td>
<td>xxxxxx</td>
<td>xxxxxx</td>
<td>xxxxxx</td>
</tr>
</tbody>
</table>

On the basis of above table data readable forms for parameters related to sectors are assigned below:

\[
DSTR(i) = \text{PARM("DSTR",i)} ;
\]
\[
\text{GLES}(i) = \text{PARM("GLES",i)} ;
\]
\[
\text{KSHR}(i) = \text{PARM("KSHR",i)} ;
\]

Normalization of Share Parameters to Correct for Round-off Error

*##* NORMALIZE SHARE PARAMETERS TO CORRECT FOR ROUNDOFF ERROR

* These parameters (CLES, B, KSHR, and GLES) can be read in as values and converted to shares here.

\[
\text{SUMHHSH(HH)} = \text{SUM(I, CLES(HH,I))} ;
\]
\[
\text{CLES(HH,I)} = \text{CLES(HH,I)}/\text{SUMHHSH(HH)} ;
\]
\[
\text{SUMIMSH(J)} = \text{SUM(I, B(I,J))} ;
\]
\[
\text{B(I,J)} = \text{B(I,J)}/\text{SUMIMSH(J)} ;
\]
\[
\text{SUMSH} = \text{SUM(I, KSHR(J))} ;
\]
\[
\text{KSHR(I)} = \text{KSHR(I)}/\text{SUMSH} ;
\]

Final set of parameter values required are estimates of elasticity values for different equations used to define the behaviour of economic agents in the model. The required number of elasticity values very much depend on the specification of agents behaviour by equation forms with associated elasticity other than one. Values of elasticity associated with various functional form are shown in Table 1. Now if only Cobb-Douglas functions are used to specify the behaviours of the agents then no additional information on elasticity values are needed. However, other than the C-D function, all other functions require additional information on elasticity values to calibrate parameters as well as to operationalize the equation. According to the model specification, additional elasticity values are needed for export demand function, import aggregation to Armington, Constant Elasticity Transformation function.

\[
\text{ETA(I)} = \text{ELASTICITY("eta",i)} ;
\]
\[
\text{RHOC(I)} = (1/\text{ELASTICITY("rhoc",i)}) - 1 ;
\]
\[
\text{RHOT(I)} = (1/\text{ELASTICITY("R HOT",i)}) + 1 ;
\]
SPECIFY PARAMETERS WHICH DEPEND ON DEFINED INDEX IM AND IE

Import duty rates are calculated here. Calculation of import duty rates (TM) uses the information of import duty and C.I.F. values of imports by sectors or activities. The amount of import duty by importable sectors (IM) are directly obtained from the table TAXR(“TM”, IM) and C.I.F. Values of imports have been estimated using the information of initial imports valued at market price (MO) and the amount of import duty directly obtained from the table TAXR(“TM”, IM). Note that payments of import duty by non-importable sectors are set equal to zero. This section also shows the use of defined index in the estimation of TM parameter. It also shows a method of generating export duties using the information contained in table TAXR.

\[
\begin{align*}
TM(IMN) &= 0.0; \\
TM(IM) &= \frac{TAXR(“TM”, IM)/(PMO(IM)*MO(IM)) - TAXR(“TM”, IM))}{(PMO(IM)*MO(IM))}; \\
TE(TEN) &= 0.0; \\
TE(IE) &= \frac{TAXR(“TE”, IE)/(POE(IE)*EO(IE)) - TAXR(“TE”, IE))}{(POE(IE)*EO(IE))};
\end{align*}
\]

**### COMPUTE FROM INITIAL DATA**

Initial values of variables and parameters can also be used to estimate the initial values of other variables. This section precisely shows estimation techniques that employ initial values to produce initial values of variables which are still unknowns. The initial values of domestic goods (DO) are calculated residually given the initial values of output (XO) and Exports (EO). Estimation of initial values for intermediate input (INTO) and value added price (PVO) use the structural equation forms. On the other hand, initial values of world price of exports (PWEO) and world price of imports (PWM0) adopt a backward calculation technique known as “calibration” using the available initial values of relevant variables.

\[
\begin{align*}
DO(I) &= XO(I) - EO(I); \\
INTO(I) &= \sum(J, A(I,J)*XO(J)); \\
PVO(I) &= PXO(I) - \sum(J, A(J,I)*PQO(J)) - TX(I); \\
PWEO(I) &= PEO(I)/((1 + TE(I))*EXRO); \\
PWM(I) &= PMO(I)/((1 + TM(I))*EXRO); \\
TMREAL(I) &= TM(I)*PWM(I)*EXRO; \\
TX(I) &= TAXR("TX", I)/(PXO(I)*XO(I));
\end{align*}
\]
CALIBRATION OF PARAMETERS FROM DATA

### FACTOR MARKET PARAMETERS

This section discusses estimation of factor market related variables and parameters. Information contained in tables FCTRE 1(I,F) and FCTRY (I,F) has been used to estimate the variables and parameters. Supply of factors (FSO) has been determined from employment matrix (FCTRE 1) while labour income (YFCTRO) and labour income by sectors (YFCTRO (1)) have been calculated using the information of wage matrix (FCTRY). Average wage by factors (WFO) has been calculated. Finally a parameter named "WFDISTO" is calculated to reflect the fact that same factors received different wages in different activities.

\[
\begin{align*}
FSO(f) & = \text{SUM}(i, \text{FCTRESI}(i,f)) \\
YFCTRO(f) & = \text{SUM}(i, \text{FCTRY}(i,f)) \\
YFSECTO(i) & = \text{SUM}(f, \text{FCTRY}(i,f)) \\
WFO(f) & = \frac{YFCTRO(f)}{FSO(f)} \\
WFDISTO(i,f)$FCTRES$1(i,f) & = \frac{\frac{\text{FCTRY}(i,f)}{\text{FCTRESI}(i,f)} / WFO(f)}{\text{WFDISTO}(i,f)(FCTRESI(i,f)EQ0)} = 0.0 ;
\end{align*}
\]

### CALIBRATION OF SHIFT AND SHARE PARAMETERS

This part shows calibration of share and shift parameters for import aggregation function, CET function and production function. Given the initial value of prices, relevant variables and exogenous elasticity values calibration method has been used to find the values of share and shift parameters from the structural equations. For instance, shares and shift parameters for imports aggregation function are derived from import demand function. Similarly, Cobb-Douglas production function is used to calculate share and shift parameters of the production function.

* FOR IMPORTS-DOMESTIC COMPOSITE (IMPORT AGGREGATION FUNCTION)

### get delta from costmin, xo from absorption, ac from armington

\[
\begin{align*}
\text{DELTA}(l) & = (\text{PMO}(l)/\text{PDO}(l)) \times (\text{M0}(l)/\text{DO}(l)) \times (1 + \text{RHOC}(l)) \; ; \\
\text{DELTA}(l) & = \text{DELTA}(l)/(1.0 + \text{DELTA}(l)) \; ; \\
\text{QO}(l) & = (\text{PDO}(l) \times \text{DO}(l) + (\text{PMO}(l) \times \text{M0}(l)) \times \text{im}(l))/\text{PQO}(l) \; ; \\
\text{RMD}(l) & = \text{M0}(l)/\text{DO}(l) \; ; \\
\text{AC}(l)$\text{im}(l) & = \text{QO}(l)/((\text{DELTA}(l) \times \text{M0}(l)) \times (1 - \text{DELTA}(l)) \times \text{DO}(l) \times (1 - \text{RHOC}(l)) + (1 - \text{DELTA}(l)) \times \text{DO}(l) \times (1 - \text{RHOC}(l)) \times (1 - \text{RHOC}(l)) \times (1 - \text{RHOC}(l)) ; \\
\text{AC}(l)$\text{im}(l) & = 1.0 \; ; \\
\text{Display } \text{DELTA}, \text{AC}, \text{RMD} ;
\end{align*}
\]
### FOR EXPORTS (CET FUNCTION)
### GET GAMMA FROM ESUPPLY

\[ \text{GAMMA}(\text{ie}) = \frac{1}{1 + \text{PDO}(\text{ie})/\text{PEO}(\text{ie})*(\text{E0}(\text{ie})/\text{DO}(\text{ie}))**(\text{RHO}(\text{ie})-1))} \]

### GET AT FROM CET
\[ \text{AT}(\text{ie}) = \frac{\text{X0}(\text{ie})}{(\text{GAMMA}(\text{ie})*\text{E0}(\text{ie})**\text{RHO}(\text{ie}) + (1-\text{GAMMA}(\text{ie}))*\text{DO}(\text{ie})**\text{RHO}(\text{ie}))*^{1/\text{RHO}(\text{ie})}} \]
Display GAMMA, AT;

### FOR FACTOR DEMAND (PRODUCTION FUNCTION)

### GET ALPHA FROM PROFIT MAX (ALPHA FOR EACH \text{i} SHOULD SUM TO 1 )
\[ \text{ALPHA}(\text{i},\text{f}) = \frac{\text{WFDIST}(\text{i},\text{f})*\text{WFO}(\text{f})*\text{FCTRES}(\text{i},\text{f})/\text{YFSECT}(\text{i})}{\text{YFSECT}(\text{i})} \]
DISPLAY ALPHA ;

### get AD from output and FDO from profitmax
\[ \text{QD}(\text{i}) = \text{PROD}(\text{f}, \text{FCTRES}(\text{i},\text{f})**\text{ALPHA}(\text{i},\text{f})) \]
\[ \text{AD}(\text{i}) = \frac{\text{X0}(\text{i})}{\text{QD}(\text{i})} \]
\[ \text{FDO}(\text{f}) = \text{SUM}(\text{i},(\text{X0}(\text{i})*\text{PVO}(\text{i})*\text{ALPHA}(\text{i},\text{f})/\text{WFDIST}(\text{i},\text{f})*\text{WFO}(\text{f}))*\text{WFDIST}(\text{i},\text{f})) \]
DISPLAY AD, QD, FDO ;

##### END OF CALIBRATION #####

##### VARIABLE DECLARATION#####

At this point the name of the variables are declared. They are declared in different blocks, namely price, production, factors, income and expenditure, and GDP calculations. This is an important part since the declared variables are used for initialisation, and equation implementation.

### PRICE BLOCK

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXR</td>
<td>EXCHANGE RATE</td>
<td>($ PER WORLD $)</td>
</tr>
<tr>
<td>PD(i)</td>
<td>DOMESTIC PRICES</td>
<td></td>
</tr>
<tr>
<td>PE(i)</td>
<td>DOMESTIC PRICE OF EXPORTS</td>
<td></td>
</tr>
<tr>
<td>PINDEX</td>
<td>GDP DEFlator</td>
<td></td>
</tr>
<tr>
<td>PK(i)</td>
<td>PRICE OF CAPITAL GOODS BY SECTOR OF DESTINATION</td>
<td></td>
</tr>
<tr>
<td>PM(i)</td>
<td>DOMESTIC PRICE OF IMPORTS</td>
<td></td>
</tr>
<tr>
<td>PQ(i)</td>
<td>PRICE OF COMPOSITE GOODS</td>
<td></td>
</tr>
<tr>
<td>PV(i)</td>
<td>VALUE ADDED PRICE</td>
<td></td>
</tr>
<tr>
<td>PWE(i)</td>
<td>WORLD PRICE OF EXPORTS</td>
<td></td>
</tr>
<tr>
<td>PX(i)</td>
<td>AVERAGE OUTPUT PRICE</td>
<td></td>
</tr>
</tbody>
</table>
### PRODUCTION BLOCK

<table>
<thead>
<tr>
<th>D(i)</th>
<th>DOMESTIC SALES</th>
<th>(88-89 BILL TAKA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E(i)</td>
<td>EXPORTS</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>M(i)</td>
<td>IMPORTS</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>Q(i)</td>
<td>COMPOSITE GOODS SUPPLY</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>X(i)</td>
<td>DOMESTIC OUTPUT</td>
<td>(88-89 BILL TAKA)</td>
</tr>
</tbody>
</table>

### FACTOR BLOCK

<table>
<thead>
<tr>
<th>FDSC(i,f)</th>
<th>FACTOR DEMAND BY SECTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS(f)</td>
<td>FACTOR SUPPLY</td>
</tr>
<tr>
<td>WF(f)</td>
<td>AVERAGE FACTOR PRICE</td>
</tr>
<tr>
<td>WFDIST(i,f)</td>
<td>FACTOR PRICE SECTORAL PROPORTIONALITY RATIOS</td>
</tr>
<tr>
<td>YFCTR(f)</td>
<td>FACTOR INCOME</td>
</tr>
</tbody>
</table>

### INCOME AND EXPENDITURE BLOCK

<table>
<thead>
<tr>
<th>CD(i)</th>
<th>FINAL DEMAND FOR PRIVATE CONSUMPTION</th>
<th>(88-89 BILL TAKA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DK(i)</td>
<td>VOLUME OF INVESTMENT BY SECTOR OF DESTINATION</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>DST(I)</td>
<td>INVENTORY INVESTMENT BY SECTOR</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>FSAV</td>
<td>NET FOREIGN SAVINGS</td>
<td>(BILL WORLD $)</td>
</tr>
<tr>
<td>FXDVNV</td>
<td>FIXED CAPITAL INVESTMENT</td>
<td>(BILL TAKA)</td>
</tr>
<tr>
<td>GD(i)</td>
<td>FINAL DEMAND FOR GOVERNMENT CONSUMPTION</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>GDTOT</td>
<td>TOTAL VOLUME OF GOVERNMENT CONSUMPTION</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>GOVSAV</td>
<td>GOVERNMENT SAVINGS</td>
<td>(BILL TAKA)</td>
</tr>
<tr>
<td>GR</td>
<td>GOVERNMENT REVENUE</td>
<td>(BILL TAKA)</td>
</tr>
<tr>
<td>CORY</td>
<td>CORPORATION INCOME FROM CAPITAL</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>GOVY</td>
<td>GOVERNMENT INCOME FROM CAPITAL</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>REMIT(HH)</td>
<td>REMITTANCE INCOME FROM ABROAD</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>TREMIT</td>
<td>TOTAL REMITTANCE IN FOREIGN CURRENCY</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>DIVID(HH)</td>
<td>DIVIDEND BY HOUSEHOLDS GROUPS</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>GOVTR(HH)</td>
<td>GOVERNMENT TRANSFER BY HOUSEHOLDS GROUPS</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>HHTRR(HH)</td>
<td>RECEIPTS OF HOUSEHOLDS TRANSFER BY HOUSEHOLDS</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>HHTRP(HH)</td>
<td>PAYMENTS OF TRANSFER BY HOUSEHOLDS</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>HHSAV</td>
<td>TOTAL HOUSEHOLD SAVINGS</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>CORSAV</td>
<td>SAVINGS BY CORPORATION</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>CORTAX</td>
<td>INCME TAX BY CORPORATION</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>ID(i)</td>
<td>FINAL DEMAND FOR PRODUCTIVE INVESTMENT</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>INDTAX</td>
<td>INDIRECT TAX REVENUE</td>
<td>(BILL TAKA)</td>
</tr>
<tr>
<td>INT(i)</td>
<td>INTERMEDIATES USES</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>INVEST</td>
<td>TOTAL INVESTMENT</td>
<td>(BILL TAKA)</td>
</tr>
<tr>
<td>STOCK</td>
<td>CHANGE IN STOCK</td>
<td></td>
</tr>
<tr>
<td>WALRAS1</td>
<td>SLACK VARIABLE FOR SAVINGS INVESTMENT EQUATION</td>
<td></td>
</tr>
<tr>
<td>MPS(hh)</td>
<td>MARGINAL PROPENSITY TO SAVE BY HOUSEHOLD TYPE</td>
<td></td>
</tr>
<tr>
<td>SAVING</td>
<td>TOTAL SAVINGS</td>
<td>(BILL TAKA)</td>
</tr>
<tr>
<td>TARIFF</td>
<td>TARIFF REVENUE</td>
<td>(BILL TAKA)</td>
</tr>
<tr>
<td>HHTAX</td>
<td>USEHOLD TAX REVENUE</td>
<td>(BILL TAKA)</td>
</tr>
<tr>
<td>YHF(HH)</td>
<td>USEHOLDS INCOME FROM FACTOR</td>
<td></td>
</tr>
<tr>
<td>YH(hh)</td>
<td>USEHOLD INCOME</td>
<td>(BILL TAKA)</td>
</tr>
</tbody>
</table>
### GDP CALCULATIONS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGDP</td>
<td>REAL GDP</td>
<td>(88-89 BILL TAKA)</td>
</tr>
<tr>
<td>GDPVA</td>
<td>VALUE ADDED IN MARKET PRICES GDP</td>
<td>(BILL TAKA)</td>
</tr>
<tr>
<td>OMEGA</td>
<td>OBJECTIVE FUNCTION VARIABLE</td>
<td></td>
</tr>
</tbody>
</table>

#### VARIABLE INITIALIZATION

At this stage, all the variables are initialized. Through the initialization process, values of the variables are allowed to adjust to produce a new equilibrium in the event of a simulation. We have mentioned earlier that when numerical values of variables are assigned with a zero extension, the values of the variable are set fixed. By the initialization method, the same variables are allowed to vary in the event of a simulation. According to GAMS syntax format, a variable is initialised with an L extension. Since values of parameters remain fixed across simulations (or different equilibriums) they are not initialised and only variables are initialised. Different techniques may be adopted to initialise different sets of variables. Some of these are: Use of initial values to initialise some variables; use of computed values to initialise other variables.

#### USE INITIAL VALUES OF VARIABLES (FROM PARAMETER SPECIFICATION)

This part shows the use of initial values method to initialise some variables. By recalling the initial value (from earlier parts) a variable can easily be initialised.

```plaintext
EXR.L = EXRO;
FSAV.L = FSAVO;
GDTOT.L = GDTOTO;
INVEST.L = INVESTO;
PINDEX.L = PINDEXO;
MPS.L(hh) = MPSO(hh);
E.L(i) = EO(i);
M.L(i) = MO(i);
PD.L(i) = PDO(i);
PE.L(i) = PEO(i);
PM.L(i) = PMO(i);
PQ.L(i) = PQO(i);
PX.L(i) = PXO(i);
X.L(i) = XO(i);
FDSC.L(i,f) = FCTRES1(i,f);
YFCTR.L(f) = SUM(i, FCTRY(i,f));
```
### COMPUTE INITIAL VALUES FOR OTHER VARIABLES

This part depicts the use of computed values to initialise other variables. It is relevant to note at this point that other methods (e.g. the use of initial value) may also be used instead of the present method to initialize the variables. From an operational point, the use of one method or another would not make a difference. Thus, it is up to the modeler to choose a specific method out of different available techniques.

### OUTPUT AND PRICE

Second method (computation of values) has also been used to initialise output related variables and price.

\[
\begin{align*}
D.L(i) &= X.L(i) - E.L(i) \\
Q.L(i) &= (PD.L(i) \times D.L(i) + (PM.L(i) \times M.L(i)) \times EM(i))/PQ.L(i) \\
PK.L(i) &= \text{SUM}(j, PQ.L(j) \times B(j,i)) \\
PWE.L(i) &= PE.L(i)/(1.0 + TE(i)) \times EXR.L \\
PWSE(i) &= PWEO(i) \\
PV.L(i) &= PX.L(i) - \text{SUM}(j, A(j,i) \times PQ.L(j)) - TX(i) \\
\end{align*}
\]

### VALUE ADDED AND THE FLOW OF FACTOR INCOME

This part shows initialisation of value added, factor income, income of institutions using the second method.

\[
\begin{align*}
FS.L(f) &= \text{SUM}(i, FDSC.L(i,f)) \\
WF.L(f) &= YFCTR.L(f)/FS.L(f) \\
WFDIST.L(i,f) &= WFDISTO(i,f) \\
TARIFF.L &= \text{SUM}(im, PWM(im) \times M.L(im) \times TM(im)) \times EXR.L \\
INDTAX.L &= \text{SUM}(i, TX(i) \times X.L(i)) \\
YHF.L(HH) &= \text{SUM}(F, (INSHS(HH,F) \times YFCTR.L(f))) \\
REMIT.L(HH) &= RSHR(HH) \times YHF.L(HH) \\
TREMIT.L &= \text{SUM}(HH, REMIT.L(HH))/EXR.L \\
GOVTR.L(HH) &= \text{GOVTRO}(HH) \\
YH.L(HH) &= YHF.L(HH) + REMIT.L(HH) + GOVTR.L(HH) \\
HHTAX.L &= \text{SUM}(hh, TH(hh) \times YH.L(hh)) \\
HHSAV.L &= \text{SUM}(hh, MPS.L(hh) \times YH.L(hh)) \\
GOVY.L &= \text{SUM}(F, INIS("GD",F) \times YFCTR(L(f))) \\
CORY.L &= \text{SUM}(F, INIS("COR",F) \times YFCTR.L(f)) \\
CORTAX.L &= CTAXR \times CORY.L \\
CORSAV.L &= CORY.L - CORTAX.L \\
\end{align*}
\]
**FINAL DEMAND**

Values of final demand and saving have also been initialised using the second method.

\[
\begin{align*}
\text{INT.L}(i) &= \text{SUM}(j, A(i,j) \times \text{X.L}(j)); \\
\text{GD.L}(i) &= \text{GLES}(i) \times \text{GDTOT.L}; \\
\text{DST.L}(i) &= \text{DSTR}(i) \times \text{X.L}(i); \\
\text{TOTDST.L} &= \text{SUM}(i, \text{DST.L}(i)); \\
\text{FXDINV.L} &= \text{INVEST.L} - \text{SUM}(i, \text{DST.L}(i) \times \text{PQ.L}(i)); \\
\text{DK.L}(i) &= (\text{KSHR}(i) \times \text{FXDINV.L}) / \text{PK.L}(i); \\
\text{ID.L}(i) &= \text{SUM}(j, B(i,j) \times \text{DK.L}(j)); \\
\text{GRL} &= \text{TARIFF.L} + \text{INDTAX.L} + \text{HHTAXL} + \text{GOVY.L} + \text{CORTAX.L} - \text{SUM}([H], \text{GOVTR.L}([H])); \\
\text{GOVSAV.L} &= \text{GR.L} - \text{SUM}(i, \text{PQ.L}(i) \times \text{GD.L}(i)); \\
\text{SAVING.L} &= \text{HHSAV.L} + \text{GOVSAV.L} + \text{FSAV.L} \times \text{EXR.L} + \text{CORSAV.L}; \\
\text{CD.L}(i) &= \text{SUM}([h], \text{CLES}([h]) \times ((1.0 - \text{MP.I}([h]) - \text{TH}([H])) \times \text{YHL.L}([h])) / \text{PQ.L}(i); \\
\text{TOTCD.L} &= \text{SUM}(i, \text{CD.L}(i));
\end{align*}
\]

*GROSS DOMESTIC PRODUCT ESTIMATION*

Finally, the initialisation of Gross Domestic Product estimate using the production approach (GDPVA) and Gross Domestic Product adopting the expenditure approach (RGDP) are shown here using the second method. These estimates are employed to initialize the price index variable. In the CGE model, the objective function and hence the variables for that function are super flows. That is they are essential for model solution. Thus, the variable for objective function (in this case OMEGA) is seldom specified by a numerical value suggesting the value of the variable would remain the same in different equilibria.

\[
\begin{align*}
\text{GDPVA.L} &= \text{SUM}(i, \text{PV.L}(i) \times \text{X.L}(i)) + \text{INDTAX.L} + \text{TARIFF.L}; \\
\text{RGDP.L} &= \text{SUM}(i, \text{CD.L}(i) + \text{DST.L}(i) + \text{ID.L}(i) + \text{GD.L}(i)) + \text{SUM}(t, \text{E.L}(t)) \times \text{SUM}(m, (1.0 - \text{TMREAL.L}([m]) \times \text{ML.L}([m])); \\
\text{PINDEX.L} &= \text{GDPVA.L} / \text{RGDP.L}; \\
\text{OMEGA.L} &= 1;
\end{align*}
\]

*END VARIABLE SPECIFICATION*

*TO CHECK FOR DATA CONSISTENCY, DISPLAY INITIAL SAM*
*SAM FOR BANGLA MODEL

*社ocial Accounting Matrix

This part shows the specification of equations to derive the values of the base year. This part is important to check the consistency of the data set that are derived from the values of parameters, and initialized values of the variables. This is an integral part of model implementation. However, a model can always be implemented without specifying the SAM replication components.

```plaintext
SAM("COMMDTY","ACTIVITY") = SUM(i,(PQ.L(i)*INT.L(i)));
SAM("COMMDTY","HOUSEHOLDS") = SUM(i,(PQ.L(i)*CD.L(i)));
SAM("COMMDTY","KACCOUNT") = SUM(i,(PQ.L(i)*(DST.L(i)+ID.L(i))));
SAM("COMMDTY","GOVT") = SUM(i,(PQ.L(i)*GD.L(i)));
SAM("COMMDTY","WORLD") = SUM(i,(EXR.L*PWE.L(i))*E.L(i));
SAM("ACTIVITY","COMMDTY") = SUM(i,(PX.L(i)*XI.L(i)));
SAM("VALUAD","ACTIVITY") = SUM(f,YFCTR.L(f));
SAM("CORP","VALUAD") = CORY.L;
SAM("HOUSEHOLDS","VALUAD") = SUM(hh,YHF.L(hh));
SAM("HOUSEHOLDS","GOVT") = SUM(hh,GOVTR.L(hh));
SAM("HOUSEHOLDS","WORLD") = SUM(hh,REMIT.L(hh));
SAM("KACCOUNT","CORP") = CORSAV.L;
SAM("KACCOUNT","HOUSEHOLDS") = HHSAV.L;
SAM("KACCOUNT","GOVT") = GOVSAV.L;
SAM("KACCOUNT","WORLD") = FSAV.L*EXR.L;
SAM("GOVT","ACTIVITY") = INDTAX.L;
SAM("GOVT","VALUAD") = GOVY.L;
SAM("GOVT","CORP") = CORTAX.L;
SAM("GOVT","HOUSEHOLDS") = HHTAX.L;
SAM("WORLD","COMMDTY") = SUM(i,((PWM(i)*EXR.L)*M.L(i)));
SAM("TOTAL","COMMDTY") = SUM(isam2,SAM(isam2,"COMMDTY"));
SAM("TOTAL","ACTIVITY") = SUM(isam2,SAM(isam2,"ACTIVITY"));
SAM("TOTAL","VALUAD") = SUM(isam2,SAM(isam2,"VALUAD"));
SAM("TOTAL","CORP") = SUM(isam2,SAM(isam2,\"CORP\"));
SAM("TOTAL","HOUSEHOLDS") = SUM(isam2,SAM(isam2,"HOUSEHOLDS"));
SAM("TOTAL","KACCOUNT") = SUM(isam2,SAM(isam2,"KACCOUNT"));
SAM("TOTAL","GOVT") = SUM(isam2,SAM(isam2,"GOVT"));
SAM("TOTAL","WORLD") = SUM(isam2,SAM(isam2,"WORLD"));
SAM(isam3,\"TOTAL\") = SUM(isam2,SAM(isam3,isam2));
```

Option Decimals = 2;
DISPLAY SAM;
OPTION DECIMALS = 3;

Option decimal indicate how many character after decimal would be displayed. Options Decimals = 3" envisaged that it would display three numbers after decimal point.
At this point the name of the variables are declared. They are declared in different blocks, namely price, production, factors, income and expenditure, and GDP calculations. The behavioural equations are re-specified here according to the GAMS format. All equation specification has two parts, a left hand side (LHS) and a right hand side (RHS). An equal (e) sign is placed between the two sides to suggest that LHS and RHS are equal. The LHS contains the initialized values of the variable and the RHS derives the same values using a causal relation between calibrated parameters, values of elasticity, and initialized data. All these are simultaneously solved to produce an optimal equilibrium solution.

### PRICE BLOCK
- **PMDEF(i)**: Definition of Domestic Import Prices
- **PEDEF(i)**: Definition of Domestic Export Prices
- **ABSORPTION(i)**: Value of Domestic Sales
- **SALES(i)**: Value of Domestic Output
- **ACTP(i)**: Definition of Activity Prices
- **PKDEF(i)**: Definition of Capital Goods Price
- **PINDEXDEF**: Definition of General Price Level

### PRODUCTION BLOCK
- **ACTIVITY(i)**: Production Function
- **PROFITMAX(i,f)**: First Order Conditions for Profit Maximum
- **INTEQ(i)**: Total Intermediate Uses
- **CET(i)**: CET Function
- **CET2(i)**: Domestic Sales for Nontraded Sectors
- **ESUPPLY(i)**: Export Supply
- **EDemand(i)**: Export Demand Functions
- **ARMINGTON(i)**: Composite Good Aggregation Function
- **ARMINGTON2(i)**: Composite Good Agg. For Nontraded Sectors
- **COSTMIN(i)**: F.O.C. for Cost Minimization of Composite Good

### INCOME BLOCK
- **YFDEF(f)**: Factor Income
- **YHFDEF**: Households Income from Factor
- **YHTDEF**: Total Households Income
- **RMDEF(HH)**: Remittance Income Determination
- **TRMDEF**: Total Remittance Determination
- **CORYDEF**: Corporation Income
- **GOVYDEF**: Government Income Form Capital
- **TARIFFDEF**: Tariff Revenue
- **INDTAXDEF**: Indirect Taxes on Domestic Production
- **CORTAXDEF**: Corporation Tax
- **HHTAXDEF**: Total Household Taxes Collected by Govt.
- **HHSAVEQ**: Household Savings
- **CORSAVDEF**: Corporation Savings
- **GREQ**: Government Revenue
TOTSAV  TOTAL SAVINGS

*### EXPENDITURE BLOCK*
CDEQ(i)  PRIVATE CONSUMPTION BEHAVIOR
GDEQ(i)  GOVT CONSUMPTION OF COMMODITIES
GRUSE  GOVERNMENT SAVINGS
DSTEQ(i)  INVENTORY INVESTMENT
FIXEDINV  FIXED INVESTMENT NET OF INVENTORY
PRODINV(i)  INVESTMENT BY SECTOR OF DESTINATION
IEQ(i)  INVESTMENT BY SECTOR OF ORIGIN

*### MARKET CLEARING*
EQUIL(i)  GOODS MARKET EQUILIBRIUM
FMEQUIL(f)  FACTOR MARKET EQUILIBRIUM
CAEQ  CURRENT ACCOUNT BALANCE (BILL DOLLARS)
WALRAS  SAVINGS INVESTMENT EQUILIBRIUM

*### GROSS NATIONAL PRODUCT*
GDPY  TOTAL VALUE ADDED INCLUDING INDTAX
GDPR  REAL GDP
OBJ  OBJECTIVE FUNCTION ;

*~~~~~~~~~~~~~~~~~~~~~~~~~~~~ EQUATION ASSIGNMENT ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~*

*### PRICE BLOCK*

PMDEF(im)..  PM(im)  =E= PWM(im)*EXR*(1 + TM(im)) ;
PEDEF(ie)..  PE(ie)  =E= PWE(ie)*EXR*(1 + TE(ie)) ;
ABSORPTION(i)..  PQ(i)*Q(i)  =E= PD(i)*D(i) + (PM(i)*M(i))$im(i) ;
SALES(i)..  PX(i)*X(i)  =E= PD(i)*D(i) + (PE(i)*E(i))$ie(i) ;
ACTP(i)..  PV(i)  =E= PX(i)*(1.0 - TX(i)) - SUM(j,a(j,i)*PQ(j)) ;
PKDEF(i)..  PK(i)  =E= SUM(J, PQ(j)*b(i,j)) ;
PINDEXDEF..  PINDEX  =E= GDPVA/RGDP ;

*~~~~~~~~~~~~~~~~~~~~~~~~~~~~ PRODUCTION BLOCK ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~*

ACTIVITY(i)..  X(i)  =E= AD(i)*PROD(f$ALPHA(i,f), FDSC(i,f)**ALPHA(i,f));
PROFITMAX(i,f)$WFDISTO(i,f)..  WF(f)*WFDIST(i,f)*FDSC(i,f) =E= X(i)*PV(i)*ALPHA(i,f) ;
INTEQ(i)..  INT(i)  =E= SUM(J, A(i,j)*X(j)) ;
CET(ie)..  X(ie)  =E= AT(ie)*(GAMMA(ie)*E(ie)**RHOST(ie) + (1-GAMMA(ie))*D(ie)**RHOST(ie))**(1/RHOST(ie)) ;
CET2(len)..  X(len)  =E= D(len) ;
ESUPPLY(ie) = E = D(ie)*((PE(ie)/PD(ie))*((1 - GAMMA(ie)) /GAMMA(ie)))**(1/(RHOT(ie)-1));

EDEMAND(ied)*ETA(IED) = E = ECON(ied)*((PWE(ied)/PWSE(ied))**(-ETA(ied)));

ARMINGTON(im) = E = AC(im)*(DELTA(im)*M(im)**(-RHOC(im)) + (1 - DELTA(im))*D(im)**(-RHOC(im)))*((1/1 + RHOC(im)));

ARMINGTON2(imn) = E = D(imn);

COSTMIN(im) = E = ((PD(im)/PM(im))*DELTA(im)/(1 - DELTA(im)))**(1/(1 + RHOC(im)));

*#################################################INCOME BLOCK#################################################

YFDEF(f) = E = SUM(i, WF(f)*WFDIST(i,f)*FDSC(i,f));

YHFDEF(HH) = E = SUM(F, (INSHS(HH,F)*YFCTR(F)))

RMDEF(HH) = E = RSHR(HH)*YHF(HH);

TRMDEF = E = SUM(HH, REMIT(HH))/EXR;

YHTDEF(HH) = E = YHF(HH) + REMIT(HH) + GOVTR(HH);

CORYDEF = E = SUM(F, INIS("COR",F)*YFCTR(f));

GOVYDEF = E = SUM(F, INIS("GD",F)*YFCTR(f));

TARIFFDEF = E = SUM(im, TM(im)*M(im)*PWM(im))*EXR;

INDTAXDEF = E = SUM(i, TX(i)*PX(i)*X(i))

HHTAXDEF = E = SUM(hh, TH(hh)*YH(hh));

CORTAXDEF = E = CTAXR*CORY;

CORSAVDEF = E = CORY - CORTAX;

HHSAVEQ = E = SUM(hh, MPS(hh)*YH(hh));

GREQ = E = TARIFF + INDTAX + HHTAX + GOVY + CORTAX - SUM(HH, GOVTR(HH));

TOTSAV = E = HHSAV + GOVSAV + CORSAV + FSAV*EXR;

*################################################# EXPENDITURE BLOCK#################################################

CDEQ(i) = E = SUM(hh, CLES(hh,i)*(1.0 - MPS(hh)-TH(HH))*YH(hh));

GDEQ(i) = E = (GLES(i)*GDTOT)/PQ(I);
GRUSE..            GOVSAV =E= GR * SUM(i, PQ(i) * GD(i));
DSTEQ(i)..<..      DST(i) =E= DSTR(i) * X(i);
FIXEDINV..<..      FXDINV =E= INVEST - SUM(i, DST(i) * PQ(i));
PRODINV(i)..<..    PK(i) * DK(i) =E= KSHR(i) * fxdinv;
IEQ(i)..<..        ID(i) =E= SUM(j, B(i,j) * DK(j));

*+++++++++++++++++++++++ MARKET CLEARING ++++++++++++++++++++++++
EQUIL(i)..<..      Q(i) =E= INT(i) + CD(i) + GD(i) + ID(i) + DST(i);
FMEQUIL(f)..<..     SUM(i, FDSC(i,f)) =E= FS(f);
CAEQ..<..          SUM(im, PWM(im) * M(im)) =E= SUM(ie, PWE(ie) * E(ie)) + FSAV + TREMIT;
WALRAS..<..        SAVING =E= INVEST + WALRAS1;

*+++++++++++++++++++++ GROSS NATIONAL PRODUCT ++++++++++++++++++++++
GDPY..<..          GDPVA =E= SUM(i, PV(i) * X(i)) + INDTAX + TARIFF;
GDPR..<..          RGDP =E= SUM(i, CD(i) + DST(i) + ID(i) + GD(i)) + SUM(ie,E(ie)) * SUM(im, (1.0 - TMREAL(im)) * M(im));
OBJ..<..           OMEGA =E= 1;

*++++ ADDITIONAL RESTRICTIONS CORRESPONDING TO EQUATIONS++++
*# PMDEF, PEDEF, EDEMAND, ESUPPLY, COSTMIN, AND PROFITMAX####
*## FOR NON-TRADED SECTORS AND SECTORS WITH FIXED WORLD EXPORT PRICES####

PM.FX(IMN) = PMO(IMN);
PE.FX(IEN) = PE0(IEN);
PWE.FX(IEDN) = PWE.L(IEDN);
E.FX(IEN) = 0;
M.FX(IMN) = 0;
FDSC.FX(I,F)$(WFDISTO(I,F) EQ 0) = 0;
GOVTR.FX(HH) = GOVTR.L(HH);

*### VARIABLE BOUNDS

In the GAMS framework, it is customary to set bounds for the endogenous variables. The setting of bounds for the endogenous variables helps to improve the algorithm performance. They are, however, not necessary for the specification of the model. Even though it is not essential, it is always helpful to set a bound for the endogenous variables. Values of variable bounds must lie between 0.0 to 1.0. That is, the lower value for variable bound is 0.0 and the upper value for variable bound is 1.0. It is
observed that the initial values for most of the prices are equal to 1.0. Therefore, on that account the upper values for variable bound can never exceed 1.0. If any one set of values of prices is equal to 1.0 and the variable bounds are set at more than 1.0, the algorithm would collapse. In the present case, the values of variable bounds are set equal to 0.0.

\[
PQ.LO(I) = 0.0; \quad PD.LO(I) = 0.0; \quad PM.LO(IM) = 0.0; \quad PK.LO(I) = 0.0;
PX.LO(I) = 0.0; \quad Q.LO(I) = 0.0; \quad X.LO(I) = 0.0; \quad M.LO(IM) = 0.0;
D.LO(I) = 0.0; \quad WF.LO(F) = 0.0; \quad INT.LO(I) = 0.0; \quad E.LO(IE) = 0.0;
FDSC.LO(I,F) \cdot (FDSC.L(I,F) \neq 0) = 0.0; \quad PV.LO(I) = 0.0; \quad PE.LO(I) = 0.0;
\]

*#MODEL CLOSURE#

Finally an important part of the model specification is the model closure. It involves choice of a numeraire, closure of the foreign exchange market, savings-investment closure, government sector, and factor market closure. At this point it is important to note that different variant of model closure can be adopted and adoption of a different types model closure may have different implications on model outcomes in the event of a simulation. For detailed analysis of closure see “MAP Technical Paper, No:3”.

**## NUMERAIRE PRICE INDEX**

In general equilibrium model only relative prices are determined. Then it is necessary to set a price as the numeraire to which all relative prices are determined. In this case, the GDP deflator or price index is the numeraire. Other choice for numeriare are the nominal exchange rate or any other price.

* \( \text{PINDEX.FX} = \text{PINDEX.L} \);

**## FOREIGN EXCHANGE MARKET CLOSURE**

In this case, both nominal exchange rate (EXR) and foreign savings (FSAV) are fixed. Price index serves as the equilibrating variable. Price index adjusts to clear the foreign exchange market. When exchange rate is the numeraire, foreign saving is allowed to adjust to clear the foreign exchange market.
* In this model, the balance of trade (current account balance) and the exchange rate are fixed exogenously;
* PINDEX is the equilibrating variable.

\[
\begin{align*}
\text{EXR.FX} & = \text{EXR.L} ; \\
\text{FSAV.FX} & = \text{FSAV.L} ; \\
\end{align*}
\]

*## INVESTMENT-SAVINGS CLOSURE*

This version specifies neoclassical closure. Aggregate investment is determined by aggregate savings. Thus the model is savings driven.

\[
\begin{align*}
\text{MPS.FX(hh)} & = \text{MPS.L(hh)} ; \\
* \text{INVEST.FX} & = \text{INVEST.L} ; \\
\end{align*}
\]

*## EXOGENOUS GOVT EXPENDITURE*
*## AND GOVT CLOSURE RULE*

Real government spending (GDTOT) is fixed exogenously. The government deficit (GOVSAV) is determined residually. In this specification, the equilibrating variable is government savings.

\[
\begin{align*}
\text{GDTOT.FX} & = \text{GDTOT.L} ; \\
* \text{GOVSAV.FX} & = \text{GOVSAV.L} ; \\
\end{align*}
\]

*## FACTOR MARKET CLOSURE*

In line with neoclassical closure, supply of factor is fixed for each type. That is total demand for labour will be equal to total supply of labour. Factors (except the capital which is sector specific) are mobile between activities. In the case of labour factors with fixed supply (FS), sectoral mobility and fixed sectoral wage differential parameters (WDIST), average wage rate are the equilibrating variables. Average wage rate (WF) adjusts to clear the labour market. While, the sector specific capital factor, sectoral rental rates adjust to clear the capital market.
FS.FX("ADM") = FS.L("ADM");  
WFDIST.FX(i,"ADM") = WFDIST.L(i,"ADM");  
* WF.FX("ADM") = WF.L("ADM");  
* FS.LO("ADM") = -inf;  
* FS.UP("ADM") = +inf;  
FS.FX("SERV") = FS.L("SERV");  
WFDIST.FX(i,"SERV") = WFDIST.L(i,"SERV");  
* WF.FX("SERV") = WF.L("SERV");  
* FS.LO("SERV") = -inf;  
* FS.UP("SERV") = +inf;  
FS.FX("AGR-HL") = FS.L("AGR-HL");  
WFDIST.FX(i,"AGR-HL") = WFDIST.L(i,"AGR-HL");  
* WF.FX("AGR-HL") = WF.L("AGR-HL");  
* FS.LO("AGR-HL") = -inf;  
* FS.UP("AGR-HL") = +inf;  
FS.FX("AGR-FLSF") = FS.L("AGR-FLSF");  
WFDIST.FX(i,"AGR-FLSF") = WFDIST.L(i,"AGR-FLSF");  
* WF.FX("AGR-FLSF") = WF.L("AGR-FLSF");  
* FS.LO("AGR-FLSF") = -inf;  
* FS.UP("AGR-FLSF") = +inf;  
FS.FX("PRTR-SK") = FS.L("PRTR-SK");  
WFDIST.FX(i,"PRTR-SK") = WFDIST.L(i,"PRTR-SK");  
* WF.FX("PRTR-SK") = WF.L("PRTR-SK");  
* FS.LO("PRTR-SK") = -inf;  
* FS.UP("PRTR-SK") = +inf;  
FS.FX("PRTR-SS") = FS.L("PRTR-SS");  
WFDIST.FX(i,"PRTR-SS") = WFDIST.L(i,"PRTR-SS");  
* WF.FX("PRTR-SS") = WF.L("PRTR-SS");  
* FS.LO("PRTR-SS") = -inf;  
* FS.UP("PRTR-SS") = +inf;  
FS.FX("PRTR-US") = FS.L("PRTR-US");  
WFDIST.FX(i,"PRTR-US") = WFDIST.L(i,"PRTR-US");  
* WF.FX("PRTR-US") = WF.L("PRTR-US");  
* FS.LO("PRTR-US") = -inf;  
* FS.UP("PRTR-US") = +inf;  
* FS.FX("capital") = FS.L("capital");  
* WFDIST.FX(i,"capital") = WFDIST.L(i,"capital");  
FDSC.FX(i,"capital") = FDSC.L(i,"capital");  
WF.FX("CAPITAL") = WF.L("CAPITAL");  
FS.LO("capital") = -inf;  
FS.UP("capital") = +inf;  

*########################################################## END OF MODEL ###################################################
Now the model is ready to run. To run the model, the user must type the following instruction "SOLVE BANGLA MAXIMIZING OMEGA USING NLP". This will solve the model (BANGLA.GMS) maximizing the objective function (OMEGA) using the non linear solver (NLP). On the other hand, following instructions are related to the space, length and structure of the output file.

OPTIONS DECIMALS=2, ITERLIM=1000,LIMROW=0,LIMCOL=0,SOLPRINT=OFF;

MODEL BANGLA /ALL/;
BANGLA.optfile = 1;
BANGLA.holdfixed = 1;
SOLVE BANGLA MAXIMIZING OMEGA USING NLP;

4. An Example of Running the Model using GAMS Software.

Running the Model

First from C prompt go to the GAMS directory:

C:

Type CD\GAMS on C prompt and press enter.

Then you would be at C:\GAMS>

To run the model, type GAMS BANGLA.GMS at C:\GAMS prompt and press enter.

That is, you type the name of the file containing the model in the GAMS prompt. Then the BANGLA.GMS model would start running. The model (BANGLA.GMS) would run in three steps. In the third or final run, it would generate an optimal solution (obviously in the case of a successful model).
Running Simulations

The model can be used to do simulation exercises. In order to do a simulation, one needs to go to the model specification to specify the simulation exercise. Following steps show how to do a simulation exercise:

C:\GAMS\KEDIT BANGLA.GMS

This will open the BANGLA.GMS model. Then go to the end of the declaration 
[SOLVE BANGLA MAXIMIZING OMEGA USING NLP (NLP denotes Non-linear programme)]. This declaration actually directs the software to run the model to obtain an optimal solution for the model BANGLA.GMS.

Then define the simulation experiment. Always use * symbol to define texts. Otherwise syntax error would occur at each line of the text. Here, the aim is to find out the consequences of an inflow of foreign capital of about 450 million US dollars. The variable that is directly effected by this experiment is FSAV (or foreign savings). The experiment is implemented by augmenting the amount of FSAV by 0.45 billion US Dollar. After specifying the simulation experiment, write "SOLVE BANGLA.GMS MAXIMIZING OMEGA USING NLP". In line GAMS format the simulation experiment is specified in the following form:

*######################################## COMPARATIVE STATICS EXPERIMENT########################################

* DUTCH DISEASE EXPERIMENT: ADDITIONAL $0.45 BILLION INFLOW
* LEAVE FSAV FIXED, AND INCREASE IT BY 0.45; THEN RESOLVE

FSAV.FX = FSAV.L + .45;
SOLVE BANGLA MAXIMIZING OMEGA USING NLP;

It means that we have again asked the software to solve the model with changes in FSAV variables. The model will be run to generate the base solution and then the simulated solution. Write the following to get base solution and simulated solution.

C:\GAMS> GAMS BANGLA.GMS

Then the BANGLA.GMS model would start running. The model (BANGLA.GMS)
would run in four steps. In the third run, it would generate an optimal solution. In the fourth or final run, it would generate an optimal solution for the simulation experiment.

Some examples of simulation possibilities under the present model:

- **Trade Reform and Tariff Liberalization**
  
  Reduction in Tariff Rates Simulation \( \Rightarrow 50\% \).
  
  \[ TM \text{(IM)} = TM\text{.L (IM)}* 0.50; \]

- **Uniform Tariff Rates Simulation**
  
  \[ TM\text{(IM)} = 0.30; \]
  
  Solve Bangla Maximizing OMEGA Using NLP;

- **Domestic Production tax**
  
  A 10\% increase in Domestic Tax
  
  \[ TD(1) = TD(1)\times 1.10; \]
  
  A 20\% Uniform Domestic Production Tax
  
  \[ TD(1) = 0.20; \]

- **Exchange Rate**
  
  Appreciation of Nominal Exchange Rate
  
  \[ EXR.FX = EXR.L\times 1.20; \]

- **Simulation with Some Sectors**
  
  Tariff Reduction in Machinery Sectors
  
  \[ TM("Machine") = TM\text{.L ("Machine")}*0.50; \]
  
  An Increase of Domestic Production Tax for Other Food Sector
  
  \[ TD ("OTH FOOD") = TD ("OTH FOOD")\times 1.10; \]

**SOLVE BANGLA MAXIMIZING OMEGA USING NLP;**

It is also important to note that two or three experiments can be implemented in a
single simulation exercise, e.g. a reduction tariff rate and an increase in domestic production tax rates. This simulation design would be

\[
\begin{align*}
\text{TM(IM)} &= \text{TM.L(IM)} \times 0.50; \\
\text{TD(I)} &= \text{TD(I)} \times 1.10;
\end{align*}
\]

SOLVE BANGLA MAXIMIZING OMEGA USING NLP;

What is KEDIT

"KEDIT" is an editor employed to write different components of the model. Alternatively, Word Perfect, and EDIT can also be used to write different components of the model. There is no hard and fast rule to use "KEDIT" as an editor, one is free to choose other editors as well. (*For details on KEDIT please see Appendix II).*
Appendix-I

Bangla.GMS Model in GAMS

STITLE 1992/93 BANGLA : BASE
SOFFSYM LIST OFFSYM XREF OFFUPPER

*######################################## SET DECLARATION #################################

SETS

1 SECTORS / RICE WHEAT SGR CANE VGTABLE PULSES FRUITS TEA OTRCRPS LSTOCK FISH FOREST EDOIL OTRFOOD TOBPROD SGRGUR SALT YARN CLOTH RMGR MNT JUTTEXT CHEM FETIZER BMET MACHINE LEATHER ENERGY HOUSING FINANCE OTRIND CONSTRUC EDUC HEALTH MISCSERV PUB AD TRADE /
FACTORS OF PRODUCTION / CAPITAL CAPITAL STOCK
ADM ADMINISTRATIVE
SERV SERVICE
AGR-HL AGRICULTURE HIRED LABOUR
AGR-FLSF AGRICULTURE FAMILY LABOUR SMALL FARM
AGR-FLLF AGRICULTURE FAMILY LABOUR LARGE FARM
PRTR-SK WORKER SKILLED
PRTR-SS WORKER SEMI SKILLED
PRTR-US WORKER UNSKILLED

HH HOUSEHOLDS TYPE / PHH PROFESSIONAL HOUSEHOLDS
SHH SERVICE HOUSEHOLDS
AGRL AGRICULTURE LABOUR HHS
AGRSF AGRICULTURE SMALL FARM
AGRLF AGRICULTURE LARGE FARM
PTWSK SKILLED HOUSEHOLDS
PTWSS SEMI-SKILLED HOUSEHOLDS
PTWUS UNSKILLED HOUSEHOLDS

The household and factor names are referred to explicitly below. If changed, they must also be changed where referenced. The household names are explicitly referenced only in the calibration section; factor names appear in equations as well.

*## SUBSETS DEFINED BELOW: "DEFINE INDEXES"

IAG(I) AG SECTORS / RICE, WHEAT, SGRCANE, VGTABLE,
PULSES, FRUITS, TEA, OTRCRPS,
LSTOCK, FISH, FOREST /
IAGN(I) NON AG SECTORS / EDOIL, OTRFOOD, TOBPROD, SGRGUR,
SALT, YARN, CLOTH, RMGRMNT, JUTTEXT, CHEM,
FETIZER, BMET, MACHINE, LEATHER, ENERGY,
HOUSING, FINANCE, OTRIND, CONSTRUC, EDUC,
HEALTH, MISCSERV, PUBAD, TRADE /

* HH(H) HOUSEHOLDS / /
IE(I) EXPORT SECTORS
IED(I) SECTORS WITH EXPORT DEMAND EQN
IEDN(I) SECTORS WITH NO EXPORT DEMAND EQN
IEN(I) NON EXPORT SECTORS
IM(I) IMPORT SECTORS
IMN(I) NON IMPORT SECTORS

ALIAS(I,J) ;
### for SAM

**SET ISAM categories**

/COMMDTY,ACTIVITY,VALUAD,CORP,HOUSEHOLDS,
GOVT,KACCOUNT,WORLD,TOTAL/

ISAM1(isam) /TOTAL/
ISAM2(isam);
ALIAS(isam2,isam3);
PARAMETER SAM(isam,isam) SOCIAL ACCOUNTING MATRIX;
isam2(isam) = NOT isam1(isam);

*PARAMETER DECLARATION**********************************

PARAMETERS

READ PARAMETERS

READ IN FOR INITIALIZATION OF VARIABLES

E0(i) EXPORTS
EXR0 EXCHANGE RATE
FSAV0 NET FOREIGN SAVINGS
GDTOT0 TOTAL VOLUME OF GOVERNMENT CONSUMPTION
GOVSAV0 GOVERNMENT SAVINGS
HHSV0 HOUSEHOLD SAVINGS
HHTAX0 HOUSEHOLD TAX REVENUE
CORTAX0 CORPORATION TAX REVENUE
CORSAV0 SAVINGS BY CORPORATION
INVEST0 TOTAL INVESTMENT
STOCK0 TOTAL STOCK CHANGE
CTAXR RATE OF CORPORATION TAX
M0(i) IMPORTS
DK0(I) SECTORAL INVESTMENT
CD0(I) SECTORAL CONSUMPTION
SCO(I) CHANGE IN SECTORAL STOCKS
MPSO(hh) HOUSEHOLD MARGINAL PROPENSITY TO SAVE
PD0(i) DOMESTIC GOODS PRICE
PEO(i) DOMESTIC PRICE OF EXPORTS
S0(I) SCALE PARAMETER
PINDEXO GDP DEFLATOR
PM0(i) DOMESTIC PRICE OF IMPORTS
X0(i) DOMESTIC OUTPUT, VOLUME

READ IN TABLE FOR INITIALIZATION OF VARIABLES (NEED NOT BE DECLARED)

* TABLE FCTRES1(i,f) FACTOR DEMAND BY SECTOR
* TABLE FCTRY(i,f) FACTOR INCOME BY SECTOR
**## READ IN PARAMETERS AS RATES, SHARES, ELASTICITIES**

DEPR(i) DEPRECIATION RATES  
DSTR(i) RATIO OF INVENTORY INVESTMENT TO GROSS OUTPUT  
ETA(i) EXPORT DEMAND PRICE ELASTICITY  
 GLES(i) GOVERNMENT CONSUMPTION SHARES  
 KSHR(i) SHARES OF INVESTMENT BY SECTOR OF DESTINATION  
 RHOC(i) ARMINGTON FUNCTION EXPONENT  
 RHOT(i) CET FUNCTION EXPONENT  
 TE(i) EXPORT SUBSIDY RATES  
 ADH(HH) PARAMETERS FOR ADJUSTMENT  
 TH(hh) HOUSEHOLD TAX RATE  
 RSHR(hh) HOUSEHOLD SHARE OF REMITTANCE  
 TM(i) TARIFF RATES ON IMPORTS  
 TX(i) INDIRECT TAX RATES

**## READ IN TABLE OF PARAMETERS (NEED NOT BE DECLARED)**

* TABLE B(i,j) CAPITAL COMPOSITION MATRIX  
* TABLE A(i,j) INPUT-OUTPUT COEFFICIENTS  
* TABLE CLES(i,hh) HOUSEHOLD CONSUMPTION SHARES

**### COMPUTED PARAMETERS FROM READ IN DATA (CALIBRATION)**

**### COMPUTED PARAMETERS FOR INITIALIZATION OF VARIABLES**

D0(i) DOMESTIC SALES, VOLUMNE  
GD0(I) GOVERNMENT CONSUMPTION INITIAL VOLUME  
CORY0 CORPORATION INCOME FROM CAPITAL  
GOVY0 GOVERNMENT INCOME FROM CAPITAL  
FD0(f) FACTOR DEMAND, AGGREGATE  
FS0(f) FACTOR SUPPLY, AGGREGATE  
INT0(i) INTERMEDIATE INPUT DEMAND  
PK0(i) CAPITAL GOODS PRICE BY SECTOR OF DESTINATION  
PQ0(i) PRICE OF COMPOSITE GOOD  
PV0(i) VALUE ADDED PRICE BY SECTOR  
PWM(i) WORLD MARKET PRICE OF IMPORTS (IN DOLLARS)  
PWE0(i) WORLD PRICE OF EXPORTS  
PWESE(i) WORLD PRICE OF EXPORT SUBSTITUTES  
PX0(i) AVERAGE OUTPUT PRICE  
Q0(i) COMPOSITE GOOD SUPPLY, VOLUMNE  
VAR0(i) VALUE ADDED RATE BY SECTOR  
WFDIST0(i,f) FACTOR PRICE SECTORAL PROPORTIONALITY CONSTANTS  
WF0(f) FACTOR PRICE, AGGREGATE AVERAGE  
R0 CAPITAL RETURN (RATE)  
YFCTR0(f) FACTOR INCOME SUMMED OVER SECTOR  
REMIT0(HH) REMITTANCE INCOME FROM ABROAD  
TREMIT0 TOTAL REMITTANCE IN FOREIGN CURRENCY  
DIVID0(HH) DIVIDEND BY HOUSEHOLDS GROUPS
HHTRR0(HH) RECIPTS OF HOUSEHOLDS TRANSFER BY HOUSEHOLDS
HHTRP0(HH) PAYMENTS OF TRANSFER BY HOUSEHOLDS
YFSECT0(i) FACTOR INCOME BY SECTOR
YHFO(HH) HOUSEHOLD INCOME FROM FACTOR
YH0(HH) HOUSEHOLD INCOME

### COMPUTED PARAMETERS AS RATES, SHARES

AC(i) ARMINGTON FUNCTION SHIFT PARAMETER
AD(i) PRODUCTION FUNCTION SHIFT PARAMETER
ALPHA(i,f) FACTOR SHARE PARAMETER-PRODUCTION FUNCTION
AT(i) CET FUNCTION SHIFT PARAMETER
DELTA(i) ARMINGTON FUNCTION SHARE PARAMETER
ECON(i) EXPORT DEMAND CONSTANT
GAMMA(i) CET FUNCTION SHARE PARAMETER
PWTS(i) PRICE INDEX WEIGHTS
QD(i) DUMMY VARIABLE FOR COMPUTING AD(i)
RMD(i) RATIO OF IMPORTS TO DOMESTIC SALES
CDH(HH) INCOME AFTER TAX AND OTHER PAYMENTS
ADCH(HH) ADJUSTED INCOME AFTER PAYMENTS
SUMSH SUM OF SHARE CORRECTION PARAMETER
SUMHHSH(hh) SUM OF SHARE FOR HH CLASSES
SUMIMSH(i) SUM OF SHARE FOR B
TMREAL(i) REAL TARIFF RATE

### TABLES USED FOR LOADING VARIABLE RESULTS

* TABLE SCALRES(*) AGGREGATE RESULTS
* TABLE SECTRES(*,i) SECTORAL PRICE AND QUANTITY RESULTS
* TABLE FCTRES1(i,f) FACTOR DEMAND RESULTS
* TABLE FCTRES2(*,f) FACTOR WAGE, SUPPLY AND INCOME RESULTS
* TABLE HHRES(*,hh) HOUSEHOLD SAVINGS AND INCOME RESULTS
**PARAMETER ASSIGNMENT**

**TABLE A(I,J) 1992-93 I-O COEFFICIENTS (UNITLESS)**

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<td>Labor in Thousands of Full Time Equivalents</td>
<td>Capital in Billions of 1992-93 Taka</td>
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**Factors of Production**

**Labor in Thousands of Full Time Equivalents**

**Capital in Billions of 1992-93 Taka**

**Table B(I,J) Capital Composition Matrix (Unity)**

| Table B(I,J) Capital Composition Matrix (Unity) |

<table>
<thead>
<tr>
<th>RICE</th>
<th>WHEAT</th>
<th>SORCANE</th>
<th>VGTABLE</th>
<th>PULSES</th>
<th>FRUITS</th>
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| + FOREST | 0.0045746 | 0.0033262 | 0.0033497 | 0.1446753 | 0.0020478 |
| MACHINE | 0.6137412 | 0.4181252 | 0.4498199 | 0.4839460 | 0.4162138 |
| CONSTRUC | 0.3816842 | 0.5785486 | 0.5566844 | 0.6254190 | 0.5140062 |

| + RMGRMNT | JUTTEXT | CHEM | FETIZER | BMET | MACHINE |
| FOREST | 0.0022656 | 0.0075526 | 0.0064016 | 0.0107102 | 0.0081370 |
| MACHINE | 0.2748894 | 0.4255367 | 0.4760874 | 0.4615887 | 0.4234852 |
| CONSTRUC | 0.7228450 | 0.7204263 | 0.7204263 | 0.5277011 | 0.5277011 |

| + LEATHER | ENERGY | HOUSING | FINANCE | OTRIND | CONSTRUC |
| FOREST | 0.0048022 | 0.0015396 | 0.0064016 | 0.0075526 | 0.0064016 |
| MACHINE | 0.1290085 | 0.2586737 | 0.4760874 | 0.4760874 | 0.4760874 |
| CONSTRUC | 0.8661893 | 0.7397867 | 1.0000000 | 0.9441175 | 0.9441175 |

<p>| + EDUC | HEALTH | MISCERV | PUBAD | TRADE |
| FOREST | 0.0167306 | 0.0143551 | 0.0134250 | 0.0134250 |
| MACHINE | 0.0345399 | 0.0390644 | 0.0349285 | 0.0349285 |
| CONSTRUC | 0.9489095 | 0.9466385 | 0.9374533 | 0.9374533 |</p>
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**TABLE FCTRES1(i,f) FACTOR DEMAND BY SECTOR**
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## HOUSEHOLD PARAMETERS

### TABLE CLES(HH,I) CONSUMPTION SHARES

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### Notes
- The table represents consumption shares of various commodities across different household and income categories.
- Each category has consumption shares for RICE, WHEAT, SGRCAN, VGTABLE, PULSES, and FRUITS.
- Additional categories include TEA, OTRCRPS, LSTOCK, FISH, FOREST, EDOIL, RMGRMT, JUTTEXT, CHEM, MACHINE, LEATHER, ENERGY, HOUSING, FINANCE, and OTRIND.
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### TABLE INIS(*,F) SHARES OF INSTITUTIONS INCOME FROM FACTORS

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</tbody>
</table>

*NOTE, TAXES ARE MAGNITUDES AND RATES ARE COMPUTED*
### Table PARM (*,i) Miscellaneous Parameters

<table>
<thead>
<tr>
<th></th>
<th>RICE</th>
<th>WHEAT</th>
<th>SGRCANE</th>
<th>VGTABLE</th>
<th>PULSES</th>
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</table>

### Parameter Scales(*)

#### Macro Totals

| EXPX      | 39.140 |
| FINDEX    | 1.000  |
| GDGDTOT   | 131.57500 |
| INVEST    | 174.97622 |
| HHTAX     | 6.66700 |
| CTAXR     | 0.4027662 |
| CORTAX    | 10.62900 |
| HHSAV     | 141.629000 |
| GOVSAM    | -14.75000 |
| FSAV      | 0.826290 |
| CORSAV    | 15.76100 |

### Table Elasticity(*,i) Sectoral Elasticities

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<th></th>
<th>RICE</th>
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<th>SGRCANE</th>
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</table>
+ OTRFOOD TOBPROD SGRGUR SALT YARN CLOTH
RHOC 1.2 1.2 1.2 1.2 1.3 1.3
RHT 1.2 1.2 1.2 1.2 1.3 1.3
ETA 1.6 1.6 1.6 1.6 1.6 1.6
+ RMGRMT JUTTEXT CHEM FETIZER BMET MACHINE
RHOC 1.3 1.3 1.3 1.3 1.2 1.2
RHT 1.3 1.3 1.3 1.3 1.2 1.2
ETA 1.6 1.6 1.6 1.6 1.6 1.6
+ LEATHER ENERGY HOUSING FINANCE OTRIND CONSTRUC
RHOC 1.3 1.2 1.3 1.4 1.3 1.3
RHT 1.3 1.2 1.3 1.4 1.3 1.3
ETA 1.6 1.6 1.4 1.7 1.6 1.6
+ EDUC HEALTH MISCSERV PUBAD TRADE
RHOC 1.2 1.2 1.2 1.2 1.3
RHT 1.2 1.2 1.2 1.2 1.3
ETA 1.6 1.6 1.6 1.6 1.6

*END OF PARAMETER ASSIGNMENT*

*SPECIFY PARAMETERS FROM TABLE VALUES*

**PARAMETERS FROM SCALRES(*)**

EXR0 = SCALRES("EXR");
FSAVO = SCALRES("FSAV");
GDTOT0 = SCALRES("GDTOT");
GOVSAVO = SCALRES("GOVSAV");
HHSAVO = SCALRES("HHSAV");
HHTAX0 = SCALRES("HHTAX");
CORSAV0 = SCALRES("CORSAV");
CORTAX0 = SCALRES("CORTAX");
CTAXR = SCALRES("CTAXR");
INVEST0 = SCALRES("INVEST");
PINDEX0 = SCALRES("PINDEX");

**OTHER TABLE VALUES OF PARAMETERS**

E0(i) = SECTRES("E",i);
ECON(i) = SECTRES("E",i);
M0(i) = SECTRES("M",i);
SC0(i) = SECTRES("SC",i);
DK0(i) = SECTRES("DK",i);
CD0(i) = SECTRES("CD",i);
GD0(i) = SECTRES("GD",i);
PDO(i) = SECTRES("PD",i);
PE0(i) = SECTRES("PE",i);
PK0(i) = SECTRES("PK",i);
PM0(i) = SECTRES("PM",i);
PQ0(i) = SECTRES("PQ",i);
PX0(i) = SECTRES("PX",i);
X0(i) = SECTRES("X",i);
TH(hh) = HHPAR("TH",hh);
MPS0(hh) = HHPAR("MPS",hh);
RSHR(hh) = HHPAR("RSHR",hh);

GOVTR0(HH) = EXPAR(HH, "GOVTR");
TX(i) = TAXR("TX",i)/(PX0(i)*X0(i));
ETA(i) = ELASTICITY("eta",i);
RHOC(i) = (1/ELASTICITY("rhoc",i)) - 1;
RHOST(i) = (1/ELASTICITY("RHOT",i)) + 1;
DSTR(i) = PARM("DSTR",i);
GLES(i) = PARM("GLES",i);
KSHR(i) = PARM("KSHR",i);

*## NORMALIZE SHARE PARAMETERS TO CORRECT FOR ROUNDOFF ERROR

These parameters (cles, b, kshr, and gles) can be read in as values and converted to shares here.

SUMHHSH(hh) = SUM(i, CLES(hh,i));
CLES(hh,i) = CLES(hh,i)/SUMHHSH(hh);
SUMIMSH(j) = SUM(i, B(i,j));
B(i,j) = B(i,j)/SUMIMSH(j);
SUMSH = SUM(i, KSHR(i));
KSHR(i) = KSHR(i)/SUMSH;

*#### DEFINE INDEXES BASED ON READ IN DATA

IAGN(i) = not IAG(i);
IE(i) = yes$E0(i);
IED(i) = yes$ETA(i);
IEDN(i) = not IED(i);
IEN(i) = not IE(i);
IM(i) = yes$M0(i);
IMN(i) = not IM(i);

*## SPECIFY PARAMETERS WHICH DEPEND ON DEFINED INDEX IM OR IE

TM(imn) = 0.0;
TM(im) = TAXR("TM",im)/(PM0(im)*M0(im) - TAXR("TM",im));
TE(ien) = 0.0;
TE(ie) = TAXR("TE",ie)/(PE0(ie)*E0(ie) - TAXR("TE",ie));

*## COMPUTE FROM INITIAL DATA

D0(i) = X0(i) - E0(i);
INT0(i) = SUM(j, A(i,j)*X0(j));
PV0(i) = PX0(i) - SUM(j, A(j,i)*PQ0(j)) - TX(i);
PWE0(i) = PE0(i)/((1+TE(i))*EXR0);
PWM(i) = PM0(i)/((1+TM(i))*EXR0);
TMREAL(i) = TM(i)*PWM(i)*EXR0;
VAR0(i) = PV0(i) + TX(i);
*#CALIBRATION OF PARAMETERS FROM DATA#

### FACTOR MARKET PARAMETERS

\[
\begin{align*}
FS_0(f) & = \text{SUM}(i, FCTRES1(i,f)) \\
YFCTR0(f) & = \text{SUM}(i, FCTRY(i,f)) \\
YFSECT0(i) & = \text{SUM}(f, FCTRY(i,f)) \\
WF_0(f) & = YFCTR0(f)/FSO(f) ;
\end{align*}
\]

\[
WFDIST0(i,f)$FCTRES1(i,f) = (FCTRY(i,f)/FCTRES1(i,f))/WF0(f) ;
\]

\[
WFDIST0(i,f)$FCTRES1(i,f) EQ 0 = 0.0 ;
\]

PARAMETER WFSF(I, F)
\[
\begin{align*}
wfs1(i,F) \\
WFF(I) \\
WFF1(I) \\
totcles(hh) \\
ttcles \\
WFS(I) ;
\end{align*}
\]

\[
\begin{align*}
WFSF(i,f)$FCTRES1(i,f) & = FCTRY(i,f)/FCTRES1(i,f) ;
WFS(I) & = \text{SUM}(F, WFSF(I,F)) ;
WFS1(I,F) & = WFDIST0(I,F)*WF0(F) ;
WFF(I) & = \text{SUM}(F, WFS1(I,F)) ;
WF1(I) & = \text{SUM}(F, WFDIST0(I,F)*WF0(F)) ;
\end{align*}
\]

Totcles(hh) = sum(i, cles(hh,I));
Ttacles = sum(hh, totcles(hh));

DISPLAY WFSF, WFS, WFF, WFF1, WFS1, totcles, ttcles ;

### HOUSEHOLD INCOME, TAX RATE, AND SAVING RATE

### INCOME FLOWS USE THE FOLLOWING FOUR COMPONENTS OF INCOME

\[
\begin{align*}
\text{DEPRECO} & = \text{SUM}(i, DEPR(i)*PKO(i)*FCTRES1(i,"capital")) \\
\text{INDTAXO} & = \text{SUM}(i, TX(i)*PXO(i)*X0(i)) \\
\text{EXPSUBO} & = \text{SUM}(ie, TE(ie)*E0(ie)*PWEO(ie))*EXR0 \\
\text{TARIFFO} & = \text{SUM}(im, PWM(im)*M0(im)*TM(im))*EXR0 \]
\]

* DISPLAY WFDIST0, WF0, FS0, YFSECT0, YFCTR0, FCTRY ;
* DISPLAY YHF0, GOVTR0, YH0, MPS0, TH ;

### CALIBRATION OF SHIFT AND SHARE PARAMETERS

### FOR IMPORTS-DOMESTIC COMPOSITE

*** get delta from costmin, xo from absorption, ac from armington

\[
\begin{align*}
\text{DELTA}(i) & = (PMO(i)/PDO(i))*(M0(i)/D0(i))**(1+RHOC(i)) ;
\text{DELTA}(i) & = \text{DELTA}(i)/(1.0+\text{DELTA}(i)) ;
\text{Q}(0)(i) & = (PD0(i)*D0(i) + (PM0(i)*M0(i))Sim(i))/PQ0(i) ;
\text{RMD}(i) & = M0(i)/D0(i) ;
\text{AC}(i)Sim(i) & = \text{Q}(0)(i)\text{DELTA}(i)M0(i)**(1-RHOC(i)) - (1-\text{DELTA}(i)D0(i) - (1-RHOC(i)))**(1-RHOC(i)) ;
\text{AC}(i)Simn(i) & = 1.0 ;
\end{align*}
\]

Display DELTA, AC, RMD ;
### FOR EXPORTS
### GET GAMMA FROM ESUPPLY
\[
\text{GAMMA}(ie) = \frac{1}{1 + \text{PD0}(ie)/\text{PE0}(ie)*\text{E0}(ie)/\text{D0}(ie))*\text{RHOT}(ie)-1}
\]
### GET AT FROM CET
\[
\text{AT}(ie) = X(ie)\text{GAMMA}(ie)*\text{E0}(ie)*\text{RHOT}(ie)+(1-GAMMA)(ie)*\text{D}(ie)*\text{RHOT}(ie))**(1-RHOT)(ie)
\]
Display GAMMA, AT;

### FOR FACTOR DEMAND
### GET ALPHA FROM PROFIT MAX (ALPHA FOR EACH i SHOULD SUM TO 1)
\[
\text{ALPHA}(i,f) = (\text{WFDIST0}(i,f)*\text{WF0}(f)*\text{FCTRES1}(i,f))/\text{YFSECT0}(i)
\]
DISPLAY ALPHA;

### get AD from output and FD0 from profitmax
\[
\text{QD}(i) = \text{PROD}(f, FCTRES1(i,f)**\text{ALPHA}(i,f))
\]
\[
\text{AD}(i) = \frac{\text{X0}(i)}{\text{QD}(i)}
\]
\[
\text{FD0}(f) = \sum(i, (\text{X0}(i)*\text{PV0}(i)*\text{ALPHA}(i,f)/(\text{WFDIST0}(i,f)*\text{WF0}(f)))\text{WFDIST0}(i,f))
\]
DISPLAY AD, QD, FD0;

### SPECIFY WEIGHTS FOR PRODUCER PRICE INDEX
\[
\text{PWTS}(i) = \frac{\text{X0}(i)}{\sum(j, \text{X0}(j))}
\]

* TO CHECK DATA CONSISTENCY BY SECTOR

* ADCH(HH) IS USED TO ADJUST HOUSEHOLD INCOME SO THAT WE GET THE ESTIMATED (I.E. SAM FIGURES) EXPANDABLE INCOME BY HOUSEHOLDS WITHOUT THIS ADCH(HH) ADJUSTMENT PARAMETERS THE CALIBRATED EXPANDABLE INCOMES ARE SOMEWHAT HIGHER THAN THE SA ESTIMATES. THESE DIFFERENCES ARE DEPICTED IN LINE 946 BY DIFF(HH).

#### END OF CALIBRATION ####

* DISPLAY X0, Q0, D0;
* DISPLAY PV0, PD0, PE0, PWE0, PM0, PWM, TM, TX, TE, PWTS;

############################################################### VARIABLES###############################################################

############################################################### VARIABLE DECLARATION #########################################################

### PRICE BLOCK
\[
\text{EXR} \quad \text{EXCHANGE RATE} \quad ($ \text{PER WORLD $})
\]
\[
\text{PD}(i) \quad \text{DOMESTIC PRICES}
\]
\[
\text{PE}(i) \quad \text{DOMESTIC PRICE OF EXPORTS}
\]
\[
\text{PINDEX} \quad \text{GDP DEFLATOR}
\]
\[
\text{PK}(i) \quad \text{PRICE OF CAPITAL GOODS BY SECTOR OF DESTINATION}
\]
\[
\text{PM}(i) \quad \text{DOMESTIC PRICE OF IMPORTS}
\]
\[
\text{PQ}(i) \quad \text{PRICE OF COMPOSITE GOODS}
\]
\[
\text{PV}(i) \quad \text{VALUE ADDED PRICE}
\]
\[
\text{PWE}(i) \quad \text{WORLD PRICE OF EXPORTS}
\]
\[
\text{PX}(i) \quad \text{AVERAGE OUTPUT PRICE}
\]
**### PRODUCTION BLOCK**

D(i)
DOMESTIC SALES
(88-89 BILL TAKA)

E(i)
EXPORTS
(88-89 BILL TAKA)

M(i)
IMPORTS
(88-89 BILL TAKA)

Q(i)
COMPOSITE GOODS SUPPLY
(88-89 BILL TAKA)

X(i)
DOMESTIC OUTPUT
(88-89 BILL TAKA)

**### FACTOR BLOCK**

FDSC(i.f)
FACTOR DEMAND BY SECTOR

FS(f)
FACTOR SUPPLY

WF(f)
AVERAGE FACTOR PRICE

WFDIST(i,f)
FACTOR PRICE SECTORAL PROPORTIONALITY RATIOS

YFCTR(f)
FACTOR INCOME

(BILL TAKA)

**### INCOME AND EXPENDITURE BLOCK**

CD(i)
FINAL DEMAND FOR PRIVATE CONSUMPTION
(88-89 BILL TAKA)

DEPREC
TOTAL DEPRECIATION EXPENDITURE

DK(i)
VOLUME OF INVESTMENT BY SECTOR OF DESTINATION
(88-89 BILL TAKA)

DST(l)
INVENTORY INVESTMENT BY SECTOR
(88-89 BILL TAKA)

TOTDST
TOTAL STOCK CHANGE

TOTCD
TOTAL CONSUMPTION

FSAV
NET FOREIGN SAVINGS

BILL WORLD $)

FXDINV
FIXED CAPITAL INVESTMENT

BILL TAKA)

GD(i)
FINAL DEMAND FOR GOVERNMENT CONSUMPTION

GDTOT
TOTAL VOLUME OF GOVERNMENT CONSUMPTION

GOVSAV
GOVERNMENT SAVINGS

BILL TAKA)

GR
GOVERNMENT REVENUE

BILL TAKA)

CORY
CORPORATION INCOME FROM CAPITAL

BILL TAKA)

GOVY
GOVERNMENT INCOME FROM CAPITAL

BILL TAKA)

REMIT(HH)
REMITTANCE INCOME FROM ABROAD

BILL TAKA)

TREMIT
TOTAL REMITTANCE IN FOREIGN CURRENCY

BILL TAKA)

DIVID(HH)
DIVIDEND BY HOUSEHOLDS GROUPS

BILL TAKA)

GOVTR(HH)
GOVERNMENT TRANSFER BY HOUSEHOLDS GROUPS

BILL TAKA)

HHTRR(HH)
RECEIPTS OF HOUSEHOLDS TRANSFER BY HOUSEHOLDS

BILL TAKA)

HHTRP(HH)
PAYMENTS OF TRANSFER BY HOUSEHOLDS

BILL TAKA)

HHSAV
TOTAL HOUSEHOLD SAVINGS

BILL TAKA)

CORSAV
SAVINGS BY CORPORATION

BILL TAKA)

CORTAX
INCOME TAX BY CORPORATION

BILL TAKA)

ID(i)
FINAL DEMAND FOR PRODUCTIVE INVESTMENT

BILL TAKA)

INDTAX
INDIRECT TAX REVENUE

BILL TAKA)

INT(i)
INTERMEDIATESUSES

BILL TAKA)

INVEST
TOTAL INVESTMENT

BILL TAKA)

STOCK
CHANGE IN STOCK

BILL TAKA)

WALRAS1
SLACK VARIABLE FOR SAVINGS INVESTMENT EQUATION

MPS(hh)
MARGINAL PROPENSITY TO SAVE BY HOUSEHOLD TYPE

BILL TAKA)

* EXPSUB
EXPORT SUBSIDY PAYMENTS

BILL TAKA)

SAVING
TOTAL SAVINGS

BILL TAKA)

TARIFF
TARIFF REVENUE

BILL TAKA)

HHTAX
HOUSEHOLD TAX REVENUE

BILL TAKA)

YHF(HH)
HOUSEHOLDS INCOME FROM FACTOR

BILL TAKA)

YH(hh)
HOUSEHOLD INCOME

BILL TAKA)

*### GDP CALCULATIONS**

RGDP
REAL GDP

BILL TAKA)

GDPVA
VALUE ADDED IN MARKET PRICES GDP

BILL TAKA)

OMEGA
OBJECTIVE FUNCTION VARIABLE

BILL TAKA)

BILL TAKA)
### VARIABLE INITIALIZATION

*## USE INITIAL VALUES OF VARIABLES (FROM PARAMETER SPECIFICATION)*

```plaintext
EXR.L = EXR0;
FSAV.L = FSAV0;
GDTOT.L = GDTOT0;
INVEST.L = INVEST0;
PINDEX.L = PINDEX0;
MPS.L(hh) = MPS0(hh);
E.L(i) = E0(i);
M.L(i) = M0(i);
PD.L(i) = PD0(i);
PE.L(i) = PE0(i);
PM.L(i) = PM0(i);
PQ.L(i) = PQ0(i);
PX.L(i) = PX0(i);
X.L(i) = X0(i);
FDSC.L(i,f) = FCTRES1(i,f);
YFCTR.L(f) = SUM(i, FCTRY(i,f));
```

*## COMPUTE INITIAL VALUES FOR OTHER VARIABLES*  
### OUTPUT AND PRICE

```plaintext
D.L(i) = X.L(i) - E.L(i);
Q.L(i) = (PD.L(i)*D.L(i) + (PM.L(i)*M.L(i))SIM(i))/PQ.L(i);
PK.L(i) = SUM(J, PQ.L(j)*B(j,i));
PWE.L(i) = PE.L(i)/((1.0 + TE(i))*EXR.L);
PWSE(i) = PE0(i);
PV.L(i) = PX.L(i) - SUM(J, A(j,i)*PQ.L(j)) - TX(i);
```

### VALUE ADDED AND THE FLOW OF FACTOR INCOME

```plaintext
FS.L(f) = SUM(i, FDSC.L(i,f));
WF.L(f) = YFCTR.L(f)/FS.L(f);
WFDIST.L(i,f) = WFDISTO(i,f);
EXPUB.L = SUM(ie, TE(ie)*E.L(ie)*PWE.L(ie))*EXR.L;
TARIFF.L = SUM(im, PWM(im)*M.L(im)*TM(im))*EXR.L;
INDTAX.L = SUM(i, TX(i)*PX.L(i)*X.L(i));
```

### YH AND THE FLOW OF FACTOR INCOME

```plaintext
YHF.L(HH) = SUM(F, (INSHS(HH,F)*YFCTR.L(f)));
REMIT.L(HH) = RSHR(HH)*YHF.L(HH);
TREMIT.L = SUM(HH, REMIT.L(HH))/EXR.L;
GOVTR.L(HH) = GOVTRO(HH);
```

```plaintext
YH.L(HH) = YHF.L(HH) + REMIT.L(HH) + GOVTR.L(HH);
HHTAX.L = SUM(hh, TH(hh)*YH.L(hh));
HHSAV.L = SUM(hh, MPS.L(hh)*YH.L(hh));
GOVY.L = SUM(F, INIS("GD",F)*YFCTR.L(f));
CORY.L = SUM(F, INIS("COR",F)*YFCTR.L(f));
CORTAX.L = CTAXR*CORY.L;
CORSAV.L = CORY.L - CORTAX.L;
```

### FINAL DEMAND

```plaintext
INT.L(i) = SUM(j, A(i,j)*X.L(j));
GD.L(i) = GLES(i)*GDTOT.L;
DST.L(i) = DSTR(i)*X.L(I);
TOTDST.L = SUM(I, DST.L(i));
```
FXDINV.L = INVEST.L - SUM(i, DST.L(i)*PQ.L(i))
DK.L(i) = (KSHR(i)*FXDINV.L)/PK.L(i)
ID.L(i) = SUM(j, B(i,j)*DK.L(j))
GR.L = TARIFF.L + INDTAX.L + HHTAX.L + GOVY.L + CORTAX.L - SUM(HH, GOVTR.L(HH))
GOVSAV.L = GR.L - SUM(i, PQ.L(i)*GD.L(i))
SAVING.L = HHSAV.L + GOVSAL.V + FSAV.L*EXR.L + CORSAV.L
CD.L(i) = SUM(hh, CLES(hh,i)*(1.0 - MPS.L(hh)-TH(HH)) * (YH.L(hh))/PQ.L(I)
TOTCD.L = SUM(I, CD.L(I))

*################ GROSS DOMESTIC PRODUCT ESTIMATION ################

GDPVA.L = SUM(i, PV.L(i)*X.L(i)) + INDTAX.L + TARIFF.L
RGDP.L = SUM(i, CDL(i) + DST.L(i) + ID.L(i) + GD.L(i)) + SUM(x, E.L(x)) - SUM(x, (1.0 - TMREAL(x))*M.L(x))
PINDEX.L = GDPVA.L/RGDP.L

*## ALTERNATIVELY, SET PINDEX TO THE PRODUCER PRICE INDEX
* PINDEX.L = SUM(i, pwts(i)*PX(i))

OMEGA.L = 1

DISPLAY REMIT.L, TREMIT.L;

$ONTEXT
OPTION DECIMALS=2;
DISPLAY YFCTR.L, YHL.L, CORY.L, CORTAX.L, CORSAV.L, GOVY.L, GDPVA.L, RGDP.L, PINDEX.L;
DISPLAY INT.L, CD.L, GD.L, ID.L, DK.L, SAVING.L, FXDINV.L, DST.L, TOTDST.L;
DISPLAY GR.L, CORSAV.L, HHSAV.L, TOTCD.L;
$OFFTEXT

*################ END VARIABLE SPECIFICATION ################

*#### TO CHECK FOR DATA CONSISTENCY, DISPLAY INITIAL SAM

*SAM FOR BANGLA MODEL

*################### SOCIAL ACCOUNTING MATRIX ###################

*LEA
SAM("COMMDTY","ACTIVITY") = SUM(i,(PQ.L(i)*INT.L(i)))
SAM("COMMDTY","HOUSEHOLDS") = SUM(i,(PQ.L(i)*CDL.L(i)))
SAM("COMMDTY","KACCOUNT") = SUM(i,(PQ.L(i)*(DST.L(i)+ID.L(i))))
SAM("COMMDTY","GOVT") = SUM(i,(PQ.L(i)*GD.L(i)))
SAM("ACTIVITY","WORLD") = SUM(i,((EXR.L*PWE.L(i))*E.L(i))
SAM("ACTIVITY","COMMDTY") = SUM(i, (PX.L(i)*X.L(i))-EXR.L*PWE.L(i)*E.L(i))
* SAM("ACTIVITY","COMMDTY") = SUM(i, PD.L(i)*D.L(i))
SAM("VALUAD","ACTIVITY") = SUM(f, YFCTR.L(f))

$ONTEXT
SAM("COMMDTY","ACTIVITY") = SUM(i,(PQ.L(i)*INT.L(i)))
SAM("COMMDTY","HOUSEHOLDS") = SUM(i,(PQ.L(i)*CDL.L(i)))
SAM("COMMDTY","KACCOUNT") = SUM(i,(PQ.L(i)*(DST.L(i)+ID.L(i))))
SAM("COMMDTY","GOVT") = SUM(i,(PQ.L(i)*GD.L(i)))
SAM("COMMDTY","WORLD") = SUM(i,((EXR.L*PWE.L(i))*E.L(i))
SAM("ACTIVITY","COMMDTY") = SUM(i, (PX.L(i)*X.L(i))-EXR.L*PWE.L(i)*E.L(i))
SAM("VALUAD","ACTIVITY") = SUM(f, YFCTR.L(f))

$OFFTEXT
SAM("CORP","VALUAD") = CORY.L;
* SAM("HOUSEHOLDS","VALUAD") = SUM(hh, YH.L(hh));
SAM("HOUSEHOLDS","VALUAD") = SUM(hh, YHF.L(hh));
* SAM("HOUSEHOLDS","CORP") = SUM(hh, DIVID.L(hh));
SAM("HOUSEHOLDS","GOVT") = SUM(hh, GOVTR.L(hh));
SAM("HOUSEHOLDS","WORLD") = SUM(hh, REMIT.L(hh));
* SAM("HOUSEHOLDS","HOUSEHOLDS") = SUM(hh, HHTRR.L(hh));

*LEA

* SAM("KACCOUNT","VALUAD") = DEPREC.L;
* LEA
SAM("KACCOUNT","CORP") = CORSAV.L;
* LEA
SAM("KACCOUNT","HOUSEHOLDS") = HHSAV.L;
SAM("KACCOUNT","GOVT") = GOVSAV.L;
SAM("KACCOUNT","WORLD") = FSAV.L*EXR.L;
SAM("GOVT","COMMDTY") = TARIFF.L;
SAM("GOVT","ACTIVITY") = INDTAX.L;

* LEA
SAM("GOVT","VALUAD") = GOVY.L;
SAM("GOVT","CORP") = CORTAX.L;
* LEA
SAM("GOVT","HOUSEHOLDS") = HHTAX.L;
SAM("WORLD","COMMDTY") = SUM(i,((PWM(i)*EXR.L)*M.L(i)));
* SAM("WORLD","KACCOUNT") = - FSAV.L*EXR.L;
SAM("TOTAL","COMMDTY") = SUM(isam2,SAM(isam2,"COMMDTY"));
SAM("TOTAL","ACTIVITY") = SUM(isam2,SAM(isam2,"ACTIVITY"));
SAM("TOTAL","VALUAD") = SUM(isam2,SAM(isam2,"VALUAD"));
SAM("TOTAL","CORP") = SUM(isam2,SAM(isam2,"CORP"));
SAM("TOTAL","HOUSEHOLDS") = SUM(isam2,SAM(isam2,"HOUSEHOLDS"));
SAM("TOTAL","KACCOUNT") = SUM(isam2,SAM(isam2,"KACCOUNT"));
SAM("TOTAL","GOVT") = SUM(isam2,SAM(isam2,"GOVT"));
SAM("TOTAL","WORLD") = SUM(isam2,SAM(isam2,"WORLD"));
SAM(isam3,"TOTAL") = SUM(isam2,SAM(isam3,isam2));

OPTION DECIMALS=2;
DISPLAY SAM;
OPTION DECIMALS=3;

*苦恼-----------------------------------------------------------------------------------------EQUATIONS-----------------------------------------------------------------------------------------

*--------------------------------------------------------------------------------------------- EQUATION DECLARATION ---------------------------------------------------------------------------------------------

*## PRICE BLOCK
PMIDEF(i) DEFINITION OF DOMESTIC IMPORT PRICES
PEDEF(i) DEFINITION OF DOMESTIC EXPORT PRICES
ABSORPTION(i) VALUE OF DOMESTIC SALES
SALES(i) VALUE OF DOMESTIC OUTPUT
ACTP(i) DEFINITION OF ACTIVITY PRICES
PKIDEF(i) DEFINITION OF CAPITAL GOODS PRICE
PINDEXDEF DEFINITION OF GENERAL PRICE LEVEL

*## PRODUCTION BLOCK
ACTIVITY(i) PRODUCTION FUNCTION
PROFITMAX(i) FIRST ORDER CONDITIONS FOR PROFIT MAXIMUM
INTEQ(i) TOTAL INTERMEDIATE USES
CET(i) CET FUNCTION
CET2(i) DOMESTIC SALES FOR NONTRADED SECTORS
ESUPPLY(i) EXPORT SUPPLY
EDENMAND(i) EXPORT DEMAND FUNCTIONS
ARMINGTON(i) COMPOSITE GOOD AGGREGATION FUNCTION
ARMINGTON2(i) COMPOSITE GOOD AGG. FOR NONTRADED SECTORS
COSTMIN(i) F.O.C FOR COST MINIMIZATION OF COMPOSITE GOOD

*** INCOME BLOCK ***
YFDEF(f) FACTOR INCOME
YHFDEF HOUSEHOLDS INCOME FROM FACTOR
YHTDEF TOTAL HOUSEHOLDS INCOME
RMDEF(HH) REMITTANCE INCOME DETERMINATION
TRMDEF TOTAL REMITTANCE DETERMINATION
CORYDEF CORPORATION INCOME
GOVYDEF GOVERNMENT INCOME FORM CAPITAL
TARIFFDEF TARIFF REVENUE
INDTAXDEF INDIRECT TAXES ON DOMESTIC PRODUCTION
* EXPSUBDEF EXPORT SUBSIDY PAYMENTS
CORTAXDEF CORPORATION TAX
HITAXDEF TOTAL HOUSEHOLD TAXES COLLECTED BY GOVT.
HHSAVEQ HOUSEHOLD SAVINGS
CORSAVDEF CORPORATION SAVINGS
GREQ GOVERNMENT REVENUE
TOTSAV TOTAL SAVINGS

*** EXPENDITURE BLOCK ***
CDEQ(i) PRIVATE CONSUMPTION BEHAVIOR
GDEQI(i) GOVT CONSUMPTION OF COMMODITIES
GRUSE GOVERNMENT SAVINGS
DSTEQ(i) INVENTORY INVESTMENT
FIXEDINV FIXED INVESTMENT NET OF INVENTORY
PRODINV(i) INVESTMENT BY SECTOR OF DESTINATION
IEQ(i) INVESTMENT BY SECTOR OF ORIGIN

*** MARKET CLEARING ***
EQUIL(i) GOODS MARKET EQUILIBRIUM
FMEQUIL(f) FACTOR MARKET EQUILIBRIUM
CAREQ CURRENT ACCOUNT BALANCE (BILL DOLLARS)
WALRAS SAVINGS INVESTMENT EQUILIBRIUM

*** GROSS NATIONAL PRODUCT ***
GDPY TOTAL VALUE ADDED INCLUDING INDTAX
GDPR REAL GDP
OBJ OBJECTIVE FUNCTION

* EQUATION ASSIGNMENT *

*** PRICE BLOCK ***
PMDEF(im). PM(im) =E= PWM(im)*EXR*(1 + TM(im)) ;
PEDEF(ic). PE(ie) =E= PWE(ie)*EXR*(1 + TE(ie)) ;
ABSORPTION(i). PQ(i)*Q(i) =E= PD(i)*D(i) + (PM(j)*M(j))$jm(j) ;
SALES(i). PX(i)*X(i) =E= PD(i)*D(i) + (PE(i)*E(i))$ie(i) ;
ACTP(i). PV(i) =E= PX(i)*(1.0 - TX(i)) - SUM(j,a(j,i)*PQ(j)) ;
PKDEF(i).. PK(i) =E= SUM(J, PQ(j)*b(j,i)) ;

PINDEXDEF.. PINDEX =E= GDPVA/RGDP ;

*######################################################## PRODUCTION BLOCK ##########################################################

ACTIVITY(i). X(i) =E= AD(i)*PROD(PSALPHA(i,f), FDSC(i,f)**ALPHA(i,f)) ;
PROFITMAX(i,f)$WFDIST0(i,f). WF(f)*WFDIST(i,f)*FDSC(i,f) =E= X(i)*PV(i)*ALPHA(i,f) ;
INTEQ(i). INT(i) =E= SUM(J, A(i,j)*X(j)) ;

CET(i). X(i) =E= AT(i)*((GAMMA(i)*E(i)**RHO(i) + (1-GAMMA(i))*D(i)**RHO(i))*(1-RHO(i))) ;

CET2(ien). X(ien) =E= DIEN ;

ESUPPLY(i). E(i) =E= D(i)*((PE(i)/PD(i))*(1 - GAMMA(i))/GAMMA(i))**(1/(RHO(i)-1)) ;
EDEMAND(ied)$ETA(IED). E(ied) =E= ECON(ied)*((PWE(ied)/PWSE(ied))*(1-ETA(ied))) ;

ARMINGTON(irm). Q(irm) =E= AQ(irm)*DELTA(irm)*M(irm)**((RHO(irm))*(1-DELTA(irm)))*ETAS(irm)**(-1/RHO(irm)) ;

ARMINGTON2(irmn). Q(irmn) =E= D(irmn) ;

COSTMIN(irm). M(irm)/D(irm) =E= ((PD(irm)/PM(irm))*(DELTA(irm)/D(irm)))**(1/(1+RHO (irm))) ;

*######################################################## INCOME BLOCK ##########################################################

YFDEF(f). YFCTR(f) =E= SUM(i, WF(f)*WFDIST(i,f)*FDSC(i,f)) ;

YHFDEF(HH). YHF(HH) =E= SUM(F, (INSH(HH,F)*YFCTR(F))) ;

RMDEF(HH). REMIT(HH) =E= RSHR(HH)*YHF(HH) ;

TRMDEF.. TREMIT =E= SUM(HH, REMIT(HH))/EXR ;

YHTDEF(HH). YH(HH) =E= YHF(HH) + REMIT(HH) + GOVTR(HH) ;

CORYDEF.. CORY =E= SUM(F, INS("COR",F)*YFCTR(f)) ;

GOVYDEF.. GOVY =E= SUM(F, INS("GD",F)*YFCTR(f)) ;

TARIFFDEF.. TARIFF =E= SUM(im, TM(im)*M(im)*PWM(im))*EXR ;

INDTAXDEF.. INDTAX =E= SUM(i, TX(i)*PX(i)*X(i)) ;

* EXPSUBDEF.. EXPSUB =E= SUM(i, TE(i)*E(i)*PWE(i))*EXR ;

HHTAXDEF.. HHTAX =E= SUM(hh, TH(hh)*YH(hh)) ;

CORTAXDEF.. CORTAX =E= CTAXR*CORY ;

CORSAVDEF.. CORSAV =E= CORY - CORTAX ;

HHSAVEQ.. HHSAVE =E= SUM(hh, MPS(hh)*YH(hh)) ;
GREQ. \[ GR = E - TARIFF + INDTAX + HHTAX + GOVY + CORTAX - \text{SUM}(HH, \text{GOVTR}(HH)); \]

TOTSAV. \[ SAVING = E - \text{HSAV} + \text{GOVSAV} + \text{CORSAV} + \text{FSAV} \times \text{EXR}; \]

* EXPENDITURE BLOCK *************************************************************

CDEQ(i). \[ PQ(i) \times CD(i) = E = \text{SUM}(hh, \text{CLES}(hh,i) \times (1.0 - \text{MPS}(hh) - \text{TH}(HH)) \times (YH(hh))); \]

GDEQ(i). \[ GD(i) = E = (\text{GLES}(i) \times \text{GDTOT}) / \text{PQ}(l); \]

GRUSE. \[ \text{GOVSAV} = E = \text{GR} - \text{SUM}(i, PQ(i) \times GD(i)); \]

DSTEQ(i). \[ DST(i) = E = DSTR(i) \times X(i); \]

FIXEDINV. \[ \text{FXDINV} = E = \text{INVEST} - \text{SUM}(i, DST(i) \times PQ(i)); \]

PRODINV(i). \[ PK(i) \times DK(i) = E = KSHR(i) \times \text{fxdinv}; \]

IEQ(i). \[ ID(i) = E = \text{SUM}(J, B(i,j) \times DK(j)); \]

* MARKET CLEARING **************************************************************

EQUIL(i). \[ Q(i) = E = \text{INT}(i) + CD(i) + GD(i) + ID(i) + DST(i); \]

FMEQUIL(f). \[ \text{SUM}(i, \text{FDSC}(i,f)) = E = FS(f); \]

CAEQ. \[ \text{SUM}(im, \text{PWM}(im) \times M(im)) = E = \text{SUM}(ie, \text{PWE}(ie) \times E(ie)) + \text{FSAV} + \text{TREMIT}; \]

WALRAS. \[ \text{SAVING} = E = \text{INVEST} + \text{WALRAS1}; \]

* GROSS NATIONAL PRODUCT ********************************************************

GDPY. \[ \text{GDPVA} = E = \text{SUM}(i, PV(i) \times X(i)) + \text{INDTAX} + \text{TARIFF}; \]

GDPR. \[ \text{RGDP} = E = \text{SUM}(i, CD(i) + DST(i) + ID(i) + GD(i)) + \text{SUM}(ie, E(ie)) + \text{SUM}(im, (1.0 - \text{TMREAL}(im)) \times M(im)); \]

OBJ. \[ \text{OMEGA} = E = 1; \]

* ADDITIONAL RESTRICTIONS CORRESPONDING TO EQUATIONS

* FOR NON-TRADED SECTORS AND SECTORS WITH FIXED WORLD EXPORT PRICES

PM.FX(imn) = PM0(imn); PE.FX(ien) = PE0(ien); PWE.FX(iedn) = PWE.L(iedn); E.FX(ien) = 0; M.FX(imn) = 0; FDSC.FX(i,f)$(\text{WFDISTO}(i,f) \text{ EQ} 0) = 0; * \text{REMIT.FX}(HH) = \text{REMIT.L}(HH); \]

GOVTR.FX(HH) = GOVTR.L(HH); * \text{TREMIT.FX} = \text{TREMIT.L};

$ONTEXT

* TO DEBUG, FIX ALL VARIABLES

EXR.FX = EXR.L;
FSAV.FX = FSAV.L;
GDTOT.FX = GDTOT.L;
GOVSAV.FX = GOVSAV.L;
INVEST.FX = INVEST.L;
PINDEX.FX = PINDEX.L;
MPS.FX(hh) = MPS.L(hh);
E.FX(i) = E.L(i);
M.FX(i) = M.L(i);
PD.FX(i) = PD0(i);
PE.FX(i) = PE0(i);
PM.FX(i) = PM0(i);
PQ.FX(i) = PQ0(i);
PX.FX(i) = PX0(i);
X.FX(i) = X0(i);
FDSC.FX(i,f) = FCTRESI(i,f);
YFCTR.FX(f) = SUM(i, FCTRY(i,f));
D.FX(i) = D.L(i);
Q.FX(i) = Q.L(i);
PK.FX(i) = PK.L(i);
PWE.FX(i) = PWE.L(i);
* PWSE.FX(i) = PWSE.L(i);
PV.FX(i) = PV.L(i);
WF.FX(f) = WF.L(F);
WFDIST.FX(i,f) = WFDIST.L(i,f);
EXPSUB.L = SUM(ie, TE(ie)*E.L(ie)*PWE.L(ie))*EXR.L;
TARIFF.FX = TARIFF.L;
INDTAX.FX = INDTAX.L;
* DEPREC.FX = DEPREC.L;
* YH.FX("cap") = YH.L("CAP");
* YH.FX("lab") = YH.L("LAB");
HHTAX.fx = SUM(hh, TH(hh)*YH.L(hh));
HHSAV.fx = hhsav.L;
INT.fx(i) = int.L(I);
CD.fx(i) = cd.L(I);
GD fx(i) = gd.L(I);
DST.fx(i) = DST.L(i);
FXDINV.fx = fxdinv.L;
DK.fx(i) = dk.L(I);
ID.fx(i) = id.L(I);
GR.fx = gr.L;
SAVING.fx = saving.L;
GDPVA.fx = gdpva.L;

*$OFFTEXT

*These are included to improve algorithm performance. They are not necessary for model specification.

PQ.LO(i) = 0.0; PD.LO(i) = 0.0; PM.LO(im) = 0.0;
PK.LO(i) = 0.0; PX.LO(i) = 0.0; Q.LO(i) = 0.0;
X.LO(i) = 0.0; M.LO(un) = 0.0; D.LO(i) = 0.0;
WF.LO(f) = 0.0; INT.LO(i) = 0.0; E.LO(te) = 0.0;
FDSC.LO(1,f)$(FDSC.L(1,f) NE 0) = 0.0;
PV.LO(i) = 0.0; PE.LO(i) = 0.0;
*## NUMERAIRE PRICE INDEX

In this case, the GDP deflator is,

* PINDEX.FX = PINDEX.L ;

*## FOREIGN EXCHANGE MARKET CLOSURE

* In this version, the balance of trade (current account balance) and the exchange rate are fixed exogenously; PINDEX is the equilibrating variable.

    EXR.FX  = EXR.L ;
    FSAV.FX  = FSAV.L ;

*## INVESTMENT-SAVINGS CLOSURE

* This version specifies neoclassical closure. Aggregate investment is determined by aggregate savings; the model is savings driven.

    MPS.FX(hh)  = MPS.L(hh) ;
* INVEST.FX  = INVEST.L ;
*## EXOGENOUS GOVT EXPENDITURE
*## AND GOVT CLOSURE RULE

* Real government spending (GDTOT) is fixed exogenously. The government deficit (GOVSAV) is determined residually.

    GDTOT.FX  = GDTOT.L ;
* GOVSAV.FX  = GOVSAV.L ;

*## FACTOR MARKET CLOSURE

* Capital stocks in this version are fixed. Commented equations in capital stock section allow mobile capital version to be chosen. Commented equations in the labor blocks allow a version with fixed wage for each labor type, with total employment endogenous.

    FS.FX("ADM")  = FS.L("ADM") ;
    WFDIST.FX(i,"ADM")  = WFDIST.L(i,"ADM") ;
* WF.FX("ADM")  = WF.L("ADM") ;
* FS.LQ("ADM")  = -inf ;
* FS.UP("ADM")  = +inf ;

    FS.FX("SERV")  = FS.L("SERV") ;
    WFDIST.FX(i,"SERV")  = WFDIST.L(i,"SERV") ;
* WF.FX("SERV")  = WF.L("SERV") ;
* FS.LQ("SERV")  = -inf ;
* FS.UP("SERV")  = +inf ;

    FS.FX("AGR-HL")  = FS.L("AGR-HL") ;
    WFDIST.FX(i,"AGR-HL")  = WFDIST.L(i,"AGR-HL") ;
* WF.FX("AGR-HL")  = WF.L("AGR-HL") ;
* FS.LQ("AGR-HL")  = -inf ;
* FS.UP("AGR-HL")  = +inf ;

    FS.FX("AGR-FLSF")  = FS.L("AGR-FLSF") ;
OPTIONS DECIMALS=2, ITERLIM=1000, LIMROW=0, LIMCOL=0, SOLPRINT=OFF:

* OPTIONS DECIMALS=2, ITERLIM=1000, LIMROW=0, LIMCOL=0, SOLPRINT=ON:

MODEL BANGLA /ALL/;
BANGLA.optfile = 1;
BANGLA.holdfixed = 1;

* SOLVE BANGLA MAXIMIZING RGDP USING NLP;
SOLVE BANGLA MAXIMIZING OMEGA USING NLP;

END OF MODEL
*### THREE REPORT AND OUTPUT BLOCKS
*## 1) TABLES OF RESULTS FOR VARIABLES IN MODEL
*## 2) TABLES OF RESULTS FOR DISPLAY
*## 3) TABLES OF RESULTS FOR COMPARISON BETWEEN BASE AND EXPERIMENT
*## USE $ONTEXT AND $OFFTEXT TO TURN OFF REPORTS NOT WANTED
*### 1) TABLES OF RESULTS FOR VARIABLES IN THE MODEL

*### MACRO AGGREGATE RESULTS
SCALRES("EXR") = EXR.L;
SCALRES("PINDEX") = PINDEX.L;
SCALRES("RGDP") = RGDP.L;
SCALRES("GDPVA") = GDPVA.L;
SCALRES("INVEST") = INVEST.L;
SCALRES("FXDINV") = FXDINV.L;
SCALRES("GDTOT") = GDTOT.L;
SCALRES("GR") = GR.L;
SCALRES("GOVY") = GOVY.L;
SCALRES("CORY") = CORY.L;
SCALRES("TARIFF") = TARIFF.L;
SCALRES("INDTAX") = INDTAX.L;
SCALRES("HHTAX") = HHTAX.L;
SCALRES("CORTAX") = CORTAX.L;
* SCALRES("EXPSUB") = EXPSUB.L;

SCALRES("SAVING") = SAVING.L;
* SCALRES("DEPREC") = DEPREC.L;
SCALRES("HHSAV") = HHSAV.L;
SCALRES("CORSAV") = CORSAV.L;
SCALRES("GOVSAV") = GOVSAV.L;

*### FACTOR OF PRODUCTION RESULTS
FCTRES1(i,f) = FDSC.L(i,f);

*### TABLE FCTRES2(*,f) MISCELLANEOUS FACTOR VARIABLE RESULTS:
SET IFVAR /WF, FS, YFCTR/;
PARAMETER FCTRES2(ifvar,f) MISCELLANEOUS FACTOR VARIABLE RESULTS:
FCTRES2("WF",f) = WF.L(f);
FCTRES2("FS",f) = FS.L(f);
FCTRES2("YFCTR",f) = YFCTR.L(f);

*### SECTORAL PRICE AND QUANTITY RESULTS
SECTRES("PQ",i) = PQ.L(i);
SECTRES("PD",i) = PD.L(i);
SECTRES("PE",i) = PE.L(i);
SECTRES("PK",i) = PK.L(i);
SECTRES("PM",i) = PM.L(i);
SECTRES("PV",i) = PV.L(i);
SECTRES("PWE",i) = PWE.L(i);
SECTRES("PX",i) = PX.L(i);
SECTRES("Q",i) = Q.L(i);
SECTRES("X",i) = X.L(i);
SECTRES("D",i) = D.L(i);
SECTRES("E",i) = E.L(i);
SECTRES("M",i) = M.L(i);  
SECTRES("INT",i) = INT.L(i);  
SECTRES("CD",i) = CD.L(i);  
SECTRES("GD",i) = GD.L(i);  
SECTRES("ID",i) = ID.L(i);  
SECTRES("DST",i) = DST.L(i);  
SECTRES("DK",i) = DK.L(i);

### HOUSEHOLD RESULTS
### TABLE HHRES(*,hh) MISCELLANEOUS HOUSEHOLD RESULTS
SET HHVAR /MPS, YH/;
PARAMETER HHRES(hhvar,hh) MISCELLANEOUS HOUSEHOLD RESULTS;
HHRES("MPS",hh) = MPS.L(hh);
HHRES("YH",hh) = YH.L(hh);

option decimals = 2;
DISPLAY SCALRES, WALRAS1.L, FCTRES1, FCTRES2, SECTRES, HHRES;
option decimals = 3;

### 2) TABLES OF RESULTS FOR DISPLAY
### DEFINE SETS FOR SOLUTION REPORT TABLES ###
* For GDP TABulations

SET igdp rows /consmpt, Investment, Inventory, Government, Exports, Imports, GDP /
    igdp1(igdp) /GDP/ 
    igdp2(igdp)
  jgdp columns /nominal
    real
    nomshare
    realshare
    deflator /
  itar categories /valueadd
    tariffs
    totalgdp /;
igdp2(igdp) = NOT igdp1(igdp);

PARAMETER gdptab(igdp,jgdp) GDP ACCOUNTS;
PARAMETER gdptab2(i,jgdp) SECTORAL VALUE ADDED;
PARAMETER sumgdp(itar,jgdp) AGGREGATE GDP;
PARAMETER gdpratio GDP VALUE ADDED CORRECTION FACTOR;

* for ABSORB
set rar rows / ag, non-ag, total /
PARAMETER ABSORB(rar,rac) ABSORPTION TABLE (REAL);

* for FACTORS
set rf / yf, yfcap, profit, rental, rdist, wdcap, yfadm, wdadm, yfserv, 
    wdserv, yfagr-hl, wdagr-hl, yfagr-flsf, wdagr-flsf, 
    yfagr-flf, wdagr-flf, yfprtr-sk, wdprrr-sk, yfprtr-ss, wdprrr-ss, 
    yfprtr-us, wdprrr-us, pint, intinp /

PARAMETER FACTORS(i,rf) FACTOR RETURNS DISTRIBUTIVE PARAMETERS;

* for COEFFS (shift and share coefficients)
PARAMETERS

agtotfd  agricultural terms of trade
agotv   ag terms of trade value added
agotw   ag terms of trade world export price
agotm   ag terms of trade world import price
avgprf  average profit rate
avgwcf  average factor price current weights
bot     nominal balance of trade
botr    real balance of trade
colind  cost of living index
esum    real exports
exrind  real exchange rate index
hold    holds value for end calculation
indhold holds value for end calculation
intinp  intermediate input demand by sector i
intinpn nominal intermediate input demand by sector i
msum    real imports
ncdot   nominal cdtot
nex     nominal exports
nim     nominal imports
ngdot   nominal govt demand
ngdp    nominal GDP
pnagind nonag price index
pagind  ag price index
pmind   domestic import price index
peind   domestic export price index
pweind  world export price index
pmind   world import price index
psav    private savings
pxind   producer price index
pdind   domestic supply price index
pdind   composite good price index
pint    cost per unit of intermediate inputs
profit  profit rate
rdist   capital rental proportionality factor
rental  rental rate of capital
shconsump consumption share of nominal GDP
shinvest investment share of nominal GDP
shex    export share of nominal GDP
shim    import share of nominal GDP
shgdtot govt consumption share of nominal GDP
shbot   balance of trade share of nominal GDP
shfsav  foreign saving share of investment
shgfsav government saving share of investment
shpsav  private saving share of investment
valadd value added at market price
sectory value added at factor cost
sectar  sectoral tariff revenue
sectnd  sectoral domestic tax revenue
wtd     base year wt domestic in total domestic sales
wtn     base year wt of imports in total trade
wtx     base year wt of exports in total trade
yf(i,f) factor income
*### SPECIFY EXTRA PARAMETERS FOR SOLUTION REPORT TABLES ###*

*### AG TERMS OF TRADE ###*

\[
\begin{align*}
\text{pagind} &= \frac{\text{SUM}(\text{iag}, \text{px}\_1(iag) \times x\_1(iag))}{\text{SUM}(\text{ag}, \text{x}\_1(iag))}; \\
\text{pnagind} &= \frac{\text{SUM}(\text{iagn}, \text{px}\_1(iagn) \times x\_1(iagn))}{\text{SUM}(\text{ag}, \text{x}\_1(iagn))}; \\
\text{agtotfd} &= 100 \times \frac{\text{pagind}}{\text{pnagind}}; \\
\text{pagind} &= \frac{\text{SUM}(\text{iag}, \text{PV}\_1(iag) \times x\_1(iag))}{\text{SUM}(\text{ag}, \text{x}\_1(iag))}; \\
\text{pnagind} &= \frac{\text{SUM}(\text{iagn}, \text{PV}\_1(iagn) \times x\_1(iagn))}{\text{SUM}(\text{ag}, \text{x}\_1(iagn))}; \\
\text{agtotva} &= 100 \times \frac{\text{pagind}}{\text{pnagind}}; \\
\text{pagind} &= \frac{\text{SUM}(\text{iag}, \text{pwe}\_1(iag) \times e\_1(iag))}{\text{SUM}(\text{ag}, \text{x}\_1(iag))}; \\
\text{pnagind} &= \frac{\text{SUM}(\text{iagn}, \text{pwe}\_1(iagn) \times e\_1(iagn))}{\text{SUM}(\text{ag}, \text{x}\_1(iagn))}; \\
\text{agtotm} &= 100 \times \frac{\text{pagind}}{\text{pnagind}}; \\
\text{pagind} &= \frac{\text{SUM}(\text{iag}, \text{pwm}\_1(iag) \times m\_1(iag))}{\text{SUM}(\text{ag}, \text{x}\_1(iag))}; \\
\text{pnagind} &= \frac{\text{SUM}(\text{iagn}, \text{pwm}\_1(iagn) \times m\_1(iagn))}{\text{SUM}(\text{ag}, \text{x}\_1(iagn))}; \\
\text{agtotni} &= 100 \times \frac{\text{pagind}}{\text{pnagind}}; \\
\end{align*}
\]

DISPLAY agtotfd, agtotva, agtotm, agtotni; DISPLAY agtotva, agtotm, agtotni;

*### MACRO BALANCES ###*

\[
\begin{align*}
\text{ncdtot} &= \text{SUM}(\text{i}, \text{cd}\_1(i) \times \text{pq}\_1(i)); \\
\text{ngdtot} &= \text{SUM}(\text{i}, \text{gd}\_1(i) \times \text{pq}\_1(i)); \\
\text{ngdp} &= \text{SUM}(\text{i}, \text{pq}\_1(i) \times (\text{cd}\_1(i) + \text{dist}\_1(i) + \text{id}\_1(i) + \text{gd}\_1(i)) + \text{pe}\_1(i) \times \text{e}\_1(i) - \text{pwm}\_1(i) \times \text{exr}\_1 \times \text{m}\_1(i)); \\
\text{nex} &= \text{SUM}(\text{i}, \text{e}\_1(i) \times \text{exr}\_1 \times \text{pwm}\_1(i)); \\
\text{nim} &= \text{SUM}(\text{i}, \text{m}\_1(i) \times \text{exr}\_1 \times \text{pwm}(\text{im})); \\
\text{bot} &= \text{nex} - \text{nim}; \\
\text{botr} &= \text{SUM}(\text{i}, \text{e}\_1(i)) - \text{SUM}(\text{i}, \text{m}\_1(i)); \\
\text{esum} &= \text{SUM}(\text{i}, \text{e}\_1(i)); \\
\text{msum} &= \text{SUM}(\text{i}, \text{m}\_1(i)); \\
\text{psav} &= \text{invest}\_1 - \text{fsav}\_1 - \text{gsvs}\_1; \\
\text{shbot} &= 100 \times \frac{\text{bot}}{\text{gdpva}\_1}; \\
\text{shconsump} &= 100 \times \frac{\text{ncdtot}}{\text{gdpva}\_1}; \\
\text{shlex} &= 100 \times \frac{\text{nex}}{\text{gdpva}\_1}; \\
\text{shfsav} &= 100 \times \frac{\text{fsav}\_1}{\text{invest}\_1}; \\
\text{shim} &= 100 \times \frac{\text{nim}}{\text{gdpva}\_1}; \\
\text{shinvest} &= 100 \times \frac{\text{invest}\_1}{\text{gdpva}\_1}; \\
\text{shgdtot} &= 100 \times \frac{\text{ngdtot}}{\text{gdpva}\_1}; \\
\text{shgsav} &= 100 \times \frac{\text{govsav}\_1}{\text{invest}\_1}; \\
\text{shpsav} &= 100 \times \frac{\text{pwm}\_1}{\text{invest}\_1}; \\
\text{shex} &= 100 \times \frac{\text{nex}}{\text{gdpva}\_1}; \\
\text{shfsav} &= 100 \times \frac{\text{fsav}\_1}{\text{invest}\_1}; \\
\text{shgdtot} &= 100 \times \frac{\text{ngdtot}}{\text{gdpva}\_1}; \\
\text{shgsav} &= 100 \times \frac{\text{govsav}\_1}{\text{invest}\_1}; \\
\text{shpsav} &= 100 \times \frac{\text{pwm}\_1}{\text{invest}\_1}; \\
\end{align*}
\]

DISPLAY bot, botr, nex, esum, nim, msum, shconsump, shinvest, shgdtot, shlex, shim, shbot, shfsav, shgsav, shpsav;

*### INDEXES ###*

Note that cost of living index (COLIND) is the simple average over households. CARD(hh) is the "cardinal" function which counts number of entries in the set.

\[
\begin{align*}
\text{COLIND} &= \frac{\text{SUM}(\text{i}, \text{pq}\_1(i) \times (\text{SUM}(\text{hh}, \text{cles}(\text{hh}, i))) \times 100)}{\text{CARD}(\text{hh})}; \\
\text{WTD}(i) &= \frac{\text{D}(i)}{\text{SUM}(\text{i}, \text{D}(j))}; \\
\text{WTM}(i) &= \frac{\text{M}(i)}{\text{SUM}(\text{i}, \text{M}(j) + \text{E}(j))}; \\
\text{WTX}(i) &= \frac{\text{E}(i)}{\text{SUM}(\text{i}, \text{M}(j) + \text{E}(j))}; \\
\text{EXRIND} &= \frac{\text{SUM}(\text{i}, \text{WTD}(i) \times \text{PD}\_1(i))}{\text{SUM}(\text{i}, (\text{WTD}(i) \times \text{PM}\_1(i)) + (\text{WTX}(i) \times \text{PE}\_1(i))) \times 100}; \\
\text{pdind} &= \frac{\text{SUM}(\text{i}, \text{D}(i) \times \text{pd}\_1(i))}{\text{SUM}(\text{i}, \text{D}(j)) \times 100}; \\
\text{peind} &= \frac{\text{SUM}(\text{i}, \text{E}(i) \times \text{pe}\_1(i))}{\text{SUM}(\text{i}, \text{E}(j)) \times 100}; \\
\end{align*}
\]

73
Pind = \frac{\text{SUM}(i, q_0(i) \cdot pq.1(i))}{\text{SUM}(j, q_0(j))} \cdot 100;

Pmind = \frac{\text{SUM}(i, m_0(i) \cdot pm.1(i))}{\text{SUM}(j, m_0(j))} \cdot 100;

Pweind = \frac{\text{SUM}(i, e_0(i) \cdot pwe.1(i))}{\text{SUM}(i, e_0(i))} \cdot 100;

Pwmind = \frac{\text{SUM}(i, m_0(i) \cdot pwm(i))}{\text{SUM}(i, m_0(i))} \cdot 100;

Pxind = \frac{\text{SUM}(i, ptwts(i) \cdot px.l(i))}{\text{SUM}(i, ptwts(i))} \cdot 100;

DISPLAY colind, exrind, ngdp, pdind, pind, peind, pweind, pwmind, pxind;

*#### SPECIFY SOLUTION REPORT TABLES ####

* GDP Tables *

Note treatment of tariffs. In U.S. NIPA, tariffs are included in the service sector. In the U.N. SNA, tariffs are treated separately. Treatment below follows U.N. SNA practice. Note also that

real GDP from expenditure side provides the control total and sectoral real value added are adjusted to match total using gdp ratio.

\[ \text{gdptab}(\text{"consmpt","nominal"}) = \text{SUM}(i, pq.l(i) \cdot cd.1(i)) \]

\[ \text{gdptab}(\text{"consmpt","real"}) = \text{SUM}(i, cd.1(i)) \]

\[ \text{gdptab}(\text{"investment","nominal"}) = \text{SUM}(i, pq.l(i) \cdot id.l(i)) \]

\[ \text{gdptab}(\text{"investment","real"}) = \text{SUM}(i, id.1(i)) \]

\[ \text{gdptab}(\text{"government","nominal"}) = \text{SUM}(i, pq.l(i) \cdot gd.l(i)) \]

\[ \text{gdptab}(\text{"government","real"}) = \text{SUM}(i, gd.1(i)) \]

\[ \text{gdptab}(\text{"exports","nominal"}) = \text{SUM}(i, pe.l(i) \cdot e.l(i)) \]

\[ \text{gdptab}(\text{"exports","real"}) = \text{SUM}(i, e.l(i)) \]

\[ \text{gdptab}(\text{"inventory","nominal"}) = \text{SUM}(i, pq.l(i) \cdot dst.l(i)) \]

\[ \text{gdptab}(\text{"inventory","real"}) = \text{SUM}(i, dst.l(i)) \]

\[ \text{gdptab}(\text{"imports","nominal"}) = \text{SUM}(i, pwm(i) \cdot m.l(i)) \]

\[ \text{gdptab}(\text{"imports","real"}) = \text{SUM}(i, (1.0 - tmreal(i)) \cdot m.l(i)) \]

\[ \text{gdptab}(\text{"exports","nominal"}) = \text{SUM}(i, pwts(i) \cdot px.l(i)) \]

\[ \text{gdptab}(\text{"exports","real"}) = \text{SUM}(i, px.l(i)) \]

\[ \text{sumgdp}(\text{"valueadd","nominal"}) = \text{SUM}(i, gdptab2(i, \text{"nominal"})) \]

\[ \text{sumgdp}(\text{"tariffs","nominal"}) = \text{SUM}(i, gdptab2(i, \text{"nominal"})) \]

\[ \text{sumgdp}(\text{"valueadd","real"}) = \text{SUM}(i, gdptab2(i, \text{"real"})) \]

\[ \text{sumgdp}(\text{"tariffs","real"}) = \text{SUM}(i, gdptab2(i, \text{"real"})) \]

\[ \text{sumgdp}(\text{"total","nominal"}) = \text{SUM}(i, gdptab2(i, \text{"nominal"})) \]

\[ \text{sumgdp}(\text{"total","real"}) = \text{SUM}(i, gdptab2(i, \text{"real"})) \]

\[ \text{sumgdp}(\text{"total","nominal"}) = \text{SUM}(i, gdptab2(i, \text{"nominal"})) \]

\[ \text{sumgdp}(\text{"total","real"}) = \text{SUM}(i, gdptab2(i, \text{"real"})) \]

\[ \text{sumgdp}(\text{"valueadd","nominal"}) = \text{SUM}(i, gdptab2(i, \text{"nominal"})) \]

\[ \text{sumgdp}(\text{"valueadd","real"}) = \text{SUM}(i, gdptab2(i, \text{"real"})) \]

\[ \text{sumgdp}(\text{"tariffs","nominal"}) = \text{SUM}(i, gdptab2(i, \text{"nominal"})) \]

\[ \text{sumgdp}(\text{"tariffs","real"}) = \text{SUM}(i, gdptab2(i, \text{"real"})) \]

\[ \text{sumgdp}(\text{"tariffs","nominal"}) = \text{SUM}(i, gdptab2(i, \text{"nominal"})) \]

\[ \text{sumgdp}(\text{"tariffs","real"}) = \text{SUM}(i, gdptab2(i, \text{"real"})) \]

\[ \text{sumgdp}(\text{"total","nominal"}) = \text{SUM}(i, gdptab2(i, \text{"nominal"})) \]

\[ \text{sumgdp}(\text{"total","real"}) = \text{SUM}(i, gdptab2(i, \text{"real"})) \]

\[ \text{sumgdp}(\text{"valueadd","nominal"}) = \text{SUM}(i, gdptab2(i, \text{"nominal"})) \]

\[ \text{sumgdp}(\text{"valueadd","real"}) = \text{SUM}(i, gdptab2(i, \text{"real"})) \]

\[ \text{sumgdp}(\text{"tariffs","nominal"}) = \text{SUM}(i, gdptab2(i, \text{"nominal"})) \]

\[ \text{sumgdp}(\text{"tariffs","real"}) = \text{SUM}(i, gdptab2(i, \text{"real"})) \]
DISPLAY GDPTAB, GDPTAB2, SUMGDP, GDPRATIO;

*## REPORT ABSORPTION ##*

absorb("ag","c") = SUM(iag,CD.L(iag)) ;  
absorb("non-ag","c") = SUM(iagn,CD.L(iagn)) ;  
absorb("total","c") = SUM(i,CD.L(i)) ;  
absorb("ag","i") = SUM(iag,ID.L(iag)) ;  
absorb("non-ag","i") = SUM(iagn,ID.L(iagn)) ;  
absorb("total","i") = SUM(i,ID.L(i)) ;  
absorb("ag","g") = SUM(iag,GD.L(iag)) ;  
absorb("non-ag","g") = SUM(iagn,GD.L(iagn)) ;  
absorb("total","g") = SUM(i,GD.L(i)) ;  
absorb("ag","E") = SUM(iag,E.L(iag)) ;  
absorb("non-ag","E") = SUM(iagn,E.L(iagn)) ;  
absorb("total","E") = SUM(i,E.L(i)) ;  

DISPLAY ABSORB ;

*### calculate and report selected parameters and coefficients ###############*

INTINP(j) = sum(i, A(i,j)*x.L(j)) ;  
INTINPN(j) = sum(i, PQ.L(i)*A(i,j)*x.L(j)) ;  
PINT(i) = SUM(J, A(J,i)*PQ.L(j)) ;  
YF(i,f) = (WFDIST.L(i,"CAPITAL")*WF.L("capital")*FDSC.L(i,"capital") )/(FDSC.L(i,"capital")*PK.L(i)) ;  
AVGPROFIT = (PV.L(i)+TX(i)*PX.L(i)*X.L(i)) ;  
RENTAL (i) = (WFDIST.L(i,"CAPITAL")*WF.L("capital")*FDSC.L(i,"capital") )/FDSC.L(i,"capital") ;  
Rental(i) = RENTAL(i)/AVGWF("capital") ;  
VALADD(i) = (PV.L(i)+TX(i)*PX.L(i)) ;  

DISPLAY AVGWF,AVGPROFIT,VALADD,SECTORY, SECTAR, secont ;

FACTORS(i,"YF") = SUM(f,YF(i,f)) ;  
FACTORS(i,"YFCAP") = YF(i,"capital") ;  
FACTORS(i,"PROFIT") = PROFIT(i) ;  
FACTORS(i,"RENTAL") = RENTAL(i) ;  
FACTORS(i,"RDIST") = RDIST(i) ;  
FACTORS(i,"WDCAP") = WFDIST.L(i,"CAPITAL") ;  
FACTORS(i,"YFADM") = YF(i,"ADM") ;  
FACTORS(i,"WDADM") = WFDIST.L(i,"ADM") ;
FACTORS(i,"YFSERV") = YF(i,"SERV");
FACTORS(i,"WDSERV") = WFDIST.L(i,"SERV");
FACTORS(i,"YFAGR-HL") = YF(i,"AGR-HL");
FACTORS(i,"WDAGR-HL") = WFDIST.L(i,"AGR-HL");
FACTORS(i,"YFAGR-FLSF") = YF(i,"AGR-FLSF");
FACTORS(i,"WDAGR-FLSF") = WFDIST.L(i,"AGR-FLSF");
FACTORS(i,"YFAGR-FLLF") = YF(i,"AGR-FLLF");
FACTORS(i,"WDAGR-FLLF") = WFDIST.L(i,"AGR-FLLF");
FACTORS(i,"YFPRTR-SK") = YF(i,"PRTR-SK");
FACTORS(i,"WDPRTR-SK") = WFDIST.L(i,"PRTR-SK");
FACTORS(i,"YFPRTR-SS") = YF(i,"PRTR-SS");
FACTORS(i,"WDPRTR-SS") = WFDIST.L(i,"PRTR-SS");
FACTORS(i,"YFPRTR-US") = YF(i,"PRTR-US");
FACTORS(i,"WDPRTR-US") = WFDIST.L(i,"PRTR-US");
FACTORS(i,"PINT") = PINT(i);
FACTORS(i,"INTINF") = INTINP(i);
COEFFS(i,"ALPHAR") = ALPHA(i,"ADM");
COEFFS(i,"ALPHAU") = ALPHA(i,"SERV");
COEFFS(i,"ALPHAS") = ALPHA(i,"AGR-HL");
COEFFS(i,"ALPHAS") = ALPHA(i,"AGR-FLSF");
COEFFS(i,"ALPHAS") = ALPHA(i,"AGR-FLLF");
COEFFS(i,"ALPHAS") = ALPHA(i,"PRTR-SK");
COEFFS(i,"ALPHAS") = ALPHA(i,"PRTR-SS");
COEFFS(i,"ALPHAS") = ALPHA(i,"PRTR-US");
COEFFS(i,"ALPHAS") = ALPHA(i,"capital");
COEFFS(i,"RMD") = RMD(i);
COEFFS(i,"DELTA") = DELTA(i);
COEFFS(i,"AD") = AD(i);

OPTION DECIMALS=3;
DISPLAY FACTORS, COEFFS;

***** 3) TABLES OF RESULTS FOR COMPARING BASE AND EXPERIMENT

***** DEFINE SETS FOR TABLES *****

* for SCALRES1,SCALRES2,RSSCALE
SET pds/BASE, EXPMNT, CHANGE /

PARAMETER SCALRES1(sc,pds) AGGREGATE VARIABLES;

* for PRICRES
SET rp / PX, PV, PE, PWE, PM, PWM, PD, PQ, PK, PROFIT, RENTAL, PINT
sector, secind /
PARAMETER PRICRES1(rp,i,pds) PRICE RESULTS BY SECTOR;

* for QUANTRES
SET rq / X, VALADD, SECTORY, E, M, ADM, SERV, AGR-HL, AGR-FLSF, AGR-FLLF, PRTR-SK, PRTR-SS, PRTR-US, CAPITAL, Q, D, DK /;

PARAMETER QUANTRES1(rq,i,pds) QUANTITY RESULTS BY SECTOR;

***** SPECIFY TABLES FOR REPORTS *****
PRICRES1("PX",i,"base") = PX.L(i) ;
PRICRES1("PV",i,"base") = PV.L(i) ;
PRICRES1("PE",i,"base") = PE.L(i) ;
PRICRES1("PWE",i,"base") = PWE.L(i) ;
PRICRES1("PM",i,"base") = PM.L(i) ;
PRICRES1("PWM",i,"base") = PWM(i) ;
PRICRES1("PD",i,"base") = PD.L(i) ;
PRICRES1("PQ",i,"base") = PQ.L(i) ;
PRICRES1("Pk",i,"base") = PROFIT(i) ;
PRICRES1("RENTAL",i,"base") = RENTAL(i) ;
PRICRES1("PINT",i,"base") = PINT(i) ;
PRICRES1("sectar",i,"base") = Sector(i) ;
PRICRES1("secind",i,"base") = secind(i) ;
QUANTRES1("X",i,"base") = X.L(i) ;
QUANTRES1("VALADD",i,"base") = VALADD(i) ;
QUANTRES1("SECTORY",i,"base") = SECTORY(i) ;
QUANTRES1("E",i,"base") = E.L(i) ;
QUANTRES1("M",i,"base") = M.L(i) ;
QUANTRES1("ADM",i,"base") = FDSC.L(i,"ADM") ;
QUANTRES1("SERV",i,"base") = FDSC.L(i,"SERV") ;
QUANTRES1("AGR-HL",i,"base") = FDSC.L(i,"AGR-HL") ;
QUANTRES1("AGR-FLLF",i,"base") = FDSC.L(i,"AGR-FLLF") ;
QUANTRES1("PRTR-SK",i,"base") = FDSC.L(i,"PRTR-SK") ;
QUANTRES1("PRTR-SS",i,"base") = FDSC.L(i,"PRTR-SS") ;
QUANTRES1("PRTR-US",i,"base") = FDSC.L(i,"PRTR-US") ;
QUANTRES1("CAPITAL",i,"base") = FDSC.L(i,"capital") ;
QUANTRES1("Q",i,"base") = Q.L(i) ;
QUANTRES1("D",i,"base") = D.L(i) ;
QUANTRES1("DK",i,"base") = DK.L(i) ;

*### MACRO AGGREGATE RESULTS*
SCALRES1("EXR","base") = EXR.L ;
SCALRES1("PINDEX","base") = PINDEX.L ;
SCALRES1("RGDP","base") = RGDP.L ;
SCALRES1("GDPVA","base") = GDPVA.L ;
SCALRES1("INVEST","base") = INVEST.L ;
SCALRES1("FXDINV","base") = FXDINV.L ;
SCALRES1("GDTOT","base") = GDTOT.L ;
SCALRES1("GR","base") = GR.L ;
SCALRES1("GOVY","BASE") = GOVY.L ;
SCALRES1("CORY","BASE") = CORY.L ;
SCALRES1("TARIFF","base") = TARIFF.L ;
SCALRES1("INDTAX","base") = INDTAX.L ;
SCALRES1("HHTAX","base") = HHTAX.L ;
SCALRES1("CORTAX","BASE") = CORTAX.L ;
* SCALRES1("EXPSUB","base") = EXPSUB.L ;
SCALRES1("SAVING","base") = SAVING.L ;
* SCALRES1("DEPREC","base") = DEPREC.L ;
SCALRES1("HHSAV","base") = HHSAV.L ;
SCALRES1("CORSAV","base") = CORSAV.L ;
SCALRES1("GOVSAV","base") = GOVSAV.L ;
SCALRES1("FSAV","base") = FSAV.L ;
* SCALRES1("WF-ADM","base") = AVGWF("ADM") ;
* SCALRES1("WF-SERV","base") = AVGWF("SERV") ;
* SCALRES1("WF-AG-RL","base") = AVGWF("AGR-RL") ;
* SCALRES1("WF-AG-FLS","base") = AVGWF("AGR-FLS") ;
* SCALRES1("WF-AG-FLF","base") = AVGWF("AGR-FLF") ;
* SCALRES1("WF-PR-TR-SS","base") = AVGWF("AGR-PRTR-SS") ;
* SCALRES1("WF-PR-TR-US","base") = AVGWF("AGR-PRTR-US") ;
SCALRES1("WF-ADM","base") = AVGWF("ADM") ;
SCALRES1("WF-SERV","base") = AVGWF("SERV") ;
SCALRES1("WF-AG-RL","base") = AVGWF("AGR-RL") ;
SCALRES1("WF-AG-FLS","base") = AVGWF("AGR-FLS") ;
SCALRES1("WF-AG-FLF","base") = AVGWF("AGR-FLF") ;
SCALRES1("WF-PR-TR-SS","base") = AVGWF("AGR-PRTR-SS") ;
SCALRES1("WF-PR-TR-US","base") = AVGWF("AGR-PRTR-US") ;
SCALRES1("WF-CAP","base") = AVGWF("CAPITAL") ;

*====================================================================*
SOCIAL ACCOUNTING MATRIX
*====================================================================*
*LEA
SAM("COMMDTY","ACTIVITY") = sum(i,(PQ.L(i)*INTL.L(i))) ;
SAM("COMMDTY","HOUSEHOLDS") = sum(i,(PQ.L(i)*CD.L(i))) ;
SAM("COMMDTY","KACCOUNT") = sum(i,(PQ.L(i)*(DST.L(i)+ID.L(i)))) ;
SAM("COMMDTY","GOVT") = sum(i,(PQ.L(i)*GD.L(i))) ;
SAM("ACTIVITY","WORLD") = sum(i,(EXR.L*PWEL.L(i)*E.L(i))) ;
SAM("ACTIVITY","COMMDTY") = sum(i,PX.L(i)*X.L(i)-EXR.L*PWEL.L(i)*E.L(i)) ;
* SAM("ACTIVITY","COMMDTY") = sum(i,PD.L(i)*D.L(i)) ;
SAM("VALUAD","ACTIVITY") = sum(f,YFCTR.L(f)) ;

$ONTEXT
SAM("COMMDTY","ACTIVITY") = sum(i,(PQ.L(i)*INTL.L(i))) ;
SAM("COMMDTY","HOUSEHOLDS") = sum(i,(PQ.L(i)*CD.L(i))) ;
SAM("COMMDTY","KACCOUNT") = sum(i,(PQ.L(i)*(DST.L(i)+ID.L(i)))) ;
SAM("COMMDTY","GOVT") = sum(i,(PQ.L(i)*GD.L(i))) ;
SAM("COMMDTY","WORLD") = sum(i,(EXR.L*PWEL.L(i)*E.L(i))) ;
SAM("ACTIVITY","COMMDTY") = sum(i,PX.L(i)*X.L(i)) ;
SAM("VALUAD","ACTIVITY") = sum(f,YFCTR.L(f)) ;

$OFFTEXT
SAM("CORP","VALUAD") = CORY.L ;
* SAM("HOUSEHOLDS","VALUAD") = sum(hh,YH.L(hh)) ;
SAM("HOUSEHOLDS","VALUAD") = sum(hh,YHLF.L(hh)) ;
* SAM("HOUSEHOLDS","CORP") = sum(hh,DIVID.L(hh)) ;
SAM("HOUSEHOLDS","GOVT") = sum(hh,GOVTR.L(hh)) ;
SAM("HOUSEHOLDS","WORLD") = sum(hh,REMIT.L(hh)) ;
* SAM("HOUSEHOLDS","HOUSEHOLDS") = sum(hh,HHTRL.L(hh)) ;

*LEA

* SAM("KACCOUNT","VALUAD") = DEPRECL.L ;
*LEA
SAM("KACCOUNT","CORP") = CORSAV.L ;
*LEA
SAM("KACCOUNT","HOUSEHOLDS") = HHSAV.L ;
SAM("KACCOUNT","GOVT") = GOVSAV.L ;
SAM("KACCOUNT","WORLD") = FSASAV.L*EXR.L ;
SAM("GOVT","ACTIVITY") = TARIFF.L ;
SAM("GOVT","ACTIVITY") = INDTAX.L ;
### COMPARATIVE STATICS EXPERIMENT

**DUTCH DISEASE EXPERIMENT: ADDITIONAL $450 MILLION INFLOW**
* LEAVE FSAV FIXED, AND INCREASE BY 500; THEN RESOLVE

- FSAV.FX = FSAV.L + .45
- SOLVE BANGLADESH MAXIMIZING OMEGA USING NLP;

**TO TEST MODEL CONSISTENCY, DOUBLE NUMERAIRE**
- EXR.FX = EXR.L + .8
- SOLVE BANGLADESH MAXIMIZING OMEGA USING NLP;

**TAX EXPERIMENT**

\[ \text{Tn(im)} = 0.30 \]

SOLVE BANGLADESH MAXIMIZING OMEGA USING NLP;

### SPECIFY TABLES FOR REPORTS

<table>
<thead>
<tr>
<th>Table Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PINT(i)</td>
<td>SUM(J.A(J,i)*PQ.L(j))</td>
</tr>
<tr>
<td>PROFIT(i)</td>
<td>(WFDIST.L(i,&quot;capital&quot;)*WF.L(&quot;capital&quot;)*FDSC.L(i,&quot;capital&quot;)/FDSC.L(i,&quot;capital&quot;)*PK.L(i))</td>
</tr>
<tr>
<td>RENTAL(i)</td>
<td>(WFDIST.L(i,&quot;capital&quot;)*WF.L(&quot;capital&quot;)*FDSC.L(i,&quot;capital&quot;) /FDSC.L(i,&quot;capital&quot;)</td>
</tr>
<tr>
<td>VALADD(i)</td>
<td>(PV.L(i)+(TX(i)*PX.L(i)))*x.L(i)</td>
</tr>
<tr>
<td>SECTORY(i)</td>
<td>(PV.L(i)*x.L(i))</td>
</tr>
<tr>
<td>AVGWF(f)</td>
<td>YFCTR.L(f)/FS.L(f)</td>
</tr>
<tr>
<td>Sector(i,m)</td>
<td>TM(im)*M.(i,m)*PWM(im)*EXR.L</td>
</tr>
<tr>
<td>secind(i)</td>
<td>TX(i)*PX.L(i)*X.L(i)</td>
</tr>
</tbody>
</table>

**PRICRES1**

- \[ \text{PX},i,"expmnt" = PX.L(i) \]
- \[ \text{PV},i,"expmnt" = PV.L(i) \]
- \[ \text{PE},i,"expmnt" = PE.L(i) \]
- \[ \text{PWE},i,"expmnt" = PWE.L(i) \]
- \[ \text{PM},i,"expmnt" = PM.L(i) \]
- \[ \text{PWM},i,"expmnt" = PWM(i) \]
- \[ \text{PD},i,"expmnt" = PD.L(i) \]
- \[ \text{PQ},i,"expmnt" = PQ.L(i) \]
- \[ \text{PK},i,"expmnt" = PK.L(i) \]
- \[ \text{PROFIT},i,"expmnt" = PROFIT(i) \]
PRICRES1("RENTAL", i, "expmnt") = RENTAL(i);
PRICRES1("PINT", i, "expmnt") = PINT(i);
PRICRES1("sectar", i, "expmnt") = sectar(i);
PRICRES1("secind", i, "expmnt") = secind(i);

QUANTRES1("X", i, "expmnt") = X.L(i);
QUANTRES1("VALADD", i, "expmnt") = VALADD(i);
QUANTRES1("SECTORY", i, "expmnt") = SECTORY(i);
QUANTRES1("E", i, "expmnt") = E.L(i);
QUANTRES1("M", i, "expmnt") = M.L(i);
QUANTRES1("ADM", i, "base") = FDSC.L(i, "ADM");
QUANTRES1("SERV", i, "base") = FDSC.L(i, "SERV");
QUANTRES1("AGR-HL", i, "base") = FDSC.L(i, "AGR-HL");
QUANTRES1("AGR-FLLF", i, "base") = FDSC.L(i, "AGR-FLLF");
QUANTRES1("PRTR-SK", i, "base") = FDSC.L(i, "PRTR-SK");
QUANTRES1("PRTR-SS", i, "base") = FDSC.L(i, "PRTR-SS");
QUANTRES1("PRTR-US", i, "base") = FDSC.L(i, "PRTR-US");
QUANTRES1("CAPITAL", i, "base") = FDSC.L(i, "capital");
QUANTRES1("Q", i, "expmnt") = Q.L(i);
QUANTRES1("D", i, "expmnt") = D.L(i);
QUANTRES1("DK", i, "expmnt") = DK.L(i);

### MACRO AGGREGATE RESULTS
SCALRES1("EXR", "expmnt") = EXR.L;
SCALRES1("PINDEX", "expmnt") = PINDEX.L;
SCALRES1("RGDP", "expmnt") = RGDP.L;
SCALRES1("GDPVA", "expmnt") = GDPVA.L;
SCALRES1("INVEST", "expmnt") = INVEST.L;
SCALRES1("FXDINV", "expmnt") = FXDINV.L;
SCALRES1("GDTOT", "expmnt") = GDTOT.L;
SCALRES1("GR", "expmnt") = GR.L;
SCALRES1("GOVY", "EXPMNT") = GOVY.L;
SCALRES1("CORY", "EXPMNT") = CORY.L;
SCALRES1("TARIFF", "expmnt") = TARIFF.L;
SCALRES1("INDTAX", "expmnt") = INDTAX.L;
SCALRES1("HHTAX", "expmnt") = HHTAX.L;
SCALRES1("CORTAX", "expmnt") = HHTAX.L;
* SCALRES1("EXPSUB", "expmnt") = EXPSUB.L;
SCALRES1("SAVING", "expmnt") = SAVING.L;
* SCALRES1("DEPREC", "expmnt") = DEPREC.L;
SCALRES1("HHSAV", "expmnt") = HHSAV.L;
SCALRES1("CORTAX", "expmnt") = CORTAX.L;
SCALRES1("GOVSAV", "expmnt") = GOVSAV.L;
SCALRES1("FSAV", "expmnt") = FSAV.L;

SCALRES1("WF-ADM", "EXPMNT") = AVGWF("ADM");
SCALRES1("WF-SERV", "EXPMNT") = AVGWF("SERV");
SCALRES1("WF-AGR-HL", "EXPMNT") = AVGWF("AGR-HL");
SCALRES1("WF-AGR-FL", "EXPMNT") = AVGWF("AGR-FLLF");
SCALRES1("WF-PR-SK", "EXPMNT") = AVGWF("PRTR-SK");
SCALRES1("WF-PR-SS", "EXPMNT") = AVGWF("PRTR-SS");
SCALRES1("WF-PR-US", "EXPMNT") = AVGWF("PRTR-US");
SCALRES1("WF-CAP","EXPMNT") = AVGWF("CAPITAL");

SCALRES1(sc,"change") $SCALRES1(sc,"base") = 100. * ((SCALRES1(sc,"expmnt") / SCALRES1(sc,"base")) - 1.0);
QUANTRES1(rq,i,"change") $QUANTRES1(rq,i,"base") = 100. * ((QUANTRES1(rq,i,"expmnt") / QUANTRES1(rq,i,"base")) - 1.0);
PRICRES1(rp,i,"change") $PRICRES1(rp,i,"base") = 100. * ((PRICRES1(rp,i,"expmnt") / PRICRES1(rp,i,"base")) - 1.0);
OPTION DECIMALS=3;
DISPLAY PRICRES1;
DISPLAY QUANTRES1;
DISPLAY SCALRES1;

*$context
parameter utility(HH)
  utilbase(HH)
  utilgrth(HH)
  CONNEW(HH)
  CONBAS(HH)
  CONGRTH(HH)
  CNEW(i)
  CBAS(i)
  CGRTH(i)
  YNEW(HH)
  YBAS(HH)
  YGRTH(HH)
  EQUIV(HH)
  FDBAS(I,F)
  FDNEW(I,F)
  FDGRTH(I,F)
  FFDIAS(I)
  FFDNEW(I)
  LDBAS(I)
  LDNEW(I)
  LDGRTH(I)
  PXCH(I)
  PXCH1(I)
  PVCH(I)
  PVGRTH(I)
  TBm
  TTM
  TMGRTH
  TBE
  TTE
  TEGRTH
  TBX
  TTX
  TXGRTH
  SECFB(I,F)
  SECFN(I,F)
  SFB(I)
  SFN(I)
  SFGRTH(I)
  SFB1(F)
  SFN1(F)
  CD1(I)
  TOTC
CLES1(I)
util1
tutil1
tutilgrth
EQUIV1
pdpmr(i)
pdper(i)
SF1grth(F)
YHC(HH)
FFDGRTH(I);

utility(HH) = PROD(i$CLES(HH,I), (CD.L(I))**CLES(HH,I)) ;
utilbase(HH) = prod(i$cles(HH,I),cd0(I)**cles(HH,I)) ;
utilgrth(HH) = 100*((utility(HH)/utilbase(HH))-1) ;
*utilgrth(HH) = 100*((utilBASE(HH)/utilITY(HH))-1) ;
*EQUIV(HH) = (UTILITY(HH)-UTILBASE(HH))* (YHC(HH))/UTILBASE(HH)) ;
*EQUIV(HH) = (UTILBASE(HH)-UTILITY(HH))* (YH0(HH))/UTILBASE(HH)) ;
*invest = sum(i,dk.(i)) ;

CONNEW(HH) = SUM(I, CLES(HH,I)*CD.L(I)) ;
CONBAS(HH) = SUM(I, CLES(HH,I)*CD0(I)) ;
*CONgrth(HH) = 100*((CONNEW(HH)/CONBAS(HH))-1) ;
*YNEW(HH) = YHL(HH) ;
*YBAS(HH) = YHC(HH) ;
*Ygrth(HH) = 100* ((YNEW(HH)/YBAS(HH))-1) ;
FDBAS(i,f) = FCTRES1(i,f) ;
FDNEW(I,F) = FDSC.L(I,F) ;
FDgrth(I,F) = FDNEW(I,F) / FDBAS(I,F) = 1 ;
FFDBAS(I) = SUM(F, FDBAS(I,F)) ;
FFDNEW(I) = SUM(F, FDNEW(I,F)) ;
FFDgrth(I) = 100* ((FFDNEW(I)/FFDBAS(I))-1) ;

CFDBAS(I) = FDBAS(I,"CAPITAL") ;
CFDNEW(I) = FDNEW(I,"CAPITAL") ;

LDBAS(I) = FFDBAS(I)-CFDBAS(I) ;
LDNEW(I) = FFDNEW(I)-CFDNEW(I) ;
LDgrth(I) = 100* ((LDNEW(I)/LDBAS(I))-1) ;

TOTC = SUM(I, CD0(I)) ;
CLES1(I) = CD0(I)/TOTC ;
util1 = PROD(i$CLES1(I), CD.L(I)**CLES1(I)) ;
*util1 = PROD(i$CLES1(I), CD.L(I)**CLES1(I)) ;
tutil1 = prod(i$cles1(I),cd0(I)**cles1(I)) ;
tutilgrth = 100*((tutil1/tutil1)-1) ;
*utilgrth(HH) = 100*((utilBASE(HH)/utilITY(HH))-1) ;
*EQUIV1 = (UTIL1-UTIL1B1)* (SUM(HH,YH0(HH))/UTILB1) ;

PXCH(i) = (PDO(I)*D0(I)+PE0(I)*E0(I)) /X0(I) ;
PXCH(i) = (PD.L(I)*D.L(I)+PE.L(I)*E.L(I)) /X.L(I) ;
PVC(i) = PX.L(i)*(1 - TX(i)) - SUM(j,a(j,i)*PQ.L(j)) ;
PVgrth(i) = 100* ((PVCH(i)/PV0(i))-1) ;

TBM = SUM(I, M0(I)) ;
TTM = SUM(I, M.L(I)) ;
TMgrth = 100* ((TTM/TBM)-1) ;
TBE = SUM(I, E0(I))
TTE = SUM(I, E.L(I))
Tegrth = 100*((TTE/TBE)-1)

TBX = SUM(I, X0(I))
TTX = SUM(I, X.L(I))
TXgrth = 100*((TTX/TBX)-1)

SECFB(I,F) = WFDIST0(i,F)*WF0(F)*FCTRES1(i,F)
SECFN(I,F) = WFDIST.I(i,F)*WF.L(F)*FDSC.I(i,F)

SFB(I) = SUM(F, SECFB(I,F))
SFN(I) = SUM(F, SECFN(I,F))
SFgrth(I)$SFB(I) = 100*((SFN(I)/SFB(I))-1)

SFB1(F) = SUM(I, SECFB(I,F))
SFN1(F) = SUM(I, SECFN(I,F))
SF1grth(F)$SFB1(F) = 100*((SFN1(F)/SFB1(F))-1)

pdprnr(i) = pm.1(i)/pd.1(i)
pdper(i) = pc.1(i)/pd.1(i)

PARAMETER TBVAL
    TNVAL;

TBVAL = SUM(I, (PV0(I)*X0(I)));
TNVAL = SUM(I, (PV.L(I)*X.L(I)))

OPTION DECIMALS=3;
Display pd.1, pm.1, pc.1, pdpmr, pdper;
*Display utility,utilbase,utilgrth,EQUIV,CONNEW,CONBAS,CONGRTH;
Display utility,utilbase,utilgrth,CONNEW,CONBAS,CONGRTH;
*DISPLAY YNEW, YBAS, YGRTH, FDBAS, FDNEW, FDGRTH, FFDBAS, FFDNEW, FFDGRTH;
DISPLAY FDBAS, FDNEW, FDGRTH, FFDBAS, FFDNEW, FFDGRTH;
DISPLAY cd0, cd1, CFDBAS, CFNEW, CDNEW, LDBAS, LDNEW, LDGRTH;
DISPLAY PXCH, PXCH1, PVCH, PV0, PVGRTH, TBX, TTX, TXGRTH, TBM, TTM, TMGRTH, TBE, TTE, TEGRTH;
DISPLAY SECFB, SECFN, SFB, SFN, SFRGTH, SF1, SF1N, SF1GRTH;
*DISPLAY TOTCD, CLES1, UTIL1, UTILB1, UTIL1GRTH, EQUIV1;
DISPLAY TOTC, CLES1, UTIL1, UTILB1, UTIL1GRTH;
DISPLAY TBVAL, TNVAL, YH.L, YHF.L, CORSAV.L;
*Softext

*######################################################## THE END ########################################################
## Appendix-II

### Description of Function Keys for KEDIT

#### *** SOME VERY IMPORTANT KEYS:***

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOME</td>
<td>cursor to command line, handle pending prefix commands, leave Input Mode</td>
</tr>
<tr>
<td>ENTER</td>
<td>if cursor is on command line, enter command. Otherwise, move cursor to beginning of next line</td>
</tr>
<tr>
<td>F2</td>
<td>add a new line, move cursor to left margin column</td>
</tr>
</tbody>
</table>

#### *Cursor Pad Keys:*

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cursor right</td>
<td>move cursor one position to the right</td>
</tr>
<tr>
<td>cursor left</td>
<td>move cursor one position to the left</td>
</tr>
<tr>
<td>cursor up</td>
<td>move cursor up one line; scroll if at the top of the text area</td>
</tr>
<tr>
<td>cursor down</td>
<td>move cursor down one line; scroll if at the bottom of the text area</td>
</tr>
<tr>
<td>HOME</td>
<td>cursor to command line, handle pending prefix commands, leave input mode</td>
</tr>
<tr>
<td>PGUP</td>
<td>move forward one window full</td>
</tr>
<tr>
<td>PCDN</td>
<td>move backward one window full</td>
</tr>
<tr>
<td>END</td>
<td>cursor to end of cursor line</td>
</tr>
<tr>
<td>DEL</td>
<td>delete character at cursor location</td>
</tr>
<tr>
<td>INS</td>
<td>toggle Insert Mode on/off</td>
</tr>
<tr>
<td>CTRL-cursor right</td>
<td>tab to next word</td>
</tr>
<tr>
<td>CTRL-cursor left</td>
<td>tab backwards to previous word</td>
</tr>
<tr>
<td>CTRL-PGUP</td>
<td>'top of file' line becomes current line</td>
</tr>
<tr>
<td>CTRL-PGDN</td>
<td>'bottom of file' becomes current line</td>
</tr>
<tr>
<td>CTRL-END</td>
<td>delete from cursor to end of cursor line</td>
</tr>
<tr>
<td>CTRL-HOME</td>
<td>cursor to upper left corner of text area</td>
</tr>
<tr>
<td>CTRL-BREAK</td>
<td>interrupt certain long running commands</td>
</tr>
<tr>
<td>PLUS key on right of keyboard</td>
<td>toggle between prefix and text area, handle pending prefix commands</td>
</tr>
<tr>
<td>ALT-numeric pad</td>
<td>enter special ASCII code</td>
</tr>
</tbody>
</table>

#### *Typewriter Area Keys:*

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTER</td>
<td>if cursor is on command line, enter command. Otherwise, move cursor to beginning of next line</td>
</tr>
<tr>
<td>ESC</td>
<td>undo changes made to cursor line since cursor entered the line</td>
</tr>
<tr>
<td>TAB</td>
<td>move to next tab column or field</td>
</tr>
<tr>
<td>SHIFT-TAB</td>
<td>move to previous tab column or field</td>
</tr>
<tr>
<td>BACKSPACE</td>
<td>move cursor one position left, delete character in cursor position</td>
</tr>
<tr>
<td>CTRL-ENTER</td>
<td>toggle between prefix and text area, handle pending prefix commands</td>
</tr>
<tr>
<td>ALT-A</td>
<td>add a new line, move cursor to left margin column</td>
</tr>
<tr>
<td>ALT-B</td>
<td>box block mark - mark one corner of a box</td>
</tr>
<tr>
<td>ALT-C</td>
<td>copy a block</td>
</tr>
<tr>
<td>ALT-D</td>
<td>delete line</td>
</tr>
<tr>
<td>ALT-F</td>
<td>fill box with a specified character</td>
</tr>
<tr>
<td>ALT-G</td>
<td>group delete - delete a block</td>
</tr>
</tbody>
</table>
Function Keys:

ALT-H  view KEDIT.HLP file
ALT-J  join two lines
ALT-K  copy a block, and leave block marked
ALT-L  line block mark - mark either end of a line block
ALT-M  move a block
ALT-O  overlay - box block overlays area starting at cursor
ALT-R  recover a changed or deleted line
ALT-S  split a line
ALT-U  unmark a block
ALT-W  word delete
ALT-Z  stream block mark - mark either end of stream block
ALT-1  POINT .A
ALT-2  POINT .B
ALT-3  POINT .C
ALT-4  go to line named .A
ALT-5  go to line named .B
ALT-6  go to line named .C
ALT-=  duplicate cursor line
CTRL-A  adjust text so first nonblank character in
        cursor line is under the cursor
CTRL-C  center a line
CTRL-F  format a paragraph
CTRL-L  left adjust a line
CTRL-P  paragraph - start a new paragraph
CTRL-R  right adjust a line

* Function Keys:

F1  cursor to current line
F2  add a new line, move cursor to left margin column
F3  QUIT current file
F4  move cursor to next tab column
F5  cursor line becomes current line
F6  ? - redisplay last command line
F7  cursor to column 1 of cursor line
F8  duplicate cursor line
F9  = - reissue last command
F10  cursor to command line of next window
SHIFT-F1 reissue last LOCATE command
SHIFT-F2 cursor to column pointer column of current line
SHIFT-F3 page up half the height of the window
SHIFT-F4 page down half the height of the window
SHIFT-F5 uppercase block
SHIFT-F6 lowercase block
SHIFT-F7 shift contents of block one char to the left
SHIFT-F8 shift contents of block one char to the right
SHIFT-F9 move cursor half width of window to the left
SHIFT-F10 move cursor half width of window to the right
ALT-F9 allows input of special ASCII codes
ALT-F10 refreshes screen after DOS message has appeared

* Examples of KEDIT Targets:

absolute line number targets:  :10 :18 :52
relative line number targets:  12 -8 16
string targets:  /abc/ /Hello/ ~/abc/ ~/.1234/
                 /abc/ & /def/
                 /x/ | /y/ | /z/
named line targets: .A .HELLO .ABC

* Examples of KEDIT Column Targets:

absolute column targets: :16 :1 :38
relative column targets: 1 -2 4
string column targets: /Joe/ /abc/ ~/George/ ~/x/
/Ed/ ~/Frank/

* KEDIT Commands:

Add (n) Add n blank lines
ALter char1 char2 (target) (n) (m) Change n occurrences, starting at the m'th occurrence, of char1 to char2 in each line through the target line
BACKward (n|*) Move backward n screens in the file
Bottom Bottom line becomes the current line
CANCEL QUIT from all files in the ring
CAPpend (text) Append text to current line
CDelete (column-target) Delete text from current column through column target
CEnter (target) Center text according to current MARGIN settings
CFirst Move the column pointer to the left zone column
Change /string1/string2/ (target) (n) (m) Change n occurrences of string1 to string2 (starting at the m'th occurrence in each line) from current line through target line
CInsert (text) Insert text after current column
CLast Move the column pointer to the right zone column
CLocate (column-target) Move the column pointer to point to the column target
CMMSG text Display text in command line
COMPress (target) Compress blanks in lines from current line through target line according to current TAB settings
COPY target1 target2 Text from current line through (but not including) target1 is copied following target2
COVerlay text Overlay text starting at current column
CReplace (text) Replace text starting at the current column
DEFine keyname (keydefinition) Display or change a keydefinition
DELeete (target) Delete lines from current line up to (but not including) the target line
DIR (fileid) View directory of DOS disk
DIRAppend (fileid) Append directory of DOS disk
DOS (doscommand) DOSNowait (doscommand)
DOSQuiet (doscommand) Invoke DOS from within KEDIT or from a KEDIT macro (Type EXIT to leave DOS environment.)
Down (n) Line n lines below current line becomes current line
DUPlicate (n) Current line is duplicated n times
Edit (fileid) Begin editing specified file or switch between current files
EMSG text Display error message on message line
ERASE fileid Erase a file from disk
EXEC fileid Execute commands in a .KED file
EXPand (target) Expand tabs in lines from current line through target line according to current TAB settings
EXTract /operand/ EXTract /operand1/operand2/operand3/ ... (For REXX macros only)
Retrieve value of specified editor settings

FASTDEF keyname internal-keydef-representation
FILE (fileid) Finish editing a file and write it to disk
Find text Look for line beginning with specified text
FINDUp text Look upwards for line beginning with specified text
FORMfeed Send formfeed character to printer
FOrward (n*) Move forward n screens in the file
FUp text Look upwards for line beginning with specified text
GDUP (n) Duplicate a block n times
GETfile (fileid) (fromline) (forlines)
Insert specified portion of a file into current file
HEXType Display current line in hexadecimal and decimal
HIT keyname Simulate hitting a key on the keyboard
IFEXT extension command
Execute command if current file's extension matches extension given
IFINITial command Execute command only if PROFILE.KED is being executed at KEDIT startup
Input (text) Input a line of text
Kedit (fileid) Begin editing specified file or switch between current files
KEYDEFS (All|Changed|Internal)
Create a file containing all current keydefinitions, or all changed keydefinitions, or internal form of keydefinitions
LEFT n Subtract n from current VERIFY setting
LEFTAdjust (target) Left adjust text according to current MARGIN settings.
(locate) target Make specified target line become the current line
LOWercase (target) Lowercase text in lines from current line up to (but not including) target line
MODify option Modify value of any SET option
MOve target1 target2 Text from current line through (but not including) target1 is moved following target2
MSG text Display message on message line
Next (n) Make line n lines below current line become current line
NEXTWindow Move cursor to command line of the next window
NFind text Look for next line not starting with specified text
NFINDUp text Look upwards for next line not starting with specified text
Overlay text Overlay current line with specified text
Point name Name a line
PREServe Save current values of most SET options for later RESTORE
PREVWindow Move cursor to command line of the previous window
PRINT (target) (n) Print all lines through target line, using pagesize of "n"
PUT (target) (fileid) Write a copy of part of current file to disk
PUTD (target) (fileid) Write part of current file to disk and then delete it
QUIT Finish with current file. Don't write file back to disk; abandon any changes
Query option Query value of most SET options.
Also allowed:
Query BLOCK, Query COLUMN, Query CURSor, Query EOF,
Query EOL, Query FLscreen, Query LASTmsg,
Query LEnth, Query LINE, Query LScreen, Query NFile,
Query RING, Query SIZE, Query TIME, Query TOF,
QUIT  Finish with current file, which has not been changed.
Don't write file back to disk
READVAR  (For REXX macros only) Read data from KEDIT command
         line into variable CMDLINE
RECover (n)  Recover the last n changed or deleted lines
REFRESH  (For REXX macros) Force KEDIT to refresh its screen
REName fileid1 fileid2
         Rename file on DOS disk
REPEat (target)  Repeatedly move 1 line closer to target and reexecute last
         command
Replace (text)  Replace a line of text
RESet  Reset pending prefix commands, blocks
RESTore  Restore SET option values saved by PRESERVE command
Right n  Add n to current VERIFY setting
RIGHTAdjust (target)
         Right adjust text according to current MARGIN settings.
SAVE (fileid)  Save file to disk
SCHange /string1/string2/ (target) (n) (m)
         Selectively change n occurrences of string1 to string2
         (starting at the m'th occurrence in each line) from
         current line through target line
(SET) option value
         Set value of any SET option
         (see below for summary of SET options)
SHIFT Left|Right (n) (target)
         Shift lines from current line through target line left or
         right n columns
SORT target (Ascending|Descending) n1 m1 n2 m2 ...;
         Sort text from current line up to (but not including) target
         line in specified order according to specified sort fields
STATus  Display the current value of all SET options
TFind (target)  Locates target, which must start in left zone column
                 if it is a string target
TOP  Make the "top of file" line become the current line
Up (n)  Make line n lines above current line become current line
UPPercase (target)Uppercase text in lines from current line up to
                 (but not including) target line
Xedit (fileid)  Begin editing specified file
?  Redisplay last line entered
= (command)  Issue specified command and then reissue last command given
*  Comment line - all following text is ignored
&  Do commands on command line, then redisplay command line

* KEDIT SET Options:
  Set ALT n  Reset alteration count for current file
  (SET) ARBchar ON|OFF char1 char2
         Default: ARBCHAR OFF $?
         Controls use of wildcard characters in string searches
  (SET) ARROW ON|OFF
         Default: ARROW ON
         Marks the command line with an arrow
  (SET) ATTRIBUTES n1 n2 ... n13
         Default: ATTRIBUTES 7 15 112 120 7 7 15 15 7 15 7 7 15
         Controls colors and highlighting used on the screen.
  (SET) AUTOSAVE OFF|n (OVERwrite|AUS)
Default: AUTOSAVE OFF OVERWRITE
Controls number of alterations to a file before it is automatically saved to disk

(Set) AUTOSCROLL Half|n|OFF
Default: AUTOSCROLL HALF
Controls how many columns automatic horizontal scrolling shifts the window

(Set) BACKUP OFF|TEMP|KEEP
Default: BACKUP OFF
Controls creation of .BAK files when files are written to disk

(Set) BEEP ON|OFF
Default: BEEP OFF
With BEEP ON, speaker beeps when an error occurs

(Set) BORDER n
Default: BORDER 0
Set the border color on color displays

(Set) CASE Mixed|Upper {Respect|Ignore} {Respect|Ignore}
Default: CASE MIXED IGNORE RESPECT
Controls handling of upper/lowercase in input and in string searches

(Set) CMDLINE TOP|BOTTOM
Default: CMDLINE BOTTOM
Controls location in the window of the command line

(Set) CURLINE n
Default: CURLINE 14
Controls where in window current line is displayed

(Set) DBASE ON|OFF
Default: DBASE OFF
Causes files to be written to disk in 512 byte multiples required by dBASE II version 2.4

(Set) DEFEXT ON|OFF
Default: DEFEXT OFF
Allows default value for file extension in KEDIT, SAVE, FILE, and GETFILE commands

(Set) EOFchar ON|OFF|ONLY
Default: EOFCHAR ON
Control writing of end-of-file character when writing files to disk

(Set) FILEId fileid
Default: the fileid given with the KEDIT command
Sets default fileid used to FILE or SAVE the file

(Set) FMode drive
Default: the drive specifier of the current fileid
Sets drive specifier for the current file

(Set) FName name
Default: the current file's name
Sets name of the current file

(Set) FORMAT Justify|NOJustify EMPTY|EXTENDED Single|DOUBLE
Default: FORMAT NOJUSTIFY EMPTY DOUBLE
Controls options used in paragraph reformatting

(Set) FType ext
Default: the current file's extension
Sets extension of the current file

(Set) HEIGHT 25|43 (RESET|PRESET)
Default: HEIGHT 25 RESET
Invoke 43 line mode on IBM Enhanced Color Display
HEX ON|OFF
  Default: HEX OFF
  Enables entry of hexadecimal or decimal values for string
  targets and in CHANGE commands

HEXDISPLAY ON|OFF
  Default: HEXDISPLAY OFF
  Causes running display of ASCII codes of cursor character

IMPEX ON|OFF
  Default: IMPEX OFF
  Allows .KED files to be invoked without preceding
  the filename with the EXEC command

INPUTMode OFF|FULL|L1ne
  Default: INPUTMODE OFF
  Controls operation of input mode

LINEND ON|OFF (char)
  Default: LINEND OFF #
  Controls multiple commands on command line

LOGO ON|OFF
  Default: LOGO ON
  Controls whether or not the KEDIT logo screen is displayed

LRecl n
  Default: LRECL 255
  Control line length of files written to disk by KEDIT.
  (Most often used in connection with SET RECFM)

MARGins left right (parindent)
  Default: MARGINS 1 72 1
  Set margins used for word processing functions

MULTView ON|OFF
  Default: MULTVIEW OFF
  Allow multiple views of a single file

NEWLines SAMELine|BELOW|BELOWCurr
  Default: NEWLINES SAMELINE
  Control scrolling of the window when new line is added to
  file

NUMBER ON|OFF
  Default: NUMBER OFF
  Cause line numbers of each line to be displayed in prefix
  area

PATH ON|OFF
  Default: PATH ON
  Cause KEDIT and GETFILE commands to search for
  files in directories defined via DOS PATH command

PREFIX ON|OFF Left|Right

PREFIX Synonym newname oldname
  Default: PREFIX OFF LEFT
  Controls display of the prefix area or defines
  alternate name for a given prefix command

RECFm Fixed|Varying
  Default: RECFM VARYING
  Controls whether lines written to disk by KEDIT
  have varying or fixed length. (Most often used
  in connection with SET LRECL)

REPROFile ON|OFF
  Default: REPROFILE OFF
  Cause PROFILE.KED to be reexecuted whenever
  a new file is added to the ring

RESERVED n attr text
(Set) RESERved n OFF
Displays (or ends display of) "text" in line "n" of display
using attribute "attr"

(Set) RETrace ON|OFF
Default: RETRACE ON
Allows faster screen updating with some display adapters

(Set) SCALE ON|OFF [n]
Default: SCALE OFF 14
Causes scale line to be displayed in line n

(Set) SCReen n (Vertical)

(Set) SCReen Size n1 (Vertical) n2 (Vertical) ...
Default: SCREEN SIZE 25
Sets size and number of windows displayed on screen,
controls vertically split screens

(Set) SHIFTState ON|OFF
Default: SHIFTSTATE OFF
Controls display of the status of Caps Lock, Num Lock,
Scroll Lock, and Insert Mode

(Set) STAY ON|OFF
Default: STAY ON
Controls current line position after many commands

(Set) STReam ON|OFF
Default: STREAM ON
Controls whether column target searches look through
the entire file or only the current line

(Set) SYNonym [LINEND char] newname (n) definition

(Set) SYNonym ON|OFF
Default: SYNONYM ON
Changes the names and definitions of KEDIT commands

(Set) TABLine ON|OFF [n]
Default: TABLine OFF 25
Causes tab line to be displayed in line n

(Set) TABs n1 n2 n3 ... n32
Default... 153
Sets tab columns

(Set) TABSIn ON|OFF|TABQUOTE
Default: TABSIN OFF
Causes tabs in input files to be automatically expanded

(Set) TABSOut ON|OFF
Default: TABSOUT OFF
Causes automatic blank compression when SAVEing or FILEing

(Set) TOPVIEW ON|OFF
Default: TOPVIEW OFF
Controls TOPVIEW-awareness of KEDIT

(Set) TRAILING ON|OFF|EMPTY
Default: TRAILING OFF
Controls addition of trailing blanks in files written to disk
by KEDIT

(Set) VARblank ON|OFF
Default: VARBLANK OFF
Controls how multiple blanks are handled in string searches

(Set) Verify n
Default: VERIFY 1
Controls which column of text is displayed in column 1 of the
text area

(Set) WORD NONBlank|ALPHAnum
Default: WORD NONBLANK
Controls what is a word for tab word, delete word

(Set) WORDWrap ON|OFF
    Default: WORDWRAP OFF
    Enables/disables wordwrap feature

(Set) WRap ON|OFF
    Default: WRap OFF
    Controls whether string searches wrap around the end of the file

(Set) Zone n1 n2
    Default: ZONE 1 255
    Controls columns examined in string searches

    Set = text    Set the contents of the = buffer

* KEDIT Prefix Area Commands:
A    Add
D    Delete
F    Following
I    Insert
M    Move
P    Preceding
    Make current line
<    Shift left
>    Shift right
"    Duplicate
.xxxx Name line
SCALE Scale line
TABL Tab line
Report on
CIRDAP-BBS National Seminar on
Poverty Monitoring

Dhaka, Bangladesh
24 March 1998

Centre on Integrated Rural Development for
Asia and the Pacific

Bangladesh Bureau of Statistics
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Centre on Integrated Rural Development for Asia and the Pacific
Chameli House, 17 Topkhana Road
GPO Box 2883, Dhaka-1000
Bangladesh
Tel.: 9568379, PABX 9558751, 9559686
FAX: 880-2-9562035
E-mail: rescir@ritchco.net

Regular and Continuous Monitoring of Poverty Situation in Bangladesh Project
Bangladesh Bureau of Statistics
Statistics Division, Ministry of Planning
Government of the People’s Republic of Bangladesh
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# Table of Contents

1. Introduction .................................................. 1

2. Inaugural Session ............................................. 1

3. Technical Session ............................................ 1

4. Annexes

   Annex-1 : List of Participants .................................. 7

   Annex-2 : Programme ........................................... 17

   Annex-3 : Speeches ............................................. 18

   Annex-4 : Poverty Monitoring Survey in the Urban Areas-April 1997: 
              Summary Results ........................................ 27

              : Poverty Monitoring Survey in the Rural Areas-April 1997: 
               Summary Results ....................................... 57
CIRDAP-BBS National Seminar on Poverty Monitoring

1. Introduction

The Poverty Monitoring System under the Monitoring Adjustment and Poverty (MAP) Project aims to establish a regular system at the Bangladesh Bureau of Statistics (BBS) for monitoring the multi-dimensional indicators of poverty. In this regard, a National Seminar on Poverty Monitoring was jointly organised by CIRDAP and BBS at CIRDAP Headquarters in Dhaka on 24 March, 1998. The seminar was arranged to disseminate and discuss the results of the fifth rural and the third urban poverty surveys carried out by BBS in April 1997.

The List of Participants and the Programme of the Seminar are given at Annex-1 and Annex-2 respectively.

2. Inaugural Session

Dr. Muhiuddin Khan Alamgir, Minister of State for Planning, Science and Technology, Government of the People's Republic of Bangladesh was the Chief Guest at the inaugural session. Among others, policy makers, academicians, researchers, senior government officials and representatives of the donor community, international organizations, diplomats, NGOs and other organizations attended the seminar.

Dr. Mustafa K. Mujeri, Director Research, CIRDAP welcomed the participants and informed that efforts had been initiated under the project for generation of disaggregated poverty statistics to facilitate the designing of more effective anti poverty programmes keeping local characteristics in view. Dr. A.V.S. Reddy, Director General, CIRDAP, highlighted the usefulness of the project and its major objectives in Bangladesh. Mr. Waliul Islam, Secretary, Statistics Division and Director General, BBS, mentioned some of the features of rural and urban poverty surveys in Bangladesh. He also mentioned that BBS would endeavor to produce disaggregated data on urban and rural poverty for 64 districts of the country in phases. The Chief Guest, Dr. Muhiuddin Khan Alamgir, in his speech reiterated the priority commitment of the government to remove the scourge of poverty and secure a decent living for every citizen within the shortest possible time. He also mentioned that the present government had initiated a wide array of development programmes and projects under the Fifth Five Year Plan, which included consensitization and empowerment of the poor through the educational system and development of local government institutions to address all areas of demographic, social and economic environments. The NGOs were also participating in these efforts, he added. He emphasised on the need for regular monitoring of the poverty alleviation impact of such joint government-NGO initiatives. He appreciated the joint effort of CIRDAP and BBS in generating a set of core poverty indicators on a regular basis. He hoped that the deliberation at the seminar would provide precise recommendations and suggestions for further improving and strengthening the on going regular poverty monitoring programme of CIRDAP and BBS. The text of the speeches are given at Annex-3.

3. Technical Session

The technical session of the Seminar was chaired by Mr. Waliul Islam, Secretary, Statistics Division and Director General, BBS. The summary results of the third urban survey was presented by
Mr. Md. Delwar Hossain, Consultant of the Project. The results of the fifth rural survey were presented by Mr. Faizuddin Ahmed, Project Director and Md. Shamsul Alam, Deputy Director of the Regular and Continuous Monitoring of Poverty Situation of Bangladesh Project, BBS.

Mr. Hossain, in his paper, provided important features of urban poverty situation by highlighting the statistical results of the survey. A total of 1200 households constituted the survey sample. For data collection, the questionnaire included ten separate modules covering household characteristics and poverty indicators in relation to land and other asset ownership, income and expenditure, occupation, food consumption, health and sanitation, housing, education, gender dimension, credit and crisis management and migration. The incidence of poverty was measured by food-energy-intake (FEI) method. The incidence of poverty by cost of basic needs (CBN) method was also calculated. The results of April 1997 were compared with the results of the earlier surveys of December 1995 and April 1996 conducted under the project.

The sources of household income and expenditure and distribution of income and expenditure by decile groups were analysed. The daily per capita food intake of all households in April 1997 was observed to be higher than that of the previous two surveys. The expenditure pattern was examined in terms of land ownership class, occupational status, education level of household heads, and women headed households.

The results of poverty survey in the rural areas were presented by Mr. Faizuddin Ahmed. A total of 3300 households constituted the survey sample. A semi-log model was used to estimate the poverty line expenditure. While defining the poverty line, both CBN and FEI methods were used. He compared the poverty status of different categories of households which was found to be the highest for agriculture labour. The poverty differentials among the poor were also classified for occupation, land ownership, level of education and similar other socio-economic characteristics of the household heads. The full text of the papers are given at Annex-4.

**Discussion**

The presentation of the two papers was followed by discussions in which three designated discussants and the participants took part.

Dr. Shaikh Maqsood Ali of Planning Commission, while appreciating the two papers, commented on the methodology and findings of the surveys. He suggested that efforts should be directed to address two important issues: (i) how to improve the methodology, and (ii) how can the findings be made more effective. The poverty measures showed slow improvement in the poverty situation over the years, he observed. He pointed out that transfer of resources were highly biased towards the higher income classes. In order to improve the poverty situation, he emphasised on designing equitable transfer mechanisms and better macro economic environment in the country. He opined that more disaggregated statistics on organised and unorganised villages were needed to reveal the dynamic process in operation in the organised villages. He noted that it was possible to achieve higher growth rates with more equitable economic policies for which strengthening of linkages between micro dynamics at the grassroots and macro policies was necessary. This would reveal the nature and extent of anti - poor bias of allocation and distribution patterns of the market mechanism, he added. He suggested that a time frame to eradicate poverty was necessary to derive the required rates of poverty alleviation, income transfer and other necessary measures.
Mr. S.M. Al Hossaini of Swanirvar Bangladesh observed that using the same norm in measuring rural and urban poverty in terms of calorie intake might not be appropriate. He also pointed out that sources of income, pattern of land ownership, and other measures suggested that poverty had only marginally declined and inequality had increased (both between groups and rural -urban). He suggested that, since this was a joint collaborative effort of CIRDAP and BBS, indexes similar to HDI and People’s Quality of Life Indicators (PQLI) of Sri Lanka could be constructed. Moreover, constant prices should be used to show the trends in poverty, he added. He urged to establish a strong institutional forum/focal institution by the government ministries to implement and interprete policy implications of poverty statistics.

Dr. Rushidan Islam Rahman of BIDS, emphasized on policy issues in poverty. She observed that mere acceleration of growth and policy intervention at the micro level (e.g. micro credit, targeted programmes) were not adequate to eradicate poverty in Bangladesh. She suggested that the papers could be made more comprehensive by incorporating the causal factors along with the findings. For the purpose, she emphasised several areas e.g. regional distribution of indicators, urban-rural differentials and integration of urban-rural issues, intertemporal analysis of poverty situation, regional dimensions, rural-urban migration and gender dimension. She suggested three major issues in policy analysis e.g. (i) causes of poverty in rural/urban areas: high incidence of poverty among wage labourers (low wage rate/high rice prices), intervention in agricultural labour market etc., (ii) sale of land for crisis coping: access to institutional credit to enable the poor to retain ownership of such resources, (iii) high cost of health care: subsidised health care services for the poor. For improvement in statistical analysis, she suggested the development of composite index, use of multi variate analysis and analysis of panel data generated from the survey.

Ms. Fahmeeda Rahman Wahab of CIDA made a few comments on the definition of landlessness, intra household disparities, and characteristics of male vis-à-vis female headed households. She also pointed out that information on access to schooling, credit, roads and services should be included in the summary results. She suggested the strengthening of links of poverty surveys with other components of the project.

Mr. Tarafder Rabiul Islam, a former UN consultant suggested that the papers should focus more on analysing the trends in poverty. For the purpose, appropriate deflator for intertemporal comparison should be used, he added.

Mr. P.K. Matiur Rahman of Dhaka University suggested that the definition of female headed households should be clear (de facto/dejure). He observed that discriminant analysis might be used to identify the determinants of poverty of male and female headed households. He suggested to construct a composite index incorporating basic needs.

Ms. Riti Ibrahim from BBS suggested that separate analysis of slum and non slum areas could be undertaken if the data set permitted. She opined that it was useful to analyse gender issues in terms of household indicators.

Mr. M.A. Halim of EC Delegation, observed that the sample size should be adequate enough to collect reliable data. He suggested that the poverty indicators should be identified to facilitate
policy decisions by the government agencies as well as the development partners. Regarding rural urban migration, he urged the need for developing rural townships. The study should analyze the implication of macro economic policies for resource allocation, he added.

Mr. Abdul Karim from MIDAS emphasized on more analysis on the causal relationship between poverty incidence and levels of education.

Dr. S.B. Naseem from BRRI suggested that the policy makers should explore the causal factors in rural-urban migration and devise measures to provide access to resources necessary for increasing welfare of the rural poor.

The paper presenters responded to and clarified some of the issues and points raised by the discussants. It was observed that the points raised by the participants could be divided into three broad categories:

1. Methodology and collection of data
2. Tabulation and presentation of data
3. Analysis and interpretation of data

It was agreed that in future more efforts would be directed in analysing the data.

In his concluding remarks, the Chairperson thanked the participants, discussants and paper presenters for their useful contributions. He observed that the deliberations of the Seminar would go a long way in improving future poverty surveys in the country. He emphasised on setting up a standardized data management system in BBS to minimise the conceptual and other differences across surveys. The following recommendations emerged out of the seminar.

**Recommendations**

- Analyse data separately for organized and unorganized villages;
- Identify the determinants, factors and processes of grassroots level dynamism from the poverty surveys;
- Adopt adequate sample size for disaggregated analysis, consolidate the methodology and analyse the results for effective use by the policy makers;
- Integrate rural and urban poverty analysis to suggest implication on rural urban migration, access to credit, infrastructure and other basic services;
- Ensure conceptual clarity in defining landlessness, household size, female headed households, basic needs and similar other characteristics; and
- Direct statistical analysis at defining composite index of poverty and explore poverty characteristics and determinants through multi variate analysis of panel data.
Annexes
Annex-1

List of Participants

Dr. Muhiuddin Khan Alamgir
Hon'ble State Minister for Planning, Science and Technology
Government of the People's Republic of Bangladesh
Tel.: 815175, 9114112 (O)
Sher-e-Bangla Nagar
Dhaka-1207

Dr. M. Lutfur Rahman
Member
General Economics Division
Bangladesh Planning Commission
Block 10, Room 5 (Ground Floor)
Sher-e-Bangla Nagar
Dhaka-1207

Tel.: 815119 (O)
9344522 (R)

Mr. Waliul Islam
Secretary, Statistics Division and
Director General
Bangladesh Bureau of Statistics
Room 14, Building 8
Bangladesh Secretariat
Dhaka-1000

Tel.: 862833 (O), 872255 (R)
Fax: 865166

Dr. Shaikh Maqsood Ali
Convener, Task Force for Poverty Alleviation
Bangladesh Planning Commission
Block 14, Room 4
Sher-e-Bangla Nagar
Dhaka-1207

Tel.: 815809, 9129857 (O)
871582 (R)

Mr. Abdul Khaleque
Deputy Economic Adviser
Finance Division
Ministry of Finance
Building 6, Room 1224
Bangladesh Secretariat
Dhaka 1000

Tel.: 862509 (O)
860595 (R)

Dr Q M Emdadul Huque
Director General
Bangladesh Livestock Research Institute
Savar
Dhaka 1341

Tel.: 9349552 (O)
9130596 (R)
Fax: 834357
Dr. Dewan Abdul Quadir  
Chief Scientific Officer  
Bangladesh Space Research and Remote Sensing Organization  
Agargaon, Sher-e-Bangla Nagar  
Dhaka-1207  
Tel.: 323994 (O), 9111393 (R)  
E-mail: sparrso@bangla.net

Dr. Rushidan Islam Rahman  
Senior Research Fellow  
Bangladesh Institute of Development Studies  
E-17 Agargaon, Sher-e-Bangla Nagar  
Dhaka  
Tel.: 813613 (O), 326981 (R)  
Fax: 813023

Mr A Taher Khan  
Project Director  
Local Government Engineering Department  
LGED Bhavan, Agargaon  
Dhaka-1207  
Tel.: 822513 (O), 9120945 (R)  
Fax: 822513

Mr Md Ansar Ali  
Assistant Engineer  
Local Government Engineering Department  
LGED Bhavan (Level-10), Agargaon  
Dhaka 1207  
Tel.: 822513 (O), 247927 (R)  
Fax: 822513

Mr Ghulam Mohammad Sukhanyar  
Charge d’Affairs  
Embassy of Afghanistan in Bangladesh  
Road 24, House CWN(C)  
Gulshan, Dhaka 1212  
Tel.: 603232, 600394 (O)  
601770 (R)  
Fax: 9884767

Mr A K Basu  
Deputy High Commissioner  
High Commission of India in Bangladesh  
Road No. 2, House No. 120  
Dhanmondi R/A, Dhaka 1205  
Tel.: 865095 (O)  
812133 (R)

Dr Werner Kiene  
Representative  
World Food Programme  
Road No.11A, House No. 69  
Dhanmondi R/A, Dhaka  
Tel.: 816344-48 (O)  
Fax: 813147  
E-mail: wfp.dhaka@drik.bgd.  
toolnet.org

Mr Farouk Chowdhury  
Economist  
USAID  
American Embassy  
Baridhara, Dhaka  
Tel.: 884700-22 (O)  
9880112 (R)
Begum Nurun Nahar
Programme Officer
FAO Representation
Road No. 8, House No. 37
Dhanmondi R/A, Dhaka

Tel.: 818015-8 (O)
Fax: 813446
E-mail: fao.bgd@field.fao.org.

Ms Fahmeeda Rahman Wahab
Development Adviser
Canadian High Commission
Road No. 48, House 16/A
Gulshan, Dhaka

Tel.: 9887091-97 Ext. 3455 (O)
Fax: 871288 (R)

Dr. Rokeya Khatun
Consultant
Local Fund Management Office
Canadian International Development Agency
Road 95, House D-2
Gulshan, Dhaka

Tel.: 884740 (O)
Fax: 837676 (R)

Mr M A Halim
Financial Officer
Delegation of the European Commission
Road 84, House 7
Gulshan-2, Dhaka

Tel.: 884730-31, 607016 (O)
Fax: 9006591 (R)

Mr S M Al-Husainy
Chairman
Swanirvar Bangladesh
770 Satmasjid Road
Dhanmondi R/A
Dhaka 1209

Tel.: 9116806, 9116808 (O)
Fax: 812424, 817711 (R)
E-mail: smah-sb@bangla.net

Mr Salahuddin Ahmed
Honorary Secretary General
Swanirvar Bangladesh
Ispahani Colony
Magbazar, Dhaka

Tel.: 9116558, 9116808 (O)
Fax: 409606 (R)

Mr Abdul Karim
Managing Director
MIDAS
Road 16 (New), House 5
Dhanmondi R/A, Dhaka 1209

Tel.: 812763 (O)
Fax: 325036 (R)

Mr MohammadMobin
Programme Manager
Concern
Road 15A, House 63
Dhanmondi R/A, Dhaka

Tel.: 812795-6 (O)
Fax: 812793
Mr. Iftekhar A Chowdhury  
Consultant, IDPAA  
Proshika  
I/1-GA, Section-2, Mirpur  
Dhaka 1216

Tel.: 803398, 805812 (O)  
329701 (R)

Mr Azizul Huq  
Former Director, CIRDAP  
167 Green Road  
Dhaka 1205

Tel.: 9118028 (R)

Mr A Q Siddiqui  
Former Managing Director  
Sonali Bank  
B-4 Celestine  
Road 2, House 8, Gulshan  
Dhaka 1212

Tel.: 9881477 (O)  
9886200 (R)

Dr Tarafder Rabiul Islam  
Former UN Adviser & FAO Programme Adviser  
6H Easter Housing Apartment  
103 Elephant Road  
Siddeswari, Dhaka 1217

Tel.: 841231, 870861 (O)  
841231, 870861 (R)

Mr Mohammad Abu Eusuf  
Junior Consultant  
C/O Dr Atius Rahman  
Senior Research Fellow  
Bangladesh Institute of Development Studies  
E-17 Agargaon, Sher-e-Bangla Nagar  
Dhaka 1207

Tel.: 823789 (O)  
9119144 (R)

Mr. Md. Delwar Hossain  
Consultant, PMS Project  
CIRDAP/BBS  
5/12, Humayun Road  
Mohammedpur, Dhaka-1207

Tel.: 9118642 (O)  
506957 (R)

Mr. Faizuddin Ahmed  
Project Director  
Bangladesh Bureau of Statistics  
5/12 Humayun Road  
Mohammedpur, Dhaka-1207

Tel.: 9118642 (O)  
9349622 (R)

Mr Abdul Jabbar  
Project Director, HES  
Bangladesh Bureau of Statistics  
Building 4, Room 627  
Bangladesh Secretariat  
Dhaka 1000

Tel.: 861808 (O)  
9339066 (R)
Mr Muhammed A Malik  
Project Director  
Bangladesh Bureau of Statistics  
14/2 Topkhana Road, Dhaka 1000

Mr Mahfuzul Islam  
Project Director  
Local Level Development Monitoring Project  
Bangladesh Bureau of Statistics  
Road 9, House 8, Block A, Section 12  
Mirpur, Dhaka 1212

Mr Md Serajul Kabir  
Project Director  
Bangladesh Bureau of Statistics  
5 Green Corner, Green Road  
Dhaka

Ms Riti Ibrahim  
Project Director  
Bangladesh Bureau of Statistics  
Building 4, Room 625  
Bangladesh Secretariat  
Dhaka 1000

Mr Md. Abu Bakar Siddique  
Director  
Agricultural Statistics Wing  
Bangladesh Bureau of Statistics  
5, Green Corner, Green Road  
Dhaka 1205

Mr Md Khurshid Kamal  
Director, RTSS Wing  
Bangladesh Bureau of Statistics  
Gaznabi Road, Mohammadpur  
Dhaka 1207

Mr Abdur Rashid Sikder  
Director  
CDP & SC Wing  
Bangladesh Bureau of Statistics  
Bangladesh Secretariat  
Dhaka 1000

Mr. S.M. Tajul Islam  
Joint Director  
Bangladesh Bureau of Statistics  
Bangladesh Secretariat  
Building 7, Room 3  
Dhaka-1000
Mr M Azizur Rahman  
Former Joint Director  
Bangladesh Bureau of Statistics  
1398/18 Reazbagh Khilgaon  
Dhaka 1219  
Tel.: 415763 (R)

Mr. Md. Shamsul Alam  
Deputy Director  
Bangladesh Bureau of Statistics  
5/12 Humayun Road Mohammedpur Dhaka-1207  
Tel.: 323925, 9118642 (O)

Mr. A.T.M. Rafiqul Hoque  
Deputy Director  
CDP & SC Wing  
Bangladesh Bureau of Statistics  
Bangladesh Secretariat Building No. 8  
Dhaka-1000  
Tel.: 860667 (Off / request)  
809133 (R)

Mr Md Imdadul Hoque  
Deputy Director  
Bangladesh Bureau of Statistics  
B-48/F-13, Motijheel Govt. Colony  
Dhaka 1000  
Tel.: 329997 (O)

Mr Md Musahar Shaik  
Deputy Director  
Population Census Wing  
Bangladesh Bureau of Statistics  
5/12 Asad Avenue Mohammedpur Dhaka 1207  
Tel.: 329993, 815942 (O)  
9334228 (R)

Mr Utpal Krishna Majumdar  
Deputy Director  
Agricultural Statistics Wing  
Bangladesh Bureau of Statistics  
5 Green Corner, Green Road  
Dhaka 1205  
Tel.: 500761 (O)

Ms Ferdous Nurun Ara  
Deputy Director  
Bangladesh Bureau of Statistics  
3/2 Asad Avenue, Mohammedpur Dhaka 1207  
Tel.: 9118079 (O)  
807620 (R)
Mr Md Nowsher Alam  
Deputy Director  
CDP & SC Wing  
Bangladesh Bureau of Statistics  
Building 8, Room 1  
Bangladesh Secretariat  
Dhaka 1000  
Tel.: 868693 (O)

Mr A.H.M. Nizamuddin Chowdhury  
Deputy Director  
Bangladesh Bureau of Statistics  
3/2 Asad Avenue  
Mohammadpur, Dhaka 1207  
Tel.: 9117534 (O)  
601591 (R)

Mr Md Abdus Sobhan  
Deputy Director  
Bangladesh Bureau of Statistics  
204 Ahmed Nagar  
Paikpara, Mirpur  
Dhaka 1216  
Tel.: 504731 (O)  
9002203 (R)

Biswa Altaf Hossain  
Deputy Director  
Bangladesh Bureau of Statistics  
12 Gaznabi Road, College Road  
Mohammadpur  
Dhaka  
Tel.: 9121108 (O)  
9129064 (R)

Mr Mainuddin Ahmed  
Deputy Director  
Bangladesh Bureau of Statistics  
R-15, Nurjahan Road  
Mohammadpur  
Dhaka  
Tel.: 9112589 (O)  
812969 (R)

Mr Md Nowsherwa  
Deputy Director  
Computer & Data Processing Wing  
Bangladesh Bureau of Statistics  
Building 8, Room 10  
Bangladesh Secretariat  
Dhaka 1000  
Tel.: 869448 (O)  
802762 (R)

Ms Hasina Alam  
Deputy Director  
ITLS & NI Wing  
Bangladesh Bureau of Statistics  
14/2 Topkhana Road  
Dhaka  
Tel.: 9564235 (O)  
895369 (R)
Mr Md Ekramul Haque
Deputy Director
IT & NI Wing
Bangladesh Bureau of Statistics
14/2 Topkhana Road
Dhaka 1000

Mr Muhammad Mehrab Ali
Deputy Director
Bangladesh Bureau of Statistics
14/2 Topkhana Road
Dhaka 1000

Mr Md Shafiqul Islam Khan
Deputy Director
Industrial Statistics Wing
Bangladesh Bureau of Statistics
5/14 Humayun Road
Mohammadpur
Dhaka 1207

Ms Fahmida Rabbi
Deputy Director
Bangladesh Bureau of Statistics
118 Bashiruddin Road
Kalabagan
Dhaka

Ms Salima Sultana
Statistical Officer
Statistics Division
Ministry of Planning
Sher-e-Bangla Nagar
Dhaka 1207

Mr Md Osman Ghani
Statistical Officer, PMS Project
Bangladesh Bureau of Statistics
5/12 Humayun Road
Mohammadpur
Dhaka

Mr Md Hefzur Rahman
Statistical Officer
Bangladesh Bureau of Statistics
5/12 Humayun Road
Mohammadpur
Dhaka 1207
Mr Md S Zoha
Statistical Officer
Statistics Division
Bangladesh Secretariat
Dhaka 1000

Tel.: 807728 (R)

Mr Md Anwar Hossain
Statistical Officer
Statistics Division
Bangladesh Secretariat
Dhaka 1000

Ms Bijoya Biswas
ASO, PMS Project
Bangladesh Bureau of Statistics
5/12 Humayun Road
Mohammadpur
Dhaka 1207

Tel.: 9118642 (O)

Mr Md Abdul Latif
Asst. Statistical Officer
PMS Project
Bangladesh Bureau of Statistics
5/12 Humayun Road
Mohammadpur
Dhaka 1207

Tel.: 9118642 (O)

Syeda Sultana Razia Begum
Programmer
Bangladesh Bureau of Statistics
5/12 Humayun Road
Mohammadpur
Dhaka 1207

Tel.: 9118642 (O)

Mr Md Shafiul Alam
Assistant Programmer
PMS Project
Bangladesh Bureau of Statistics
5/12 Humayun Road
Mohammadpur
Dhaka 1207

Tel.: 323925 (O)

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Tel.:</th>
<th>Fax:</th>
<th>E-mail:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. A.V.S. Reddy</td>
<td>Director General</td>
<td>9563348 (O), 883034 (R)</td>
<td>+880-2-9562035</td>
<td><a href="mailto:cirdap@citechco.net">cirdap@citechco.net</a></td>
</tr>
<tr>
<td>Dr P Subrahmanyam</td>
<td>Director Pilot Projects</td>
<td>9560391 (O), 889405 (R)</td>
<td>+880-2-9562035</td>
<td><a href="mailto:cirdap@citechco.net">cirdap@citechco.net</a></td>
</tr>
<tr>
<td>Dr. Mustafa K. Mujeri</td>
<td>Director Research</td>
<td>9568379, 9559686 (O)</td>
<td>+880-2-9562035</td>
<td><a href="mailto:rescir@citechco.net">rescir@citechco.net</a></td>
</tr>
<tr>
<td>Dr G M Ramesh Kumar</td>
<td>Consultant, Planning Unit</td>
<td>9564772 (O)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ms. Lisa S. Singh</td>
<td>Programme Officer (Research)</td>
<td>9569686 (O), 884566 (R)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr Bazlul Haque Khondker</td>
<td>Consultant, MAP Project</td>
<td>9559686 (O)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Shafiqur Rahman</td>
<td>Programme Associate</td>
<td>9559686 (O)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Moksud B. Siddiqui</td>
<td>Research Associate</td>
<td>9559686 (O), 9005522 (R)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ms. Zeenat Ahmed</td>
<td>Research Associate</td>
<td>9559686 (O), 603010 (R)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ms. Nausheen Khaliq</td>
<td>Research Assistant</td>
<td>9559686 (O), 604506 (R)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ms Fawjia Tawheed</td>
<td>Research Assistant</td>
<td>9559686 (O)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Nasim Al-Rashid</td>
<td>Secretary Research</td>
<td>9559686 (O), 418567 (R)</td>
<td></td>
<td></td>
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</tbody>
</table>
Programme

09:30-09:55 : Registration
10:00-10:30 : Inauguration
10:30-11:00 : Refreshments

Technical Session

Chairperson : Mr. Waliul Islam
Secretary, Statistics Division and
Director General
Bangladesh Bureau of Statistics

11:00-11:20 : Poverty Monitoring Survey in the Urban Areas, April 1997 -
Summary Results
Mr. Md. Delwar Hossain
Consultant, CIRDAP/BBS

11:20-11:40 : Poverty Monitoring Survey in the Rural Areas, April 1997 -
Summary Results
Mr. Faizuddin Ahmed
Project Director
Bangladesh Bureau of Statistics

Mr. Md. Shamsul Alam
Deputy Project Director
Bangladesh Bureau of Statistics

11:40-12:30 : Discussion

Discussants : Dr. Shaikh Maqsood Ali
Task Leader
Sustainable Human Development Project
Bangladesh Planning Commission

Mr. S.M. Al-Husainy
Chairman
Swanirvar Bangladesh

Dr. Rushidan Islam Rahman
Senior Research Fellow
Bangladesh Institute of Development Studies

12:30-13:15 : Open Discussion
13:15-13:30 : Wrap-up by Chairperson

Rapporteurs : Fawjia Tawheed, Nausheen Khaliq, Zeenat Ahmed, Moksud Belal Siddiqui
Speech of the Chief Guest

Dr. Muhiuddin Khan Alamgir
Minister of State
Ministry of Planning
Ministry of Science and Technology
Government of the People’s Republic of Bangladesh

Bismillahir Rahmanir Rahim

Director General, CIRDAP, Distinguished Participants, Ladies and Gentlemen

It is indeed a great pleasure for me to inaugurate the CIRDAP-BBS National Seminar on Poverty Monitoring in Bangladesh. I would like to express my deep appreciation to CIRDAP and Bangladesh Bureau of Statistics (BBS) for continuing the programme of poverty monitoring surveys and making it possible for us to use a comprehensive poverty information base for guiding our poverty eradication goals more meaningfully and more effectively.

Distinguished Participants,

As you are all aware, poverty alleviation, as a matter of fact its eradication, is our national concern. A priority commitment of the present government under the leadership of Prime Minister Sheikh Hasina is to remove the scourge of poverty and secure a decent living for every citizen of the country within the shortest possible time. A large number of people live below the poverty line and suffer from both economic and social deprivations. The fast population growth has now been contained to some extent and reduced to a rate of nearly 1.7 percent. Even at this rate of population growth we need to accelerate our rate of economic development both at the present rate or level of about 6 percent per year, if those who are poor are to be freed from the shackles of poverty and suffering. The task indeed is challenging. We have, however, faced this challenge by rationalising our national policies in order to promote and sustain the strategies for rapid socio-economic advancement and offering opportunities for a poor to take up productive and quality life. A wide array of development programmes and projects under the aegis of the fifth five year plan has been launched to address the concerns for improvements in all areas of our demographic, social, and economic environments. In addition, we have developed programmes for sensitisation and empowerment of the poor through our educational system and development of local government institutions. The government agencies as well as NGOs are participating in these programmes and projects. The poverty alleviation impact of such joint government-NGO initiatives require regular monitoring. This is compelling in view of the need for evaluating these impacts in order to give more effective and newer meanings to our programmes to this end.

Distinguished Participants,

The poverty syndrome incorporating all major aspects of its state and process characteristics can only be well understood if multidimensional poverty indicators are available for use and analysis. I am happy to note that the current CIRDAP-BBS collaborative programme is designed to generate a set of core
poverty indicators on a regular basis. These indicators have remained very valuable for guiding our policies and development efforts to alleviate and eventually eradicate poverty in the shortest possible time. The joint CIRDAP-BBS work in the poverty arena deserves all our appreciation and support. I will be very pleased if this work is continued.

*Ladies and Gentlemen,*

It is my pleasure to note that IDRC and CIDA have been providing technical and financial support in implementation of the project not only in Bangladesh but in other member countries of CIRDAP as well. I would appreciate if both the agencies continue their support to CIRDAP for carrying out such an important activity and at the same time facilitating exchange of experiences about poverty reduction successes among the member nations.

I am confident that the seminar will be a success. The policy makers, the planners, the researchers, and experts participating in the seminar will make very fruitful deliberations and come up with precise recommendations and suggestions for further improving and strengthening the ongoing regular poverty monitoring programme of CIRDAP and BBS.

Thank you.

*Joy Bangla*

*Joy Bangabandhu*

*Bangladesh Amar Hauk*
Speech

by

Mr. Waliul Islam
Secretary, Statistics Division and Director General
Bangladesh Bureau of Statistics at the Inaugural Session

Dr Mohiuddin Khan Alamgir, Hon'ble Chief Guest; Dr Reddy, Director General, CIRDAP; Dr Mujeri, Director, CIRDAP; Distinguished Participants, Ladies and Gentlemen:

Assalamu Alaikum

This seminar has been jointly organised, as you know, by Bangladesh Bureau of Statistics (BBS) and CIRDAP. We are grateful to CIRDAP for collaborating with us in successfully organising a number of seminars for disseminating the results of five rural and three urban poverty surveys carried out so far. I express my sincere thanks to the State Minister for Planning, Science, and Technology for gracing this occasion as Chief Guest. I am grateful to all of you for being present in this inaugural session. Also, I am looking forward to your active participation in the seminar.

In today's seminar the findings of the survey done in April 1997 will be presented. Poverty profiles of urban and rural segments of the population will be highlighted and discussed. This will make the urban and rural poverty comparisons illuminating and educative.

There is need for a much more indepth study of urban poverty. Under the guidance of our Planning Minister, we have been able to attract support from different development partners to conduct, hopefully from July this year, the intensive urban poverty survey.

We all know that poverty has many a manifestation. The poor not only suffer from deprivations in income, expenditure, food intake, and nutrition but also denied fair access to health, education, employment, housing, security, and other amenities of a decent living. The proportion of rural poor population close to 47 percent is somewhat higher than the urban poor proportion of nearly 43 percent. The landless and small landowning rural households have remained around 80 percent. The use of public hospital services is still limited to about 11 percent rural and 5 percent urban patients. There have been, however, specific achievements which deserve our appreciation. The safe drinking water supply is now available to about 98 percent households. The goal of universal primary education has been successfully realised through country-wide government-NGO collaborations and campaigns. The child immunisation programme has made a record accomplishment. The recent economic growth rate near about 6 percent is much higher than the rate of population increase which has been brought down to 1.7 percent. The impact on poverty status of this income growth seems to have been offset to a great extent by inequalities in income distributions. The Gini-coefficient measures still persist at 0.39 in rural and 0.43 in urban areas.

We have to keep up and further intensify our targetted programmes and their implementation strategies to gain more successes in helping the poor move up above poverty and lead a better living. The poverty-eradication accomplishments need regular monitoring. This is indispensible for guiding our efforts and programmes of removing poverty more coherently and effectively.
The on-going programme of poverty survey has been providing a set of core poverty indicators on a regular basis. Currently we are giving these indicators at the national level by urban and rural disaggregation. We need to have disaggregated poverty information at least upto the district level. Until now the fund constraint has not allowed us to do so. Hopefully, within a year or two, we will be able to provide poverty data by 23 greater districts and then within another year and so by 64 districts.

I believe that the seminar will have very useful deliberations. Also, I believe that the suggestions and recommendations that will come up from such deliberations will help us further improve and strengthen our present regular poverty monitoring survey programme.

Thank you.
Speech

by

Dr. A.V.S. Reddy
Director General, CIRDAP

At the Inaugural Session

Honorable Chief Guest, Dr. Muhiuddin Khan Alamgir, Minister of State for Planning, Science & Technology, Government of the People's Republic of Bangladesh, Mr. Waliul Islam, Secretary, Statistics Division and Director General, Bangladesh Bureau of Statistics, Excellencies, Distinguished Participants, Ladies and Gentlemen:

It is indeed a great pleasure for me to address this august gathering and welcome you all at the inaugural session of CIRDAP-BBS National Seminar on Poverty Monitoring in Bangladesh. We are extremely grateful to you, Hon'ble Chief Guest, for gracing this occasion by your presence despite busy schedule.

As you are aware, CIRDAP is an inter-governmental organization with its mandate to assist member countries in promoting rural development. Despite substantial growth and resultant improvements in the well-being of the rural people, poverty still persists in most of our member countries. The countries are also aware of the new challenges that have emerged in the context of recent global and regional developments. The policy framework now focuses more on integrated approaches to enhance the welfare of the poor. Success in such a strategy requires adequate understanding of the poverty dynamics and causal linkages.

Ladies and Gentlemen,

In order to promote a greater understanding of the poverty dynamics and create poverty reducing policy environment in its member countries, CIRDAP initiated a project on ‘Monitoring Adjustment and Poverty (MAP) in Bangladesh’ in 1992 with financial assistance from the International Development Research Center (IDRC) of Canada and Canadian International Development Agency (CIDA). The major objective of this project has been to strengthen the capabilities of national institutions like the BBS and the Planning Commission to undertake monitoring of poverty and analysis of the impact of macro economic policies on poverty.

Distinguished Participants,

The poverty surveys conducted by BBS provide aggregate country level poverty measures for rural and urban areas. CIRDAP and BBS have initiated measures to further enhance the usefulness and relevance of these surveys. These include: consolidation of the survey methodology, expansion of the coverage of the indicators, disaggregation of poverty statistics over different regions of the country, training, development of computer software to link the survey results to Geographic Information System (GIS) and other measures to facilitate useful dissemination of the survey results. Efforts have also been taken to minimize the time required to publish the survey results.
I am happy to mention that, with useful experiences gained from the MAP project in Bangladesh, CIRDAP has provided useful inputs in initiating similar projects in Nepal, Pakistan, Lao PDR and Sri Lanka. In all these efforts IDRC, Canada has provided generous support to CIRDAP.

I would like to express my sincere gratitude to the Hon'ble Chief Guest, for your deep interest in the activities of CIRDAP and kind consent to inaugurate the seminar. Your presence and valuable observations will provide useful directions in our efforts.

_Distinguished Participants,_

I am confident your deliberations during the seminar will substantially contribute to successful implementation of the project and help achieve its objectives.

I thank you once again, Distinguished Participants, Ladies and Gentlemen.
Welcome Address

by

Dr. Mustafa K. Mujeri
Director Research, CIRDAP
at the Inaugural Session

Honorable Chief Guest Dr. Muhiuddin Khan Alamgir, Minister of State for Planning, Science & Technology, Government of the People's Republic of Bangladesh, Dr. A.V.S. Reddy, Director General, CIRDAP, Mr. Waliul Islam, Secretary, Statistics Division and Director General, BBS, Excellencies, Distinguished Participants, Ladies and Gentlemen:

It is indeed a great honor for me to welcome you at this inaugural session of the CIRDAP-BBS National Seminar on Poverty Monitoring. I express on behalf of CIRDAP and the BBS, our deep gratitude to the Hon'ble Chief Guest for gracing this occasion despite busy schedules.

Distinguished Participants,

This seminar has been arranged to disseminate and discuss the results of the fifth round of poverty survey carried out in rural areas and the third round of survey in urban areas of Bangladesh. Both the surveys were carried out by BBS in April 1997 under the joint collaboration of the Regular and Continuous Monitoring of Poverty Situation in Bangladesh Project of BBS and the Monitoring Adjustment and Poverty (MAP) Project of CIRDAP. It may be mentioned here that, under various rounds of the survey, the poverty situation of the same set of households are being monitored. The rural poverty survey began in October 1994 while the survey in the urban areas started in December 1995. The methodology of monitoring poverty with the same set of households permits to generate panel data to monitor the poverty status of the households in terms of multi-dimensional indicators adopted under the survey.

Ladies and Gentlemen,

The poverty monitoring system, being developed under the project is, expected to improve the coverage as well as overall design of poverty survey in Bangladesh. This year our plan is to expand the sample size to provide representative poverty statistics over the 23 regions (old districts) of the country. Over the next three years, poverty statistics will be generated for 64 districts based on representative samples at the district level. We hope the generation of disaggregated poverty statistics will help in monitoring poverty at the local level and assist in initiating more effective anti-poverty programmes keeping local characteristics in view. I am confident your deliberations during the seminar will review the findings of the surveys and provide useful guidance in conducting future surveys. I would like to take this opportunity to express our sincere appreciation to IDRC and CIDA for their support in this important endeavor.

In conclusion may I once again express on behalf of CIRDAP and the BBS, our sincere gratitude to the Chief Guest and to you all, Ladies and Gentlemen, for your kind presence and encouragement.

Thank you all.
Poverty Monitoring Survey in the Urban Areas - April 1997:
Summary Results

Poverty Monitoring Survey in the Rural Areas - April 1997:
Summary Results
Poverty Monitoring Survey in the Urban Areas - April 1997: Summary Results

- Md. Delwar Hossain
  Consultant, CIRDAP/BBS

The third round of urban poverty survey, under the Poverty Monitoring System, was conducted by the Bangladesh Bureau of Statistics (BBS) in April 1997. The earlier surveys were carried out in April 1996 and December 1995. The summary results of the April 1997 survey are presented in this paper. The results have also been compared with the findings of the earlier surveys, wherever appropriate.

Sample Design
The survey sample is based on the Integrated Multi-purpose Survey Design, adopted by BBS for its major ongoing surveys. For the urban poverty survey, a sub-sample from this integrated design has been taken. It includes 40 enumeration areas (EAs) selected at the first stage. These EAs are clusters of households, with 250 households on the average. The spatial distribution of sample EAs is shown at Annex-1. The second stage sample consists of 30 households selected from each EA. A total of 1,200 households constitute the survey sample.

Data Collection
The field work was completed within a period of 16 days: 15-30 April 1997. Three reference periods were used for collecting information: a week, a month and six months. Each period was counted preceding the day of enumeration. One week reference period was used for food items and working status of household members, one month reference period for daily consumption of non-food items, and six month reference period for durable non-food items.

The field enumeration work was done by local enumerators with supervision provided by project officers of Dhaka head office as well as regional and thana statistical officers of BBS. The enumerators and supervisors were imparted training in two phases before undertaking the field work.

The questionnaire included ten separate modules covering household characteristics and poverty indicators in relation to land and other asset ownership, income and expenditure occupation, food consumption, health and sanitation, housing, education gender dimension, credit and crisis management and migration.

1. Incidence of Poverty
For measuring the incidence of poverty, the poverty line has been estimated using the food-energy-intake (FEI) method. For the purpose of comparison, the poverty line based on the cost-of-basic-needs (CBN) method has also been calculated.
Poverty Line under FEI method

The FEI method determines the poverty line by deriving the expenditure (or income) level at which the expected value of calorie intake equals the pre-determined food-energy requirement.

For the purpose, the following equation is estimated:

\[ \ln y = a + bX + e \]

where 
- \( y \) = monthly per capita expenditure (food and non-food)
- \( x \) = daily per capita calorie intake
- \( e \) = disturbance term

In the equation, calorie intake is taken as the exogenous variable as it is pre-determined. For urban population, the minimum calorie requirement is taken as 2,112 K cal per capita per day. The estimated equation is

\[ \ln y = 3.795376 + 0.001331 x \]

At the specified level, the poverty line is estimated at Tk 739.85. The head-count measure of poverty as well as the depth and the severity of poverty, as measured by poverty gap and squared poverty gap, are shown in Table 1.
Table 1: Incidence of Urban Poverty

<table>
<thead>
<tr>
<th>Poverty measure</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty line expenditure (Tk)</td>
<td>739.85</td>
<td>668.90</td>
<td>707.80</td>
</tr>
<tr>
<td>Head count ratio (percent)</td>
<td>43.4</td>
<td>44.4</td>
<td>43.3</td>
</tr>
<tr>
<td>Poverty gap (P1)</td>
<td>0.135</td>
<td>0.142</td>
<td>0.145</td>
</tr>
<tr>
<td>Squared poverty gap (P2)</td>
<td>0.058</td>
<td>0.061</td>
<td>0.061</td>
</tr>
</tbody>
</table>

Poverty Line under CBN Method

Under the CBN method, the poverty line is set as the cost of a normative 'basic needs' bundle chosen to be adequate to reach a pre-determined calorie requirement. For food consumption, the minimum consumption bundle contains 832 gm of food corresponding to an average per capita daily intake of 2,112 K cal. and 58 gm of protein. In order to account for non-food consumption expenditure and since non-food items are not fixed, the level of non-food consumption has been determined on the basis of daily per capita consumption expenditure using the following form:

\[ E[Y_i - X_i | X_i = Z_f] \]

Where

- \( Y_i \) = monthly per capita total consumption expenditure of the household
- \( X_i \) = monthly per capita food expenditure of the household
- \( Z_f \) = monthly per capita normative poverty line food expenditure

In order to account for regional differences in food prices, the poverty lines have also been computed separately for six divisions - Dhaka, Chittagong, Khulna, Rajshahi, Barisal and Sylhet. Since the food bundle is constant, daily per capita food expenditures differ across divisions due to differences in prices. The estimates of poverty line and head-count measure of poverty can be seen in Table 2.

Table-2: Poverty Estimates by CBN Method

<table>
<thead>
<tr>
<th>Location</th>
<th>Poverty line (Tk)</th>
<th>Head count ratio (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dhaka</td>
<td>938.21</td>
<td>48.0</td>
</tr>
<tr>
<td>Chittagong</td>
<td>686.67</td>
<td>33.4</td>
</tr>
<tr>
<td>Khulna</td>
<td>926.97</td>
<td>55.1</td>
</tr>
<tr>
<td>Rajshahi</td>
<td>676.55</td>
<td>64.7</td>
</tr>
<tr>
<td>Barisal</td>
<td>738.31</td>
<td>32.1</td>
</tr>
<tr>
<td>Sylhet</td>
<td>811.87</td>
<td>45.9</td>
</tr>
<tr>
<td>Total</td>
<td>765.47</td>
<td>45.2</td>
</tr>
</tbody>
</table>

1 The food consumption bundle consists of: 397 gm of rice, 40 gm of wheat, 40 gm of pulses, 48 gm of fish, 12 gm of beef, 27 gm of potato, 150 gm of other vegetables, 20 gm of oil, 20 gm of fruits, 58 gm of milk, and 20 gm of sugar.
In the presentation of the following results, the poverty line based on FEI method has been used.

2. Income and Expenditure

Household Income

According to the survey, average monthly household income is Tk 8,405 ranging between Tk 2,847 for the poor and Tk 12,443 for the well-off (Table 3).

Table 3: Average Monthly Household Income

<table>
<thead>
<tr>
<th>Survey</th>
<th>Household Income</th>
<th>Amount in Taka</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
</tr>
<tr>
<td>April 1997</td>
<td>8,405</td>
<td>2,847</td>
</tr>
<tr>
<td>April 1996</td>
<td>7,667</td>
<td>2,510</td>
</tr>
<tr>
<td>December 1995</td>
<td>6,506</td>
<td>2,702</td>
</tr>
</tbody>
</table>
**Income Sources**

The survey distinguishes three main sources of household income:

- wages, salaries and permanent assets
- small-scale economic activities
- transfer, charity, loans and similar sources

For monthly income of all households, wages and salaries including permanent assets account for Tk 2,824 (33.6 per cent), small-scale economic activities Tk 2,702 (32.1 per cent) and transfers, charity, loans etc. Tk 2,879 (34.2 per cent) of the total income.

For the poor households, similar shares are Tk 1,587 (55.8 percent), Tk 1,003 (35.2 per cent) and Tk 257 (9.0 per cent) and for the well-off households Tk 3,722 (29.9 percent), Tk 3,937 (31.6 per cent) and Tk 4,784 (38.4 per cent) respectively (Table 4).

### Table 4: Major Sources of Household Income

<table>
<thead>
<tr>
<th></th>
<th>April 1997</th>
<th>April 1996</th>
<th>December 1995</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Wages, salaries and</td>
<td>2,824</td>
<td>1,587</td>
<td>3,722</td>
</tr>
<tr>
<td>permanent assets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small scale economic</td>
<td>2,702</td>
<td>1,003</td>
<td>3,937</td>
</tr>
<tr>
<td>activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer, charity,</td>
<td>2,879</td>
<td>257</td>
<td>4,784</td>
</tr>
<tr>
<td>loans etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8,405</td>
<td>2,847</td>
<td>12,443</td>
</tr>
</tbody>
</table>

Figure 5: Major Sources of Household Income, 1997
**Per Capita Income**

For all households, the average per capita monthly income is Tk 1,645. For the poor, per capita income is Tk 539 compared to Tk 2,489 of the well-off (Table 5).

![Figure 6: Per Capita Monthly Income, 1997](image)

**Table 5 : Per Capita Monthly Income (Taka)**

<table>
<thead>
<tr>
<th>Category</th>
<th>April 1997</th>
<th>April 1996</th>
<th>December 1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>1,645</td>
<td>1,509</td>
<td>1,263</td>
</tr>
<tr>
<td>Poor</td>
<td>539</td>
<td>478</td>
<td>506</td>
</tr>
<tr>
<td>Well-off</td>
<td>2,489</td>
<td>2,328</td>
<td>1,854</td>
</tr>
</tbody>
</table>

**Income Distribution by Decile Groups**

Household income distribution by decile groups suggests that the lowest decile, having a population share of 8.1 percent, receives 1.5 percent of the total income. In contrast, the highest decile has an income share of 40.9 percent with a population share of 13.1 percent. The Gini coefficient is estimated at 0.43 (Table 6).

**Table 6: Household Income Distribution by Decile Groups**

<table>
<thead>
<tr>
<th>Decile Group</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>population</td>
<td>income</td>
<td>population</td>
</tr>
<tr>
<td>1</td>
<td>8.1</td>
<td>1.5</td>
<td>8.2</td>
</tr>
<tr>
<td>2</td>
<td>8.2</td>
<td>2.8</td>
<td>7.9</td>
</tr>
<tr>
<td>3</td>
<td>8.3</td>
<td>3.5</td>
<td>8.6</td>
</tr>
<tr>
<td>4</td>
<td>9.4</td>
<td>4.4</td>
<td>9.2</td>
</tr>
<tr>
<td>5</td>
<td>10.4</td>
<td>5.3</td>
<td>9.6</td>
</tr>
<tr>
<td>6</td>
<td>10.0</td>
<td>6.5</td>
<td>10.2</td>
</tr>
<tr>
<td>7</td>
<td>10.1</td>
<td>8.4</td>
<td>10.5</td>
</tr>
<tr>
<td>8</td>
<td>10.5</td>
<td>11.0</td>
<td>11.4</td>
</tr>
<tr>
<td>9</td>
<td>11.8</td>
<td>15.8</td>
<td>11.4</td>
</tr>
<tr>
<td>10</td>
<td>13.1</td>
<td>40.9</td>
<td>13.0</td>
</tr>
</tbody>
</table>

| Gini coefficient | 0.43 | 0.44 | 0.49 |
**Household Expenditure**

The average monthly household expenditure is Tk 5,832. It is Tk 2,632 for the poor and Tk 8,157 for the well-off (Table 7).

**Table 7 : Average Monthly Household Expenditure**

<table>
<thead>
<tr>
<th>Survey</th>
<th>Expenditure (Tk)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>April 97</td>
<td>5832</td>
<td>2632</td>
<td>8157</td>
</tr>
<tr>
<td>April 96</td>
<td>5285</td>
<td>2320</td>
<td>7530</td>
</tr>
<tr>
<td>December 95</td>
<td>5601</td>
<td>2510</td>
<td>8626</td>
</tr>
</tbody>
</table>

**Distribution of Expenditure by Decile Groups**

As per the distribution of household expenditure by decile groups, the lowest decile has 6.6 per cent of the population with 2.2 percent of total expenditure. The highest decile, on the other hand, has population and expenditure shares of 14.4 percent and 35.5 percent respectively. The Gini coefficient of expenditure distribution is 0.34 (Table 8).

**Table 8 : Distribution of Household Expenditure by Decile Groups**

<table>
<thead>
<tr>
<th>Decile Group</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>population expenditure</td>
<td>population expenditure</td>
<td>population expenditure</td>
</tr>
<tr>
<td>1</td>
<td>6.6</td>
<td>5.7</td>
<td>5.8</td>
</tr>
<tr>
<td>2</td>
<td>7.3</td>
<td>7.7</td>
<td>7.8</td>
</tr>
<tr>
<td>3</td>
<td>8.5</td>
<td>8.9</td>
<td>8.5</td>
</tr>
<tr>
<td>4</td>
<td>9.4</td>
<td>9.5</td>
<td>9.3</td>
</tr>
<tr>
<td>5</td>
<td>9.7</td>
<td>10.1</td>
<td>10.0</td>
</tr>
<tr>
<td>6</td>
<td>10.3</td>
<td>10.5</td>
<td>10.2</td>
</tr>
<tr>
<td>7</td>
<td>10.6</td>
<td>10.8</td>
<td>10.9</td>
</tr>
<tr>
<td>8</td>
<td>11.6</td>
<td>11.4</td>
<td>11.5</td>
</tr>
<tr>
<td>9</td>
<td>11.7</td>
<td>11.4</td>
<td>13.1</td>
</tr>
<tr>
<td>10</td>
<td>14.4</td>
<td>14.1</td>
<td>12.5</td>
</tr>
<tr>
<td>Gini coefficient</td>
<td>0.34</td>
<td>0.35</td>
<td>0.35</td>
</tr>
</tbody>
</table>

3. **Nutrition and Welfare**

**Food Intake**

The average per capita per day food intake of all households is 909.5 gm ---- 388.3 gm (42.7 percent) of rice; 63.7 gm (7.0 percent) of other cereals; 72.5 gm (8.0 percent) of potato; 130.4 gm (14.3 percent) of vegetables; 19.9 gm (2.2 percent) of pulses; 75.0 gm (8.2 percent) of items like meat, poultry, egg and fish; and 42.1 gm (4.6 percent) of milk and milk products.
For the poor, the average daily per capita food intake is 729.7 gm, while for the well-off it is 1040.1 gm (Table 9).

**Table 9 : Daily Per Capita Food Intake**

<table>
<thead>
<tr>
<th>Food Items</th>
<th>Poor</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>392.0</td>
<td>378.2</td>
<td>373.6</td>
<td>385.6</td>
<td>374.0</td>
<td>386.3</td>
<td>388.3</td>
<td>375.8</td>
<td>380.9</td>
<td></td>
</tr>
<tr>
<td>Other cereals</td>
<td>42.8</td>
<td>55.2</td>
<td>53.6</td>
<td>78.9</td>
<td>80.9</td>
<td>82.7</td>
<td>63.7</td>
<td>69.8</td>
<td>70.4</td>
<td></td>
</tr>
<tr>
<td>Potato</td>
<td>72.3</td>
<td>55.6</td>
<td>57.0</td>
<td>72.6</td>
<td>64.5</td>
<td>73.7</td>
<td>72.5</td>
<td>60.7</td>
<td>66.6</td>
<td></td>
</tr>
<tr>
<td>Vegetables</td>
<td>97.4</td>
<td>111.2</td>
<td>105.1</td>
<td>154.5</td>
<td>148.0</td>
<td>176.9</td>
<td>130.4</td>
<td>132.1</td>
<td>146.6</td>
<td></td>
</tr>
<tr>
<td>Milk &amp; milk prod.</td>
<td>13.2</td>
<td>10.9</td>
<td>10.1</td>
<td>63.1</td>
<td>54.3</td>
<td>50.2</td>
<td>42.1</td>
<td>41.3</td>
<td>33.3</td>
<td></td>
</tr>
<tr>
<td>Meat, poultry, egg, fish</td>
<td>33.9</td>
<td>39.2</td>
<td>54.9</td>
<td>104.8</td>
<td>100.9</td>
<td>126.0</td>
<td>75.0</td>
<td>74.3</td>
<td>96.0</td>
<td></td>
</tr>
<tr>
<td>Pulses</td>
<td>14.2</td>
<td>15.2</td>
<td>16.3</td>
<td>24.1</td>
<td>25.5</td>
<td>24.9</td>
<td>19.9</td>
<td>21.0</td>
<td>21.3</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>63.9</td>
<td>64.7</td>
<td>40.2</td>
<td>156.5</td>
<td>164.4</td>
<td>104.4</td>
<td>117.6</td>
<td>121.6</td>
<td>78.3</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>729.7</td>
<td>730.2</td>
<td>713.4</td>
<td>1040.1</td>
<td>1022.5</td>
<td>1025.1</td>
<td>909.5</td>
<td>896.6</td>
<td>893.4</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 8: Per Capita Per Day Food Intake, 1997**

**Calorie Intake**

The average daily per capita calorie intake for all households is 2239.7 K cal ---- 61.0 percent of which is derived from rice; 9.1 percent from other cereals; 3.2 percent from vegetables; 3.1 percent from pulses; 7.9 percent from edible oils; and 4.1 percent from meat, fish and eggs.

The daily per capita calorie intake of the poor is 1925 K cal compared to 2468.4 K cal for the well-off. For the poor, 71.7 percent of the calorie is derived from rice compared to 55 percent for the well-off (Table 10).
Table 10: Daily Per Capita Calorie Intake

<table>
<thead>
<tr>
<th>Food items</th>
<th>April 97</th>
<th>April 96</th>
<th>December 96</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Rice</td>
<td>1366.7</td>
<td>1379.8</td>
<td>1357.2</td>
</tr>
<tr>
<td>Other Cereals</td>
<td>204.1</td>
<td>141.8</td>
<td>249.4</td>
</tr>
<tr>
<td>Potato</td>
<td>70.3</td>
<td>70.1</td>
<td>70.4</td>
</tr>
<tr>
<td>Vegetables</td>
<td>70.6</td>
<td>51.6</td>
<td>84.4</td>
</tr>
<tr>
<td>Pulses</td>
<td>68.4</td>
<td>48.7</td>
<td>82.8</td>
</tr>
<tr>
<td>Milk &amp; milkproducts</td>
<td>35.2</td>
<td>10.0</td>
<td>53.5</td>
</tr>
<tr>
<td>Meat, fish, egg</td>
<td>92.1</td>
<td>41.2</td>
<td>129.1</td>
</tr>
<tr>
<td>Edible oils</td>
<td>176.2</td>
<td>101.6</td>
<td>230.4</td>
</tr>
<tr>
<td>Fruits</td>
<td>40.8</td>
<td>8.1</td>
<td>67.3</td>
</tr>
<tr>
<td>Others</td>
<td>115.3</td>
<td>72.1</td>
<td>143.9</td>
</tr>
<tr>
<td>Total</td>
<td>2239.7</td>
<td>1925.0</td>
<td>2468.4</td>
</tr>
</tbody>
</table>

**Food and Non-food Expenditures**

For all households, the per capita monthly expenditure on food and non-food commodities is Tk 1141.20 ---- of which 52.1 percent is incurred on food and 47.9 percent on non-food commodities. Among food items, expenditures on cereals is 31.8 percent.

For the poor households, per capita monthly expenditure is Tk 498.50 compared to Tk 1631.40 for the well-off households. The proportion of total expenditure spent on food is 66.4 percent for the poor compared to 48.8 percent for the well-off. The poor spend 45.7 percent of their total food expenditure on cereals whereas similar share for the well-off is 27.4 percent (Table 11).
Table 11: Monthly Per Capita Expenditures

<table>
<thead>
<tr>
<th>Category</th>
<th>April 97</th>
<th></th>
<th>April 96</th>
<th></th>
<th>December 95</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Food</td>
<td>594.7</td>
<td>331.0</td>
<td>795.4</td>
<td>581.6</td>
<td>323.7</td>
<td>786.6</td>
</tr>
<tr>
<td>Cereals</td>
<td>189.2</td>
<td>151.3</td>
<td>217.8</td>
<td>185.6</td>
<td>150.1</td>
<td>213.7</td>
</tr>
<tr>
<td>Others</td>
<td>405.5</td>
<td>179.7</td>
<td>577.6</td>
<td>396.0</td>
<td>173.6</td>
<td>572.9</td>
</tr>
<tr>
<td>Non-food</td>
<td>546.5</td>
<td>167.5</td>
<td>835.9</td>
<td>458.4</td>
<td>119.8</td>
<td>728.4</td>
</tr>
<tr>
<td>Education</td>
<td>64.4</td>
<td>11.8</td>
<td>104.6</td>
<td>59.5</td>
<td>10.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Medicare</td>
<td>26.3</td>
<td>5.4</td>
<td>42.20</td>
<td>22.1</td>
<td>5.7</td>
<td>35.1</td>
</tr>
<tr>
<td>Others</td>
<td>455.8</td>
<td>150.3</td>
<td>689.1</td>
<td>376.8</td>
<td>104.1</td>
<td>593.3</td>
</tr>
<tr>
<td>Total</td>
<td>1141.2</td>
<td>498.5</td>
<td>1631.4</td>
<td>1040.0</td>
<td>443.5</td>
<td>1515.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percent</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>52.1</td>
<td>66.4</td>
<td>48.8</td>
</tr>
<tr>
<td>Non-food</td>
<td>47.9</td>
<td>33.6</td>
<td>51.2</td>
</tr>
</tbody>
</table>

Figure 10: Household Expenditure Pattern, 1997

4. Ownership and Access to Resources

Land

In terms of ownership of land, 19.5 percent of urban households are landless, 70.7 percent belong to small landowning households, 7.8 percent to medium and 1.8 percent are large landowners (Table 12).
Table 12: Landownership Status of Households

<table>
<thead>
<tr>
<th>Landownership Status</th>
<th>April 97</th>
<th></th>
<th>December 95</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
</tr>
<tr>
<td>Landless</td>
<td>19.5</td>
<td>24.1</td>
<td>16.2</td>
<td>23.5</td>
</tr>
<tr>
<td>Small</td>
<td>70.7</td>
<td>74.0</td>
<td>68.3</td>
<td>67.2</td>
</tr>
<tr>
<td>Medium</td>
<td>7.8</td>
<td>1.1</td>
<td>12.6</td>
<td>7.3</td>
</tr>
<tr>
<td>Large</td>
<td>1.8</td>
<td>0.5</td>
<td>2.7</td>
<td>2.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: Small owning lands £ 2.49 ac, medium owning lands 2.50 to 7.49 ac, and large owning lands 7.50+ ac

Among the poor, 24.1 percent are landless while 16.2 percent of the well-off are landless. The small landowning households comprise of 74.0 percent of the poor and 68.3 percent of the well-off. The medium and large landowning households represent 1.1 percent and 0.5 percent of the poor and 12.6 percent and 2.7 percent of the well-off respectively.

*Income and Expenditure by Landownership Class*

The per capita monthly income of the landless is Tk 1,003 which increases with landownership. The large landowners have a per capita monthly income of Tk 5,466. The per capita monthly income of the landless poor is Tk 487 compared to Tk 1,677 of the landless well-off. Within the poor, large
landowners have a per capita monthly income of Tk 860. In contrast, the well-off large landowners have a per capita monthly income of Tk 6,119.

The per capita monthly expenditure, like income, increases with land ownership. For the landless households, the expenditure is Tk 1,006, which increases to Tk 1,074 for the small landowners, Tk 1,760 for the medium landowners and Tk 1,986 for the large landowners.

For the poor households, per capita monthly expenditure is Tk 489 for the landless and Tk 499 for the small landowners. The well-off landless households have an expenditure of Tk 1,683. For the small and large landowners in the well-off category, the per capita monthly expenditures are Tk 1,552 and Tk 2,188 respectively (Table 13).

<table>
<thead>
<tr>
<th>Survey</th>
<th>Landownership Class</th>
<th>Income (Tk.)</th>
<th>Expenditure (Tk.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>All Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>April 97</td>
<td>Landless</td>
<td>1003 487 1677</td>
<td>1006 489 1683</td>
</tr>
<tr>
<td></td>
<td>Small</td>
<td>1496 548 2284</td>
<td>1074 499 1552</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>3188 705 3388</td>
<td>1760 593 1854</td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>5466 860 6119</td>
<td>1986 557 2188</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1645 539 2489</td>
<td>1141 498 1632</td>
</tr>
<tr>
<td>April 96</td>
<td>Landless</td>
<td>851 456 1290</td>
<td>889 433 1372</td>
</tr>
<tr>
<td></td>
<td>Small</td>
<td>1631 492 2653</td>
<td>1021 445 1539</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>1817 380 1939</td>
<td>1598 485 1692</td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>2741 857 2992</td>
<td>1169 503 1258</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1509 479 2329</td>
<td>1040 443 1516</td>
</tr>
<tr>
<td>December 95</td>
<td>Landless</td>
<td>926 519 1389</td>
<td>950 453 1517</td>
</tr>
<tr>
<td></td>
<td>Small</td>
<td>1220 495 1824</td>
<td>1059 472 1548</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>2187 653 2438</td>
<td>1579 527 1749</td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>2420 745 2668</td>
<td>14 88 678 1608</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1264 506 1854</td>
<td>1088 470 1569</td>
</tr>
</tbody>
</table>

**Table 13: Per Capita Income and Expenditure by Landownership Class**

**Incidence of Poverty by Landownership Class**

Among the urban landless, the incidence of poverty is 51.9 percent. The poor in small, medium, and large landowning classes constitute 44.1 percent, 6.4 percent and 13.6 percent respectively (Table 14).

**Table 14: Incidence of Poverty by Landownership Class**

<table>
<thead>
<tr>
<th>Landownership class</th>
<th>Poverty incidence (head count ratio in percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
</tr>
<tr>
<td>Landless</td>
<td>51.9</td>
</tr>
<tr>
<td>Small</td>
<td>44.1</td>
</tr>
<tr>
<td>Medium</td>
<td>6.4</td>
</tr>
<tr>
<td>Large</td>
<td>13.6</td>
</tr>
</tbody>
</table>
5. **Occupational Status**

*Occupation of Head of Households*

For all households, 6.5 percent have agriculture as the main occupation while the remaining 93.5 percent belong to non-agriculture category. Within agriculture, 3.1 percent belong to owner farm households, 1.9 percent to agriculture labour households and 1.5 percent to other farming households.

In the case of non-agriculture occupations, trade and business constitute 24.5 percent, professional and management services 22.3 percent, wage labour 16.8 percent and other non-agriculture 29.9 percent.

In the case of poor households, agriculture is the main occupation of 8.6 percent of the household heads compared to 5.0 percent for the well-off. Owner farmers and agriculture labour constitute 3.8 percent and 2.6 percent of the poor respectively as against 2.6 percent and 1.4 percent of the well-off. Within the well-off, management and professional households and households in trade and business are relatively large at 30.4 percent and 26.8 percent respectively. In contrast, 11.1 percent of the households in management and professional occupations and 21.4 percent in trade and business are poor. The heads of 22.4 percent of the poor households work as non-agriculture labour compared to 12.4 percent of the well-off household heads (Table 15).

**Table 15: Occupation Status of Household Heads**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>April 97</th>
<th></th>
<th>April 96</th>
<th></th>
<th>December 95</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Agriculture:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner farmer</td>
<td>3.1</td>
<td>3.8</td>
<td>2.6</td>
<td>4.3</td>
<td>4.4</td>
<td>4.2</td>
</tr>
<tr>
<td>Agriculture labour</td>
<td>1.9</td>
<td>2.6</td>
<td>1.4</td>
<td>3.8</td>
<td>5.3</td>
<td>2.8</td>
</tr>
<tr>
<td>Other farming</td>
<td>1.5</td>
<td>2.2</td>
<td>1.0</td>
<td>2.1</td>
<td>3.1</td>
<td>1.3</td>
</tr>
<tr>
<td>Total</td>
<td>6.5</td>
<td>8.6</td>
<td>5.0</td>
<td>10.2</td>
<td>12.8</td>
<td>8.3</td>
</tr>
<tr>
<td>Non-agriculture:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management &amp; professional</td>
<td>22.3</td>
<td>11.1</td>
<td>30.4</td>
<td>24.1</td>
<td>14.3</td>
<td>31.6</td>
</tr>
<tr>
<td>Trade &amp; business</td>
<td>24.5</td>
<td>21.4</td>
<td>26.8</td>
<td>23.0</td>
<td>18.4</td>
<td>26.5</td>
</tr>
<tr>
<td>Labour</td>
<td>16.8</td>
<td>22.4</td>
<td>12.4</td>
<td>13.5</td>
<td>20.0</td>
<td>8.6</td>
</tr>
<tr>
<td>Others</td>
<td>29.9</td>
<td>36.1</td>
<td>25.4</td>
<td>29.2</td>
<td>34.5</td>
<td>25.0</td>
</tr>
<tr>
<td>Total</td>
<td>93.5</td>
<td>91.4</td>
<td>95.0</td>
<td>89.8</td>
<td>87.2</td>
<td>91.7</td>
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<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Income and Expenditures**

The per capita monthly income of owner farmers is Tk 1,365. The agriculture labour households have monthly per capita income of Tk 840. In case of management and professional households, the per capita monthly income is Tk 2,508 and for the non-agriculture labour households it is Tk 752 (Table 16).

For the poor, the monthly per capita income of owner farmers is Tk 616 and of agriculture labour households Tk 533. In contrast, the well-off owner farmers and agriculture labour households have
incomes of Tk 1990 and Tk 1650 respectively. The well-off management and professional households have income of Tk 2854 and trade and business households Tk 2734.

Table 16: Income by Occupation of Household-Heads

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Monthly per capita income</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td></td>
<td>April 97</td>
<td>April 96</td>
<td>December 95</td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Agriculture:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner farmer</td>
<td>1364.8</td>
<td>615.5</td>
<td>1989.5</td>
<td>867.0</td>
<td>500.2</td>
<td>1207.2</td>
</tr>
<tr>
<td>Agriculture labour</td>
<td>840.4</td>
<td>532.6</td>
<td>1650.2</td>
<td>604.5</td>
<td>435.6</td>
<td>866.4</td>
</tr>
<tr>
<td>Other farming</td>
<td>1179.8</td>
<td>504.1</td>
<td>2194.2</td>
<td>762.3</td>
<td>489.4</td>
<td>1229.2</td>
</tr>
<tr>
<td>Non-agriculture:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management &amp; professional</td>
<td>2507.5</td>
<td>669.3</td>
<td>2853.8</td>
<td>2335.4</td>
<td>460.0</td>
<td>2779.2</td>
</tr>
<tr>
<td>Trade &amp; business</td>
<td>1955.0</td>
<td>612.9</td>
<td>2733.8</td>
<td>1638.6</td>
<td>482.8</td>
<td>2263.9</td>
</tr>
<tr>
<td>Labour</td>
<td>752.0</td>
<td>468.8</td>
<td>1161.7</td>
<td>1182.7</td>
<td>546.3</td>
<td>1680.0</td>
</tr>
<tr>
<td>Others</td>
<td>955.6</td>
<td>576.9</td>
<td>1320.5</td>
<td>1193.9</td>
<td>524.5</td>
<td>2177.0</td>
</tr>
</tbody>
</table>

The monthly per capita expenditure of owner farmers is Tk 1,294 and of agriculture labour households Tk 739. The expenditure of management and professional households is higher at Tk 1626. For trade and business households, the expenditure is Tk 1262 and for non-agriculture labour households Tk 853. In the case of households with heads having other non-agricultural occupation, the expenditure is Tk 928 (Table 17).

The poor owner farmers report a monthly per capita expenditure of Tk 486 compared to Tk 1988 of the well-off. Among agriculture labour households, monthly per capita expenditure is Tk 461 for the poor and Tk 1479 for the well-off. In case of management and professional households, the expenditure of the poor is Tk 584 and of the well-off Tk 2159. The expenditure for trade and business is Tk 528 for the poor as against Tk 1673 of the well-off.

Table 17: Expenditure by Occupation of Household Heads

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Monthly per capita expenditure</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
</tr>
<tr>
<td>Agriculture:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner farmer</td>
<td>1294.4</td>
<td>486.2</td>
<td>1988.0</td>
<td>723.7</td>
<td>422.7</td>
<td>1003.1</td>
<td>1152.8</td>
<td>428.9</td>
<td>1413.2</td>
<td></td>
</tr>
<tr>
<td>Agriculture labour</td>
<td>739.4</td>
<td>460.6</td>
<td>1478.9</td>
<td>678.8</td>
<td>464.6</td>
<td>1010.8</td>
<td>573.4</td>
<td>408.2</td>
<td>1047.7</td>
<td></td>
</tr>
<tr>
<td>Other farming</td>
<td>859.0</td>
<td>469.6</td>
<td>1433.6</td>
<td>988.8</td>
<td>401.9</td>
<td>1953.5</td>
<td>701.5</td>
<td>465.4</td>
<td>1400.1</td>
<td></td>
</tr>
<tr>
<td>Non-agriculture:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management &amp; professional</td>
<td>1625.7</td>
<td>584.4</td>
<td>2158.6</td>
<td>1421.4</td>
<td>505.8</td>
<td>1666.3</td>
<td>1639.6</td>
<td>556.0</td>
<td>1537.2</td>
<td></td>
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<tr>
<td>Trade &amp; business</td>
<td>1262.3</td>
<td>528.2</td>
<td>1672.7</td>
<td>1159.5</td>
<td>459.8</td>
<td>1537.7</td>
<td>1148.1</td>
<td>478.2</td>
<td>1573.3</td>
<td></td>
</tr>
<tr>
<td>Labour</td>
<td>852.8</td>
<td>481.5</td>
<td>1310.3</td>
<td>858.4</td>
<td>443.6</td>
<td>1347.5</td>
<td>724.9</td>
<td>448.2</td>
<td>1150.7</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>928.0</td>
<td>549.7</td>
<td>1416.5</td>
<td>895.6</td>
<td>438.4</td>
<td>1301.1</td>
<td>961.5</td>
<td>482.0</td>
<td>1344.1</td>
<td></td>
</tr>
</tbody>
</table>

41
Incidence of Poverty

The incidence of poverty is 50.5 percent among owner farmers and 59.0 percent among agriculture labour households. In case of non-agriculture labour households, the poverty incidence is 63.2 percent. For management and professional households, such incidence is 35.3 percent. The incidence of poverty for the households headed by persons having trade and business is also substantially lower at 35.8 percent (Table 18).

Table 18: Poverty Incidence by Occupation of Household Heads

<table>
<thead>
<tr>
<th>Occupation</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agriculture:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner farmer</td>
<td>50.5</td>
<td>48.2</td>
<td>26.7</td>
</tr>
<tr>
<td>Agriculture labour</td>
<td>59.0</td>
<td>60.7</td>
<td>74.3</td>
</tr>
<tr>
<td>Other farming</td>
<td>64.8</td>
<td>62.2</td>
<td>74.7</td>
</tr>
<tr>
<td><strong>Non-agriculture:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management &amp; professional</td>
<td>35.3</td>
<td>30.0</td>
<td>20.3</td>
</tr>
<tr>
<td>Trade &amp; business</td>
<td>35.8</td>
<td>35.2</td>
<td>38.9</td>
</tr>
<tr>
<td>Labour</td>
<td>63.2</td>
<td>70.4</td>
<td>59.9</td>
</tr>
<tr>
<td>Others</td>
<td>52.5</td>
<td>50.6</td>
<td>50.4</td>
</tr>
</tbody>
</table>

Main Sources of Income

The major income earning sources of relatively large numbers of urban households consist of (i) wages and salaries, and (ii) self-employment. The proportion of households with wages and salaries as their main source of income is 42.0 percent and with self-employment 37.9 percent. On the other hand, daily wage earning is the main source of income for 15.2 percent households.

In the self-employment category, the proportion of poor is 42.2 percent and of well-off 34.7 percent. However, the well-off households having wages and salaries as their main income is 52.8 percent. While amongst the poor, such households constitute 27.3 percent. In daily wage earning group, the share of poor is 26.7 percent and the well-off 6.9 percent (Table 19).

Table 19: Main Sources of Income

<table>
<thead>
<tr>
<th>Source</th>
<th>% of households</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Wages &amp; salaries</td>
<td>42.0</td>
<td>27.3</td>
<td>52.8</td>
<td>40.0</td>
</tr>
<tr>
<td>Self-employment</td>
<td>37.9</td>
<td>42.2</td>
<td>34.7</td>
<td>38.1</td>
</tr>
<tr>
<td>Daily wage</td>
<td>15.2</td>
<td>26.7</td>
<td>6.9</td>
<td>16.5</td>
</tr>
<tr>
<td>Others</td>
<td>4.9</td>
<td>3.8</td>
<td>5.6</td>
<td>5.4</td>
</tr>
</tbody>
</table>
Poverty Incidence by Income Sources

The households having “daily wage” as the main income earning source have the highest incidence of poverty, nearly 74 percent. Among self-employment, the incidence of poverty is about 47 percent (Table 20).

Table 20: Poverty Incidence by Main Income Sources

<table>
<thead>
<tr>
<th>Source</th>
<th>Head-count measure of poverty (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
</tr>
<tr>
<td>Wages &amp; salaries</td>
<td>27.3</td>
</tr>
<tr>
<td>Self-employment</td>
<td>46.9</td>
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<tr>
<td>Daily wage</td>
<td>73.8</td>
</tr>
<tr>
<td>Others</td>
<td>32.1</td>
</tr>
</tbody>
</table>

6. Household Characteristics

The distribution of households in terms of number of members is given in Table 21. Four and five members households are relatively common, both for poor and well-off groups. These are followed by three and six member-households. One member households are relatively uncommon: only 0.8 percent among the poor and 3.9 percent among the well-off households.

Table 21: Households by Number of Members

<table>
<thead>
<tr>
<th>Household size</th>
<th>% of households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
</tr>
<tr>
<td></td>
<td>All</td>
</tr>
<tr>
<td>1</td>
<td>2.6</td>
</tr>
<tr>
<td>2</td>
<td>6.3</td>
</tr>
<tr>
<td>3</td>
<td>13.8</td>
</tr>
<tr>
<td>4</td>
<td>21.1</td>
</tr>
<tr>
<td>5</td>
<td>21.9</td>
</tr>
<tr>
<td>6</td>
<td>13.6</td>
</tr>
<tr>
<td>7</td>
<td>7.9</td>
</tr>
<tr>
<td>8</td>
<td>5.1</td>
</tr>
<tr>
<td>9</td>
<td>3.0</td>
</tr>
<tr>
<td>10</td>
<td>4.8</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

Activity Status

Of the total sample population of 6137, persons within the age group of 5 years and above have a share of 90.1 percent. The share of persons belonging to “in-work” group is 31.1 percent. On the other hand, 4.5 percent are unemployed and 25.0 percent are involved in household work. The proportion
of student is relatively large, about 33.0 percent. The shares of males and females in age group 5 years and above are 51.1 percent and 48.9 percent respectively. For males, the “in-work” proportion is 52.3 percent as against 9.0 percent for females. Females involved in household work constitute 50.0 percent while males doing such work are only 1.0 percent. The shares of students are 33.5 percent in males and 32.4 percent in females. Among the poor, the “in-work” population is 31.4 percent and students 27.0 percent. On the other hand, within the well-off “in-work” population is 31.0 percent and student 37.3 percent. The poor males who belong to “in-work” group are 53.7 percent as compared to 8.5 percent for poor females. Among the well-off, the “in-work” males and females constitute 51.3 percent and 9.4 percent respectively. In case of students, the shares are 26.9 percent for the males and 27.2 percent for the females among the poor while similar shares in case of well-off are 38.2 percent and 36.3 percent respectively (Table 22).

Table 22 : Activity Status of Population (5 years and above)

<table>
<thead>
<tr>
<th>Activity</th>
<th>April 97</th>
<th></th>
<th>April 96</th>
<th></th>
<th>December 95</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>All</td>
<td>Poor</td>
<td>All</td>
<td>Poor</td>
</tr>
<tr>
<td>In-work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31.1</td>
<td>31.4</td>
<td>31.0</td>
<td>29.7</td>
<td>29.1</td>
<td>30.1</td>
</tr>
<tr>
<td>male</td>
<td>52.3</td>
<td>53.7</td>
<td>51.3</td>
<td>51.0</td>
<td>50.9</td>
<td>51.1</td>
</tr>
<tr>
<td>female</td>
<td>9.0</td>
<td>8.5</td>
<td>9.4</td>
<td>6.6</td>
<td>5.1</td>
<td>7.6</td>
</tr>
<tr>
<td>Unemployed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4.5</td>
<td>6.1</td>
<td>3.3</td>
<td>5.0</td>
<td>6.5</td>
<td>3.8</td>
</tr>
<tr>
<td>male</td>
<td>6.1</td>
<td>7.9</td>
<td>4.7</td>
<td>7.0</td>
<td>8.4</td>
<td>5.9</td>
</tr>
<tr>
<td>female</td>
<td>2.9</td>
<td>4.2</td>
<td>1.9</td>
<td>2.7</td>
<td>4.3</td>
<td>1.5</td>
</tr>
<tr>
<td>Household work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25.0</td>
<td>26.1</td>
<td>24.2</td>
<td>26.1</td>
<td>25.6</td>
<td>26.3</td>
</tr>
<tr>
<td>male</td>
<td>1.0</td>
<td>0.9</td>
<td>1.0</td>
<td>1.7</td>
<td>1.5</td>
<td>1.8</td>
</tr>
<tr>
<td>female</td>
<td>50.0</td>
<td>51.8</td>
<td>48.9</td>
<td>52.7</td>
<td>52.6</td>
<td>52.8</td>
</tr>
<tr>
<td>Student</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>33.0</td>
<td>27.0</td>
<td>37.3</td>
<td>32.6</td>
<td>29.6</td>
<td>34.9</td>
</tr>
<tr>
<td>male</td>
<td>33.5</td>
<td>26.9</td>
<td>38.2</td>
<td>33.9</td>
<td>29.9</td>
<td>36.9</td>
</tr>
<tr>
<td>female</td>
<td>32.4</td>
<td>27.2</td>
<td>36.3</td>
<td>31.3</td>
<td>29.2</td>
<td>32.7</td>
</tr>
<tr>
<td>Unable to work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6.4</td>
<td>9.4</td>
<td>4.3</td>
<td>6.6</td>
<td>9.0</td>
<td>4.8</td>
</tr>
<tr>
<td>male</td>
<td>7.2</td>
<td>10.5</td>
<td>4.8</td>
<td>6.4</td>
<td>9.2</td>
<td>4.3</td>
</tr>
<tr>
<td>female</td>
<td>5.6</td>
<td>8.3</td>
<td>3.7</td>
<td>6.8</td>
<td>8.7</td>
<td>5.4</td>
</tr>
</tbody>
</table>

Roof Materials

On main houses, brick/cement built roofs are found in case of 32.6 percent households. The proportions of poor and well-off households having such roofs on their main houses are 12.9 percent and 46.9 percent respectively. The c.i. sheet roofs are, however, more common; the share of households having such roofs is 54.3 percent. Among the poor, the c.i. sheet roofs are found in case of 66.1 percent of the households and among the well-off 45.8 percent households. Other cheap materials like bamboo/
straw/leaves/others are used for building roofs on main houses by 13.1 percent households with proportions of poor and well-off households being 21.0 percent and 7.3 percent respectively (Table 23).

Table 23: Roof Materials of Main Houses

<table>
<thead>
<tr>
<th>Materials</th>
<th>% of households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
</tr>
<tr>
<td></td>
<td>All</td>
</tr>
<tr>
<td>Brick/cement</td>
<td>32.6</td>
</tr>
<tr>
<td>CI sheet</td>
<td>54.3</td>
</tr>
<tr>
<td>Others</td>
<td>13.1</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

The proportion of households using wood/bamboo for cooking purposes is 46.8 percent. On the other hand, natural gas is used by 34.3 percent and leaves/cowdung/straw by 12.1 percent of the households.

The proportion of poor households using wood/bamboo for cooking is 52.5 percent as compared to 42.7 percent for well-off households. The use of natural gas is reported by 17.6 percent of poor households and 46.5 percent of well-off households (Table 24).
Table 24: Fuel Used for Cooking

<table>
<thead>
<tr>
<th>Fuel</th>
<th>% of households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
</tr>
<tr>
<td></td>
<td>All  Poor  Well-off</td>
</tr>
<tr>
<td>Natural gas</td>
<td>34.3 17.6 46.5</td>
</tr>
<tr>
<td>Wood/bamboo</td>
<td>46.8 52.5 42.7</td>
</tr>
<tr>
<td>Leaves/cowdung/straw</td>
<td>12.1 25.3 2.5</td>
</tr>
<tr>
<td>Others</td>
<td>6.8 4.6 8.3</td>
</tr>
<tr>
<td>Total</td>
<td>100 100 100</td>
</tr>
</tbody>
</table>

Figure 14: Fuel Used for Cooking, 1997

7. Health and Sanitation

Diseases

The proportion of household members suffering from various diseases in the preceding month of the survey is 10.1 percent. Among the poor, the proportion is 11.9 percent while among the well-off, it is 8.6 percent (Table 25).

Table 25: Household Members Suffering Diseases

<table>
<thead>
<tr>
<th>Category</th>
<th>% suffered during preceding month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
</tr>
<tr>
<td>All</td>
<td>10.1</td>
</tr>
<tr>
<td>Poor</td>
<td>11.9</td>
</tr>
<tr>
<td>Well-off</td>
<td>8.6</td>
</tr>
</tbody>
</table>
Source of Drinking Water

The tap water is used for drinking by 31.0 percent households. For the poor, the share is 20.8 percent and for the well-off 38.5 percent. The use of tube-well water is wide spread. It is used by 68.0 percent households with proportions of poor and well-off households being 77.4 percent and 61.2 percent respectively. The other sources of drinking water such as pond, canal, river are insignificant, only 1.0 percent (Table 26).

Table 26 : Drinking Water by Source

<table>
<thead>
<tr>
<th>Source</th>
<th>% of households</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
<td>April 96</td>
<td>December 95</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
</tr>
<tr>
<td>Tap</td>
<td>31.0</td>
<td>20.8</td>
<td>38.5</td>
<td>32.0</td>
</tr>
<tr>
<td>Tube-well</td>
<td>68.0</td>
<td>77.4</td>
<td>61.2</td>
<td>67.3</td>
</tr>
<tr>
<td>Others</td>
<td>1.0</td>
<td>1.8</td>
<td>0.3</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Figure 15: Drinking Water Sources, 1997

Water for Cooking Purposes

Relatively more households use both tap and tube-well water for cooking. The tap supplies cooking water to 35.7 percent households; the share of poor households using the source for cooking water is 16.4 percent and well-off households 49.6 percent. On the other hand, tube-well is used by 44.3 percent households; shares of poor and well-off households using the source are 57.6 percent and 34.5 percent respectively. Water from ponds and rivers/canals is also used for cooking by 17.8 percent households, by 21.6 percent poor households and 15.0 percent of well-off households (Table 27).

Table 27 : Sources of Cooking Water

<table>
<thead>
<tr>
<th>Source</th>
<th>% of households</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
<td>April 96</td>
<td>December 95</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
</tr>
<tr>
<td>Tap</td>
<td>35.7</td>
<td>16.4</td>
<td>49.6</td>
<td>35.0</td>
</tr>
<tr>
<td>Tube-well</td>
<td>44.3</td>
<td>57.6</td>
<td>34.5</td>
<td>45.2</td>
</tr>
<tr>
<td>Pond &amp; river/canal</td>
<td>17.8</td>
<td>21.6</td>
<td>15.0</td>
<td>19.0</td>
</tr>
<tr>
<td>Others</td>
<td>0.2</td>
<td>4.4</td>
<td>0.9</td>
<td>0.8</td>
</tr>
</tbody>
</table>
Sanitation

The sanitary pucca latrines are used by 41.1 percent households. The poor and the well-off who reported using such latrines are 31.3 percent and 48.2 percent respectively. There are 14.3 percent households who use flash latrines. The share of poor using flash latrines is 3.0 percent as compared to 22.4 percent for well-off households. The proportion of households using slab latrines is 18.6 percent with the proportions of poor and well-off households at 19.6 percent and 17.8 percent respectively (Table 28).

Table 28 : Sanitation Coverage by Type

<table>
<thead>
<tr>
<th>Type</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Flash toilet</td>
<td>14.3</td>
<td>3.0</td>
<td>22.4</td>
</tr>
<tr>
<td>Sanitary/ pucca</td>
<td>41.1</td>
<td>31.3</td>
<td>48.2</td>
</tr>
<tr>
<td>Slab*</td>
<td>18.6</td>
<td>19.6</td>
<td>17.8</td>
</tr>
<tr>
<td>Others</td>
<td>26.0</td>
<td>46.1</td>
<td>11.6</td>
</tr>
</tbody>
</table>

* Slab also includes others during December 1995.

8. Education

Education of Household Heads

The proportion of households with heads in “never read” category is 29.5 percent. Within the poor, such households have a share of 51.0 percent and in the well-off 13.8 percent. The households heads having SSC + education are found in case of 34.5 percent households, varying between 10.3 percent for the poor and 52.0 percent for the well-off (Table 29).
Table 29: Educational Status of Household Heads

<table>
<thead>
<tr>
<th>Level of education</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Never read</td>
<td>29.5</td>
<td>51.0</td>
<td>13.8</td>
</tr>
<tr>
<td>Class i-v</td>
<td>19.8</td>
<td>25.9</td>
<td>15.4</td>
</tr>
<tr>
<td>Class v-ix</td>
<td>16.1</td>
<td>12.6</td>
<td>18.7</td>
</tr>
<tr>
<td>SSC+</td>
<td>34.5</td>
<td>10.3</td>
<td>52.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Income and Expenditure by Level of Education

Both income and expenditure show increasing trends with the level of education. For “never read” category, monthly per capita income and expenditure are Tk 604 and Tk 607 respectively. For poor households in this category, income is Tk 485 and expenditure Tk 458 compared to Tk 1020 and Tk 1127 respectively of well-off households. On the other hand, households having heads with education of SSC + have income of Tk 2757 and expenditure of Tk 1739. The poor households with heads having education of class SSC + have income of Tk 655 and expenditure of Tk 571. On the other hand, for the same category in well-off group, income is Tk 3094 and expenditure Tk 1926 (Table 30).

Table 30: Income and Expenditure by Education Level of Household Heads

<table>
<thead>
<tr>
<th>Education Status</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>per capita per month income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never read</td>
<td>604</td>
<td>485</td>
<td>1020</td>
</tr>
<tr>
<td>Class i-v</td>
<td>901</td>
<td>546</td>
<td>1373</td>
</tr>
<tr>
<td>Class v-ix</td>
<td>1817</td>
<td>623</td>
<td>2461</td>
</tr>
<tr>
<td>SSC+</td>
<td>2757</td>
<td>655</td>
<td>3094</td>
</tr>
<tr>
<td>Total</td>
<td>1645</td>
<td>539</td>
<td>2489</td>
</tr>
<tr>
<td>per capita per month expenditure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never read</td>
<td>607</td>
<td>458</td>
<td>1127</td>
</tr>
<tr>
<td>Class i-v</td>
<td>785</td>
<td>517</td>
<td>1143</td>
</tr>
<tr>
<td>Class v-ix</td>
<td>1140</td>
<td>545</td>
<td>1461</td>
</tr>
<tr>
<td>SSC+</td>
<td>1739</td>
<td>571</td>
<td>1926</td>
</tr>
<tr>
<td>Total</td>
<td>1141</td>
<td>498</td>
<td>1632</td>
</tr>
</tbody>
</table>
Poverty Incidence by Educational Status

The poor in “never read” category constitute 77.8 percent. In contrast, in households having heads with education of class SSC+, the proportion of the poor is much lower, 13.8 percent (Table 31).

Table 31: Poverty Incidence by Education of Household Heads

<table>
<thead>
<tr>
<th>Education status</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never read</td>
<td>77.8</td>
<td>75.2</td>
<td>73.5</td>
</tr>
<tr>
<td>Class i-v</td>
<td>57.2</td>
<td>63.0</td>
<td>58.4</td>
</tr>
<tr>
<td>Class v-ix</td>
<td>35.0</td>
<td>41.0</td>
<td>44.1</td>
</tr>
<tr>
<td>SSC+</td>
<td>13.8</td>
<td>14.5</td>
<td>13.4</td>
</tr>
</tbody>
</table>

9. Gender Dimensions

Women headed households constitute 8.9 percent of the total households. Of these, 42.9 percent of the households have heads in “never read” category. In contrast, households with heads with education class i-v are 20.5 percent and class vi-ix 18.6 percent. The proportion of households with heads having SSC+ education, on the other hand, is 17.7 percent. The share of poor women-headed households in “ever read” category is 65.3 percent compared to 24.1 percent for well-off women-headed households. In case of SSC+ education, the poor and well-off households with women-heads are 6.1 percent and 27.5 percent respectively (Table 32).
Table 32: Women-headed Households by Education Status

<table>
<thead>
<tr>
<th>Education Status</th>
<th>% of households</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
</tr>
<tr>
<td>Never read</td>
<td>42.9</td>
<td>65.3</td>
<td>24.1</td>
<td>45.9</td>
</tr>
<tr>
<td>Class i-v</td>
<td>20.5</td>
<td>22.4</td>
<td>18.9</td>
<td>19.4</td>
</tr>
<tr>
<td>Class vi-ix</td>
<td>18.6</td>
<td>6.1</td>
<td>29.3</td>
<td>16.3</td>
</tr>
<tr>
<td>SSC+</td>
<td>17.7</td>
<td>6.1</td>
<td>27.5</td>
<td>18.4</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Income and Expenditure

The per capita monthly income of households headed by women is Tk 1,379, which is 16.2 percent lower than the overall average income of Tk 1,645. On the other hand, the per capita monthly expenditure of these households is Tk 1,222 which is 7.1 percent more than the overall average expenditure of Tk 1,141. For “never read” category, the income and expenditure are Tk 611 and Tk 591 respectively. In case of the poor in the same category, income is Tk 452 and expenditure Tk 442. In contrast, the well-off in the category have income of Tk 1,290 and expenditure Tk 1,231.

The households with heads having SSC+ education, have average income of Tk 2,501 and expenditure Tk 2,226 (Table 33).

Table 33: Income and Expenditure of Women-headed Households

<table>
<thead>
<tr>
<th>Education status of head</th>
<th>% of households</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
</tr>
<tr>
<td></td>
<td>per capita per month income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never read</td>
<td>611</td>
<td>452</td>
<td>1290</td>
<td>526</td>
</tr>
<tr>
<td>Class i-v</td>
<td>1061</td>
<td>404</td>
<td>1796</td>
<td>1452</td>
</tr>
<tr>
<td>Class vi-ix</td>
<td>2085</td>
<td>409</td>
<td>2291</td>
<td>1391</td>
</tr>
<tr>
<td>SSC+</td>
<td>2501</td>
<td>728</td>
<td>2902</td>
<td>1837</td>
</tr>
<tr>
<td>Total</td>
<td>1379</td>
<td>458</td>
<td>2231</td>
<td>1146</td>
</tr>
<tr>
<td></td>
<td>per capita per month expenditure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never read</td>
<td>591</td>
<td>442</td>
<td>1231</td>
<td>509</td>
</tr>
<tr>
<td>Class i-v</td>
<td>1042</td>
<td>548</td>
<td>1595</td>
<td>1222</td>
</tr>
<tr>
<td>Class vi-ix</td>
<td>1654</td>
<td>598</td>
<td>1785</td>
<td>1418</td>
</tr>
<tr>
<td>SSC+</td>
<td>2226</td>
<td>690</td>
<td>2572</td>
<td>3228</td>
</tr>
<tr>
<td>Total</td>
<td>1222</td>
<td>492</td>
<td>1898</td>
<td>1385</td>
</tr>
</tbody>
</table>

Poverty Incidence

The incidence of poverty among women-headed households in “never read” category is 81.1 percent. On the other hand, the incidence for household heads with SSC+ education is low, only 18.4 percent (Table 34).
Table 34: Poverty Incidence of Women-headed Households by Education of Households Heads

<table>
<thead>
<tr>
<th>Education</th>
<th>April 9</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never read</td>
<td>81.1</td>
<td>78.3</td>
<td>65.4</td>
</tr>
<tr>
<td>Class i-iv</td>
<td>52.7</td>
<td>27.8</td>
<td>31.2</td>
</tr>
<tr>
<td>Class vi-ix</td>
<td>10.9</td>
<td>32.9</td>
<td>79.4</td>
</tr>
<tr>
<td>SSC+</td>
<td>18.4</td>
<td>13.4</td>
<td>12.1</td>
</tr>
</tbody>
</table>

10. Crisis and Crisis Coping

Of the total households, 5.5 percent report having encountered crises. Of them, those reporting crisis due to death of main income earner constitute 3.0 percent. The large scale expenditure, in particular medical expenditure, is reported by 33.3 percent households. The litigation expenditure is reported by 3.1 percent and dowry payment by 6.1 percent of the households. Among the poor those incurring large-scale medical expenditure are 28.0 percent as compared to 36.6 percent for well-off households. The death of main income earner is reported by 8.0 percent poor households; none of the well-off households, however, faced this crisis. The litigation and dowry payment are reported by 4.9 percent and 9.8 percent of the well-off households; the poor households, on the other hand, did not encounter these crises (Table 35).
Table 35: Incidence of Crisis

<table>
<thead>
<tr>
<th>Nature of crisis</th>
<th>% of households</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
</tr>
<tr>
<td>Death of main income earner</td>
<td>3.0</td>
<td>8.0</td>
<td>-</td>
<td>21.5</td>
</tr>
<tr>
<td>Large-scale expenditure for treatment</td>
<td>33.3</td>
<td>28.0</td>
<td>36.6</td>
<td>35.4</td>
</tr>
<tr>
<td>Litigation</td>
<td>3.1</td>
<td>-</td>
<td>4.9</td>
<td>10.8</td>
</tr>
<tr>
<td>Dowry payment</td>
<td>6.1</td>
<td>-</td>
<td>9.8</td>
<td>9.2</td>
</tr>
<tr>
<td>Others</td>
<td>54.5</td>
<td>64.0</td>
<td>48.7</td>
<td>23.1</td>
</tr>
</tbody>
</table>

Crisis Coping

The expenditure from past saving and borrowing are the relatively common coping measures adopted by large number of households. The former measure is adopted by 23.5 percent while the latter by 50.0 percent households. Among the poor, expenditure from saving is resorted by 21.7 percent households. The well-off households who have adopted this measure constitute 24.4 percent. The households taking credit to overcome crises are 53.7 percent among the well-off and 43.5 percent among the poor (Table 36).

Table 36: Crisis Coping Measures by Households

<table>
<thead>
<tr>
<th>Measures</th>
<th>% of households</th>
<th>April 97</th>
<th>April 96</th>
<th>December 96</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
</tr>
<tr>
<td>Expenditure from saving</td>
<td>23.5</td>
<td>21.7</td>
<td>24.4</td>
<td>26.2</td>
</tr>
<tr>
<td>Sale of land</td>
<td>4.7</td>
<td>4.4</td>
<td>4.9</td>
<td>6.2</td>
</tr>
<tr>
<td>Credit</td>
<td>50.0</td>
<td>43.5</td>
<td>53.7</td>
<td>35.4</td>
</tr>
<tr>
<td>Others</td>
<td>21.8</td>
<td>30.4</td>
<td>17.0</td>
<td>32.2</td>
</tr>
</tbody>
</table>
Figure 19: Crisis Coping Measures of Poor Households
Poverty Monitoring Survey in the Rural Areas-April 1997:
Summary Results

Faizuddin Ahmed
Project Director, PMS Project, BBS

Md. Shamsul Alam
Deputy Director, PMS Project, BBS

The fifth round of rural poverty survey under the Poverty Monitoring System was conducted by the Bangladesh Bureau of Statistics (BBS) in April 1997. The earlier surveys were carried out in October '94, April '95, December '95 and April '96. The summary results of April 1997 survey are presented in this paper. The results have also been compared with the findings of earlier surveys, wherever appropriate.

Sample Design
The survey sample is based on the Integrated Multi-purpose Survey Design, adopted by BBS for its major ongoing surveys. For the rural poverty survey, a sub-sample from this integrated design has been taken. The sub-sample includes 110 enumeration areas (EAs) selected at the first stage. These EAs are clusters of households with 250 households on the average. The spatial distribution of sample EAs is shown at Annex-1. In the second stage, 30 households have been selected from each EA. A total of 3300 households constitute the survey sample.

Data Collection
The field work for data collection was completed within a period of 16 days: 15-30 April '97. Three reference periods were used for collecting information: a week, a month and six months. Each period was counted proceeding the day of enumeration. One week reference period was used for food items and working status of household members, one month reference period for daily consumption of non-food items, and six month reference period for durable non-food items.

The field enumeration work was done by local enumerators with supervision provided by project officers in Dhaka head office as well as by regional and thana statistical officers of BBS. The enumerators and supervisors were imparted training in two phases before undertaking the fieldwork.

The questionnaire included ten separate modules related to household characteristics and poverty indicators e.g. land and other asset ownership, income and expenditure, food consumption, credit and crisis management and migration.

1. Incidence of Poverty
For measuring the incidence of poverty, the poverty line has been estimated using the food-energy intake (FEI) method. For the purpose of comparison, the poverty line based on the cost-of-basic needs (CBN) method has also been calculated.
**Poverty Line under FEI Method**

The FEI method determines the poverty line by deriving the expenditure (or income) level at which the expected value of calorie intake equals the pre-determined food-energy requirement.

For the purpose, the following equation is estimated:

\[
l_n y = a + bx + e
\]

Where  
\( y \) = monthly per capita expenditure (food and non-food)  
\( x \) = daily per capita calorie intake  
\( e \) = disturbance term

In the equation, calorie intake is taken as the exogenous variable as it is pre-determined. For rural population, the minimum calorie requirement is taken as 2122 K cal per capita per day. The estimated equation is

\[
l_n y = 3.352511 + 0.001286x
\]

At the specified level, the poverty line is estimated at Tk. 447.8. The head-count measure of poverty as well as depth and severity of poverty, as measured by poverty gap and squared poverty gap, are shown in Table 1.

**Table 1: Incidence of Rural Poverty**

<table>
<thead>
<tr>
<th>Poverty measure</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty line expenditure (Tk.)</td>
<td>447.8</td>
<td>437.6</td>
<td>419.7</td>
</tr>
<tr>
<td>Head count ratio (per cent)</td>
<td>46.8</td>
<td>47.9</td>
<td>46.8</td>
</tr>
<tr>
<td>Poverty gap (P1)</td>
<td>0.112</td>
<td>0.120</td>
<td>0.116</td>
</tr>
<tr>
<td>Squared poverty gap (P2)</td>
<td>0.039</td>
<td>0.044</td>
<td>0.042</td>
</tr>
</tbody>
</table>

**Figure 1:** Incidence of Rural Poverty

**Poverty Line under CBN Method**

Under the CBN method, the poverty line is set as the cost of a normative 'basic needs' bundle chosen to be adequate to reach a pre-determined calorie requirement. For food consumption, the minimum
consumption bundle contains 832 gm of food corresponding to an average per capita daily intake of 2112 K cal and 58 gm of protein. In order to account for non-food consumption expenditure and since non-food items are not fixed, the level of non-food consumption has been determined on the basis of daily per capita consumption expenditure using the following form:

\[ E[ Y_i - X_i | X_i = Z_f ] \]

Where \( Y_i = \) monthly per capita total consumption expenditure of the household.
\( X_i = \) monthly per capita food expenditure of the household.
\( Z_f = \) monthly per capita normative poverty line food expenditure.

In order to account for regional differences in food prices, the poverty lines have also been computed separately for six divisions - Dhaka, Chittagong, Khulna, Rajshahi, Barisal and Sylhet. Since the food bundle is constant, daily per capita food expenditures differ across divisions due to differences in prices. The estimates of poverty line and head-count measure of poverty can be seen in Table 2.

Table 2: Poverty Estimates by CBN Method

<table>
<thead>
<tr>
<th>Location</th>
<th>Poverty line (Tk.)</th>
<th>Head count Ratio (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dhaka</td>
<td>537.49</td>
<td>58.2</td>
</tr>
<tr>
<td>Chittagong</td>
<td>557.29</td>
<td>59.6</td>
</tr>
<tr>
<td>Khulna</td>
<td>513.92</td>
<td>53.8</td>
</tr>
<tr>
<td>Rajshahi</td>
<td>499.23</td>
<td>66.8</td>
</tr>
<tr>
<td>Barisal</td>
<td>534.37</td>
<td>66.1</td>
</tr>
<tr>
<td>Sylhet</td>
<td>554.22</td>
<td>54.7</td>
</tr>
<tr>
<td>Total</td>
<td>519.59</td>
<td>58.6</td>
</tr>
</tbody>
</table>

In the presentation of the following results, the poverty line based on FEI method has been used.

Figure 2: Poverty Incidence by Division (CBN Method)

1 The food consumption bundle consists of 397 gm of rice, 40 gm of wheat, 40 gm of pulses, 48 gm of fish, 12 gm of beef, 27 gm of potato, 150 gm of other vegetables, 20 gm of oil, 20 gm of fruits, 58 gm of milk, and 20 gm of sugar.
2. Income and Expenditure

Household Income

According to the latest rural survey, average monthly household income is Tk. 3721.0 ranging between Tk. 2148 for the poor and Tk. 5024 for the well-off (Table 3).

Table 3: Average Monthly Household Income

<table>
<thead>
<tr>
<th>Survey</th>
<th>All</th>
<th>Poor</th>
<th>Well-off</th>
</tr>
</thead>
<tbody>
<tr>
<td>April '97</td>
<td>3721.0</td>
<td>2148.0</td>
<td>5024.0</td>
</tr>
<tr>
<td>April '96</td>
<td>3466.9</td>
<td>2078.8</td>
<td>4681.6</td>
</tr>
<tr>
<td>December '95</td>
<td>3327.9</td>
<td>2102.8</td>
<td>4347.1</td>
</tr>
</tbody>
</table>

Income Sources

The survey distinguishes four main sources of household income:
- agriculture
- wages, salaries and permanent assets
- small-scale economic activities
- transfer, charity, loans and similar sources

For monthly income of all households agriculture accounts for Tk. 1337 (35.9 per cent), wages and salaries including permanent assets Tk. 1435 (38.6 per cent), small scale economic activities Tk 550 (14.24 per cent), and transfer, charity, loans & others Tk. 418 (11.20 per cent).

For poor households, similar shares are Tk. 605 (28.2 per cent), Tk. 1020 (47.5 per cent), Tk. 272 (12.7 per cent) and Tk. 240 (11.2 per cent) and for the well-off households Tk. 1943 (38.7 per cent) Tk 1780 (35.4 per cent) Tk. 743 (14.8 per cent) and Tk. 558 (11.1 per cent) respectively (Table 4).
Table 4: Major Sources of Household Income

(Monthly income in Taka)

<table>
<thead>
<tr>
<th>Source of Income</th>
<th>April '97</th>
<th>April '96</th>
<th>December '95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Agriculture</td>
<td>1337</td>
<td>605</td>
<td>1943</td>
</tr>
<tr>
<td>Wages, salaries</td>
<td>1435</td>
<td>1020</td>
<td>1780</td>
</tr>
<tr>
<td>and permanent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>assets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small scale</td>
<td>530</td>
<td>272</td>
<td>743</td>
</tr>
<tr>
<td>economic activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>transfer, charity,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>loans etc.</td>
<td>418</td>
<td>240</td>
<td>558</td>
</tr>
<tr>
<td>Total</td>
<td>3721</td>
<td>2147</td>
<td>5024</td>
</tr>
</tbody>
</table>

Per capita Income

For all households, the average per capita monthly income is Tk. 720.8. For the poor, per capita income is Tk 402.5 compared to Tk 1001.2 for the well-off (Table 5).

Table 5: Per Capita Monthly Income

<table>
<thead>
<tr>
<th>Category</th>
<th>April '97</th>
<th>April '96</th>
<th>December '95</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>720.8</td>
<td>673.2</td>
<td>649.3</td>
</tr>
<tr>
<td>Poor</td>
<td>402.5</td>
<td>393.7</td>
<td>396.2</td>
</tr>
<tr>
<td>Well-off</td>
<td>1001.2</td>
<td>930.7</td>
<td>872.8</td>
</tr>
</tbody>
</table>
Household income distribution by decile groups suggests that the lowest decile, having a population share of 7.3 per cent, receives 1.6 per cent of the total income. In contrast, the highest decile has an income share of 39.7 per cent with a population share of 13.6 per cent. The Gini coefficient is estimated at 0.39 (Table 6).

**Table 6: Household Income Distribution by Decile Groups**

<table>
<thead>
<tr>
<th>Decile Group</th>
<th>April '97 Population</th>
<th>April '97 Income</th>
<th>April '96 Population</th>
<th>April '96 Income</th>
<th>December '95 Population</th>
<th>December '95 Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7.3</td>
<td>1.6</td>
<td>6.9</td>
<td>1.3</td>
<td>8.4</td>
<td>1.2</td>
</tr>
<tr>
<td>2</td>
<td>7.8</td>
<td>2.9</td>
<td>7.5</td>
<td>2.9</td>
<td>7.9</td>
<td>2.7</td>
</tr>
<tr>
<td>3</td>
<td>8.5</td>
<td>3.9</td>
<td>8.2</td>
<td>3.8</td>
<td>8.6</td>
<td>3.7</td>
</tr>
<tr>
<td>4</td>
<td>9.0</td>
<td>4.8</td>
<td>9.2</td>
<td>4.7</td>
<td>8.9</td>
<td>4.7</td>
</tr>
<tr>
<td>5</td>
<td>9.6</td>
<td>5.7</td>
<td>9.5</td>
<td>5.7</td>
<td>10.0</td>
<td>5.7</td>
</tr>
<tr>
<td>6</td>
<td>10.3</td>
<td>6.8</td>
<td>10.5</td>
<td>6.8</td>
<td>9.9</td>
<td>6.9</td>
</tr>
<tr>
<td>7</td>
<td>10.4</td>
<td>8.4</td>
<td>10.6</td>
<td>8.6</td>
<td>10.5</td>
<td>8.6</td>
</tr>
<tr>
<td>8</td>
<td>11.4</td>
<td>10.7</td>
<td>11.3</td>
<td>11.2</td>
<td>11.4</td>
<td>11.1</td>
</tr>
<tr>
<td>9</td>
<td>12.1</td>
<td>15.5</td>
<td>12.2</td>
<td>16.2</td>
<td>11.3</td>
<td>15.8</td>
</tr>
<tr>
<td>10</td>
<td>13.6</td>
<td>39.7</td>
<td>13.7</td>
<td>38.4</td>
<td>12.5</td>
<td>39.2</td>
</tr>
<tr>
<td>Gini coefficient</td>
<td>0.39</td>
<td></td>
<td>0.38</td>
<td></td>
<td>0.42</td>
<td></td>
</tr>
</tbody>
</table>
Household Expenditure

The average monthly household expenditure is Tk 2915. It is Tk 1791 for the poor and Tk. 3845 for the well-off (Table 7).

Table 7: Average Monthly Household Expenditure

<table>
<thead>
<tr>
<th>Survey</th>
<th>All</th>
<th>Poor</th>
<th>Well-off</th>
</tr>
</thead>
<tbody>
<tr>
<td>April '97</td>
<td>2915</td>
<td>1791</td>
<td>3845</td>
</tr>
<tr>
<td>April '96</td>
<td>2752</td>
<td>1724</td>
<td>3651</td>
</tr>
<tr>
<td>December '95</td>
<td>2819</td>
<td>1655</td>
<td>3787</td>
</tr>
</tbody>
</table>

Distribution of Expenditure by Decile Groups

As per the distribution of household expenditure by decile groups, the lowest decile has 5.2 per cent of the population with 2.8 per cent of total expenditure. The highest decile, on the other hand, has population and expenditure shares of 15.1 per cent and 28.5 per cent respectively. The Gini coefficient of expenditure distribution is 0.22 (Table 8).

Table 8: Distribution of Household Expenditure by Decile Groups (per cent)

<table>
<thead>
<tr>
<th>Decile Group</th>
<th>April '97</th>
<th>April '96</th>
<th>December '95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Population</td>
<td>Expenditure</td>
<td>Population</td>
</tr>
<tr>
<td>1</td>
<td>5.2</td>
<td>2.8</td>
<td>5.4</td>
</tr>
<tr>
<td>2</td>
<td>7.1</td>
<td>4.3</td>
<td>7.1</td>
</tr>
<tr>
<td>3</td>
<td>8.3</td>
<td>5.2</td>
<td>7.9</td>
</tr>
<tr>
<td>4</td>
<td>9.0</td>
<td>6.2</td>
<td>9.0</td>
</tr>
<tr>
<td>5</td>
<td>9.8</td>
<td>7.3</td>
<td>9.4</td>
</tr>
<tr>
<td>6</td>
<td>10.3</td>
<td>8.5</td>
<td>10.3</td>
</tr>
<tr>
<td>7</td>
<td>11.3</td>
<td>9.9</td>
<td>10.9</td>
</tr>
<tr>
<td>8</td>
<td>11.2</td>
<td>11.9</td>
<td>11.7</td>
</tr>
<tr>
<td>9</td>
<td>12.7</td>
<td>15.4</td>
<td>13.0</td>
</tr>
<tr>
<td>10</td>
<td>15.1</td>
<td>28.5</td>
<td>15.0</td>
</tr>
</tbody>
</table>

Gini-coefficient: 0.22, 0.21, 0.31
3. Nutrition and Welfare

Food Intake

The average per capita per day food intake of all households is 877.7 gm -- 468.9 gm (53.4 per cent) of rice, 45.9 gm (5.2 per cent) of other cereals; 54.2 (6.2 per cent) of potato; 138.5 gm (15.8 per cent) of vegetables; 16.7 (1.9 per cent) of pulses; 51.0 gm (5.8 per cent) of items like meat, poultry, egg and fish; and 27.1 gm (3.1 per cent) of milk and milk products.

For the poor, the average daily per capita food intake is 709.5 gm, while for the well-off it is 1016.9 gm (Table 9).

Table 9: Daily per capita food intake (in grams)

<table>
<thead>
<tr>
<th>Food items</th>
<th>April 97</th>
<th>April 96</th>
<th>December 97</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Rice</td>
<td>468.9</td>
<td>424.6</td>
<td>505.7</td>
</tr>
<tr>
<td>Other cereals</td>
<td>45.9</td>
<td>30.2</td>
<td>58.8</td>
</tr>
<tr>
<td>Potato</td>
<td>54.2</td>
<td>46.0</td>
<td>60.9</td>
</tr>
<tr>
<td>Vegetables</td>
<td>138.5</td>
<td>113.5</td>
<td>159.2</td>
</tr>
<tr>
<td>Milk &amp; Milk Prod.</td>
<td>27.1</td>
<td>10.0</td>
<td>41.2</td>
</tr>
<tr>
<td>Meat, Poultry, egg, fish</td>
<td>51.0</td>
<td>27.3</td>
<td>70.7</td>
</tr>
<tr>
<td>Pulses</td>
<td>16.7</td>
<td>11.1</td>
<td>21.4</td>
</tr>
<tr>
<td>Other</td>
<td>75.4</td>
<td>46.8</td>
<td>99.0</td>
</tr>
<tr>
<td>Total</td>
<td>877.7</td>
<td>709.5</td>
<td>1016.9</td>
</tr>
</tbody>
</table>

Calorie Intake

The average daily per capita calorie intake for all households is 2278.6 K cal; 72.4 per cent of which is derived from rice, 6.4 per cent from other cereals; 3.1 per cent from vegetables; 2.5 per cent from pulses; 4.1 per cent from edible oils; and 2.77 per cent from meat, fish and eggs.
The daily per capita calorie intake of the poor is 1918.0 K cal compared to 2577.2 K cal for the well-off. For the poor, 77.9 per cent of the calorie is derived from rice compared to 69.1 per cent for the well-off (Table 10).

Table 10: Daily Per Capita Calorie Intake

<table>
<thead>
<tr>
<th>Food items</th>
<th>April’97</th>
<th>April’96</th>
<th>December’95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Rice</td>
<td>1650.7</td>
<td>1494.4</td>
<td>1780.2</td>
</tr>
<tr>
<td>Other cereals</td>
<td>146.8</td>
<td>101.2</td>
<td>184.6</td>
</tr>
<tr>
<td>Potato</td>
<td>52.5</td>
<td>44.6</td>
<td>59.1</td>
</tr>
<tr>
<td>Vegetables</td>
<td>70.9</td>
<td>57.5</td>
<td>82.0</td>
</tr>
<tr>
<td>Pulses</td>
<td>57.5</td>
<td>38.2</td>
<td>73.4</td>
</tr>
<tr>
<td>Milk &amp; Milk Prod.</td>
<td>20.8</td>
<td>7.4</td>
<td>32.0</td>
</tr>
<tr>
<td>Meat, egg, fish</td>
<td>61.1</td>
<td>32.0</td>
<td>85.3</td>
</tr>
<tr>
<td>Edible Oils</td>
<td>94.1</td>
<td>63.6</td>
<td>119.3</td>
</tr>
<tr>
<td>Fruits</td>
<td>14.3</td>
<td>5.0</td>
<td>22.0</td>
</tr>
<tr>
<td>Others</td>
<td>109.9</td>
<td>74.1</td>
<td>139.3</td>
</tr>
<tr>
<td>Total</td>
<td>2278.6</td>
<td>1918.0</td>
<td>2577.2</td>
</tr>
</tbody>
</table>

Figure 8: Daily Per Capita Calorie Intake

Food and Non-food Expenditures

For all households, the per capita monthly expenditure on food and non-food commodities is Tk. 571.5 of which 68.7 per cent is incurred on food and 31.3 per cent on non-food commodities. Among food items, expenditures on cereals is 45.6 per cent.
For the poor households, per capita monthly expenditure is Tk. 338.0 compared to Tk. 769.1 for the well-off households. The proportion of total expenditure spent on food is 76.1 per cent for the poor compared to 65.8 per cent for the well-off. The poor spend 57.5 per cent of their total food expenditure on cereals whereas similar share for the well-off is 40.2 per cent (Table 11).

Table 11: Monthly Per Capita Expenditure

<table>
<thead>
<tr>
<th>Food items</th>
<th>April '97</th>
<th>April '96</th>
<th>December '95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Food</td>
<td>392.7</td>
<td>257.8</td>
<td>505.9</td>
</tr>
<tr>
<td>Cereals</td>
<td>178.9</td>
<td>148.2</td>
<td>203.5</td>
</tr>
<tr>
<td>Others</td>
<td>213.8</td>
<td>109.6</td>
<td>302.4</td>
</tr>
<tr>
<td>Non-Food</td>
<td>178.8</td>
<td>80.2</td>
<td>263.2</td>
</tr>
<tr>
<td>Education</td>
<td>14.5</td>
<td>4.0</td>
<td>23.6</td>
</tr>
<tr>
<td>Medicare</td>
<td>9.4</td>
<td>4.2</td>
<td>13.9</td>
</tr>
<tr>
<td>Others</td>
<td>154.9</td>
<td>72.0</td>
<td>225.7</td>
</tr>
<tr>
<td>Total</td>
<td>571.5</td>
<td>338.0</td>
<td>769.1</td>
</tr>
</tbody>
</table>

| per cent   |           |           |             |           |           |             |           |           |             |
| Food       | 68.7      | 76.1      | 65.8        | 69.3      | 77.3      | 66.0        | 70.7      | 81.5      | 66.8        |
| Non-food   | 31.3      | 23.9      | 34.2        | 30.7      | 22.7      | 34.0        | 29.3      | 18.5      | 33.2        |

Figure 9: Monthly Per Capita Expenditures
4. Ownership and Access to Resources

**Land**

In terms of ownership of land, 3.6 per cent of rural households are landless; 76.9 per cent belong to small landowning households and 13.1 per cent to medium; and 6.4 per cent are large landowners (Table 12).

Among the poor, 5.6 per cent are landless while only 2.0 per cent of the well-off are landless. The small landowning households comprise of 85.2 per cent of the poor and 70.1 per cent of the well-off. The medium and large landowning households represent 7.0 per cent and 2.2 per cent of the poor and 18.1 per cent and 9.8 per cent of the well-off respectively.

**Table 12: Landownership Status of Households**

<table>
<thead>
<tr>
<th>Land ownership Status</th>
<th>April '97</th>
<th>April '96</th>
<th>December '95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Landless</td>
<td>3.6</td>
<td>5.6</td>
<td>2.0</td>
</tr>
<tr>
<td>Small</td>
<td>76.9</td>
<td>85.2</td>
<td>70.1</td>
</tr>
<tr>
<td>Medium</td>
<td>13.1</td>
<td>7.0</td>
<td>18.1</td>
</tr>
<tr>
<td>Large</td>
<td>6.4</td>
<td>2.2</td>
<td>9.8</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: Small owning lands £1.99 acre, medium owning land £2.00 to 4.99 acre, and large owning lands £5.00 acre.

**Income and Expenditure by Landownership Class**

The per capita monthly income of the landless is Tk. 347 which increases with landownership. The large landowners have a per capita monthly income of Tk. 1627. The per capita monthly income of the landless poor is Tk. 273 compared to Tk. 542 of the landless well-off. Within the poor, large landowners have a per capita monthly income of Tk. 594. In contrast, the well-off large landowners have a per capita monthly income of Tk. 1856.

The per capita monthly expenditure, like income, increases with landownership. For the landless households, the expenditure is Tk. 379, which increases to Tk. 501 for the small landowners, Tk. 726 for the medium landowners and Tk. 878 for the large landowners.

For the poor households, per capita monthly expenditure is Tk. 299 for the landless and 332 for the small landowners. The well-off landless households have an expenditure of Tk. 592. For the small and large landowners in the well-off category, the per capita monthly expenditures are Tk. 693 and Tk. 993 respectively (Table 13).
Figure 10: Landownership Status of Households

- **All**: 6.4%
- **Poor**: 2.2%
- **Well-off**: 9.8%

- **Landless**
- **Small**
- **Medium**
- **Large**
<table>
<thead>
<tr>
<th>Survey</th>
<th>Landownership class</th>
<th>Income</th>
<th>Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>All</td>
<td>Poor</td>
</tr>
<tr>
<td>April '97</td>
<td>Landless</td>
<td>347</td>
<td>273</td>
</tr>
<tr>
<td></td>
<td>Small</td>
<td>578</td>
<td>391</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>952</td>
<td>506</td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>1627</td>
<td>594</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>721</td>
<td>403</td>
</tr>
<tr>
<td>April '96</td>
<td>Landless</td>
<td>374</td>
<td>328</td>
</tr>
<tr>
<td></td>
<td>Small</td>
<td>540</td>
<td>378</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>973</td>
<td>504</td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>1417</td>
<td>593</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>673</td>
<td>393</td>
</tr>
<tr>
<td>Dec. '95</td>
<td>Landless</td>
<td>371</td>
<td>274</td>
</tr>
<tr>
<td></td>
<td>Small</td>
<td>532</td>
<td>383</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>875</td>
<td>505</td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>1350</td>
<td>629</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>649</td>
<td>397</td>
</tr>
</tbody>
</table>

**Incidence of Poverty by Landownership Class**

Among the rural landless, the incidence of poverty is 72.7 per cent. The poor in small, medium, and large landowning classes constitute 53.3 per cent, 27.2 per cent and 18.1 per cent respectively (Table 14).

**Table 14: Incidence of Poverty by Landownership Class**

<table>
<thead>
<tr>
<th>Landownership Class</th>
<th>Poverty incidence (Head count ratio in per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April '97</td>
</tr>
<tr>
<td>Landless</td>
<td>72.7</td>
</tr>
<tr>
<td>Small</td>
<td>53.3</td>
</tr>
<tr>
<td>Medium</td>
<td>27.2</td>
</tr>
<tr>
<td>Large</td>
<td>18.1</td>
</tr>
</tbody>
</table>
5. Occupation Status

*Occupation of Head of Households*

The occupation of the head of households shows that highest percentage of households are headed by agriculture labour, the percentage being 34.6 per cent. The proportion of households having own cultivation as occupation is 26.1 per cent and other agriculture occupation 3.6 per cent. As regards non-agriculture occupations 11.5 per cent are engaged in trade, 5.0 per cent in production and transport labour category and 17.7 per cent in other non-agricultural activities.

In the poor group nearly one half of the heads (46.8 per cent) are agriculture labour followed by owner cultivators 18.1 per cent. In case of well-off households, 32.6 per cent household heads are owner cultivators followed by agriculture labour 24.7 per cent The percentage of heads having trade as occupation is 13.4 per cent. Only 1.4 per cent of all households and 1.9 per cent of poor and 0.9 per cent of well-off households are engaged as tenant farmers.

Table 15: Occupational status of Household Heads

<table>
<thead>
<tr>
<th>Occupation</th>
<th>April '97</th>
<th></th>
<th>April '96</th>
<th></th>
<th>December '95</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Owner cultivator tenant</td>
<td>26.1</td>
<td>18.1</td>
<td>32.6</td>
<td>27.0</td>
<td>19.4</td>
<td>33.7</td>
</tr>
<tr>
<td>agriculture labour</td>
<td>34.7</td>
<td>46.8</td>
<td>24.7</td>
<td>34.0</td>
<td>45.2</td>
<td>24.3</td>
</tr>
<tr>
<td>other agriculture trade</td>
<td>3.6</td>
<td>3.9</td>
<td>3.4</td>
<td>3.5</td>
<td>2.7</td>
<td>4.1</td>
</tr>
<tr>
<td>production and transport</td>
<td>11.5</td>
<td>9.1</td>
<td>13.4</td>
<td>11.1</td>
<td>9.9</td>
<td>12.1</td>
</tr>
<tr>
<td>other non-agri</td>
<td>17.7</td>
<td>14.8</td>
<td>20.3</td>
<td>18.2</td>
<td>16.1</td>
<td>19.6</td>
</tr>
</tbody>
</table>

Figure 11: Incidence of Poverty by Landownership Class
**Income and Expenditure**

The per capita monthly income of owner farmers is Tk. 849. The corresponding income of the poor households is Tk. 431 and well-off Tk. 1062. The per capita income of the tenant farmers is Tk. 509, poor households Tk. 381 and well-off households Tk. 747. The per capita income of the agriculture labour households is Tk. 572, poor households Tk. 374 and well-off households Tk. 923. The per capita income of the households with other agriculture occupation is Tk. 611. The corresponding income of the poor households stands at Tk. 383 and well-off households Tk. 842. The per capita income of the households having trade as their occupation is Tk. 591. Such income for the poor households is Tk. 424 and well-off households Tk. 979. Per capita income of the transport and production labour is comparatively low. The income of such households is Tk. 472, poor households Tk. 384 and well-off households Tk. 695. Per capita income of the non-agricultural households is comparatively high. The per capita income of these households is Tk. 853, poor households Tk. 453 and well-off households Tk. 1096 (Table-16).

The monthly per capita expenditure of owner farmers is Tk 652 and of tenant farmer Tk 417. The expenditure of agriculture labour household is Tk 450, other agriculture Tk 577, trade Tk 591, production and transport labour Tk 472 and other non-agriculture Tk 650.

**Table-16: Income by occupation of household head**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Income (Tk)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97 All</td>
<td>April 97 Poor</td>
<td>April 97 Well-off</td>
<td>April 96 All</td>
</tr>
<tr>
<td>Owner cultivator</td>
<td>849 431 1062</td>
<td>767 453 945</td>
<td>780 430 951</td>
<td></td>
</tr>
<tr>
<td>tenant</td>
<td>509 381 747</td>
<td>692 473 833</td>
<td>688 524 798</td>
<td></td>
</tr>
<tr>
<td>agriculture labour</td>
<td>572 374 923</td>
<td>550 345 924</td>
<td>452 349 644</td>
<td></td>
</tr>
<tr>
<td>other</td>
<td>611 383 842</td>
<td>620 430 736</td>
<td>622 415 793</td>
<td></td>
</tr>
<tr>
<td>agriculture trade</td>
<td>591 424 979</td>
<td>682 418 885</td>
<td>716 405 945</td>
<td></td>
</tr>
<tr>
<td>production and transport</td>
<td>472 384 695</td>
<td>534 365 715</td>
<td>596 431 780</td>
<td></td>
</tr>
<tr>
<td>worker</td>
<td>853 453 1096</td>
<td>775 419 1045</td>
<td>753 400 1020</td>
<td></td>
</tr>
<tr>
<td>other non-agriculture</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>721 402 1001</td>
<td>673 394 931</td>
<td>649 396 873</td>
<td></td>
</tr>
</tbody>
</table>

The poor owner cultivators have a monthly per capita expenditure of Tk 352, compared to Tk 805 for the well-off. Among agriculture labour households monthly per capita expenditure is Tk 325 for the poor as against Tk 672 for the well-off. In case of other agriculture households per capita expenditure is Tk 342 for the poor and Tk 815 for the well-off. In case of households with trade occupation, per capita expenditure of poor households is Tk 337 compared to Tk 752 for the well-off households. Per capita expenditure of the poor households in production and transport is Tk 349 compared to Tk 627 for the same occupation group for the well-off households. Per capita income of the other non-agriculture households is Tk 355 for the poor and Tk 766 for the well-off (Table 17).
Table-17: Expenditure by occupation of household head

<table>
<thead>
<tr>
<th>Occupation</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>Owner cultivator</td>
<td>652</td>
<td>352</td>
<td>805</td>
</tr>
<tr>
<td>tenant</td>
<td>417</td>
<td>349</td>
<td>544</td>
</tr>
<tr>
<td>agriculture labour</td>
<td>450</td>
<td>325</td>
<td>672</td>
</tr>
<tr>
<td>other agriculture</td>
<td>577</td>
<td>342</td>
<td>815</td>
</tr>
<tr>
<td>trade</td>
<td>591</td>
<td>337</td>
<td>752</td>
</tr>
<tr>
<td>production and transport worker</td>
<td>472</td>
<td>349</td>
<td>627</td>
</tr>
<tr>
<td>other non-agriculture</td>
<td>650</td>
<td>335</td>
<td>841</td>
</tr>
<tr>
<td>Total</td>
<td>565</td>
<td>335</td>
<td>766</td>
</tr>
</tbody>
</table>

Incidence of poverty

The incidence of poverty is 33.7 per cent among owner farmers, 65.2 per cent among tenant farmers and 63.7 per cent among agriculture labour households. In case of other agriculture households, the poverty incidence is 50.2 per cent. For households in trade, such incidence is 38.8 per cent. The incidence of poverty for the households in production and transport labour is 55.6 per cent and other non-agriculture 37.8 per cent (Table 18).

Main sources of income

The major income earning sources of relatively large number of households consist of (i) self-employment in agriculture (ii) self-employment in non-agriculture (iii) agriculture labour. The proportion of households with self-employment in agriculture is 35.6 per cent, self employment in non-agriculture 23.6 per cent, agriculture labour 26.9 per cent and others 13.9 per cent.

In the agriculture labour category, the proportion of poor is 41.1 per cent and of well-off 15.2 per cent. However, the well-off households having self employment in agriculture is 42.6 per cent. While amongst the poor, such households constitute 27.0 per cent. For other category the proportion of heads having such income source is 9.3 per cent for poor households and 17.8 per cent for well-off households (Table 19).

Table-18: Poverty incidence by occupation of household heads

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Head-count measure of poverty (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
</tr>
<tr>
<td>Agriculture:</td>
<td></td>
</tr>
<tr>
<td>owner farmer</td>
<td>33.7</td>
</tr>
<tr>
<td>tenant</td>
<td>65.2</td>
</tr>
<tr>
<td>agriculture labour</td>
<td>63.7</td>
</tr>
<tr>
<td>other agriculture</td>
<td>50.2</td>
</tr>
<tr>
<td>trade</td>
<td>38.8</td>
</tr>
<tr>
<td>production and transport labour</td>
<td>55.6</td>
</tr>
<tr>
<td>other non-agriculture</td>
<td>37.8</td>
</tr>
</tbody>
</table>
Table-19: Main sources of income

<table>
<thead>
<tr>
<th>Source</th>
<th>% of households</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
<td>April 96</td>
<td>December 95</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
</tr>
<tr>
<td>agriculture self employment</td>
<td>35.6</td>
<td>27.0</td>
<td>42.6</td>
<td>35.1</td>
</tr>
<tr>
<td>non-agriculture self employment</td>
<td>23.6</td>
<td>22.6</td>
<td>24.4</td>
<td>25.6</td>
</tr>
<tr>
<td>agriculture labour</td>
<td>26.9</td>
<td>41.1</td>
<td>15.2</td>
<td>26.4</td>
</tr>
<tr>
<td>others</td>
<td>13.9</td>
<td>9.3</td>
<td>17.8</td>
<td>12.9</td>
</tr>
</tbody>
</table>

Poverty incidence by income sources

The households having “agriculture labour” as the main income earning source have the highest incidence of poverty, 73.1 per cent. Among self-employment in agriculture such incidence is 36.4 per cent (Table 20).

Table-20: Poverty incidence by main income sources

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Head-count measure of poverty (per cent)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
<td>April 96</td>
<td>December 95</td>
</tr>
<tr>
<td>agriculture self employment</td>
<td>36.4</td>
<td>35.2</td>
<td>34.9</td>
</tr>
<tr>
<td>non-agriculture self employment</td>
<td>46.2</td>
<td>47.8</td>
<td>44.4</td>
</tr>
<tr>
<td>agriculture labour</td>
<td>73.1</td>
<td>67.7</td>
<td>67.5</td>
</tr>
<tr>
<td>others</td>
<td>29.4</td>
<td>32.6</td>
<td>34.0</td>
</tr>
</tbody>
</table>

Household characteristics

The distribution of households in terms of number of members is given in Table-21. Four and five members households are relatively common, both for poor and well-off groups. These are followed by three and six member-households. One member household is relatively uncommon: only 0.9 per cent of the poor and 2.9 per cent of the well-off households.
Figure 13: Poverty Incidence by Main Income Sources

Table 21: Households by number of members

<table>
<thead>
<tr>
<th>Household size</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td>1</td>
<td>2.0</td>
<td>0.9</td>
<td>2.9</td>
</tr>
<tr>
<td>2</td>
<td>6.8</td>
<td>4.3</td>
<td>8.8</td>
</tr>
<tr>
<td>3</td>
<td>13.2</td>
<td>11.7</td>
<td>14.4</td>
</tr>
<tr>
<td>4</td>
<td>21.0</td>
<td>21.0</td>
<td>21.1</td>
</tr>
<tr>
<td>5</td>
<td>18.8</td>
<td>20.3</td>
<td>17.6</td>
</tr>
<tr>
<td>6</td>
<td>15.7</td>
<td>17.1</td>
<td>14.5</td>
</tr>
<tr>
<td>7</td>
<td>9.3</td>
<td>10.9</td>
<td>8.0</td>
</tr>
<tr>
<td>8</td>
<td>5.7</td>
<td>7.4</td>
<td>4.4</td>
</tr>
<tr>
<td>9</td>
<td>3.1</td>
<td>2.5</td>
<td>3.5</td>
</tr>
<tr>
<td>10</td>
<td>4.4</td>
<td>3.8</td>
<td>4.8</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Activity status

Of the total sample population of 14906, persons within the age group of 5 years and above have a share of 87.5 per cent. The share of persons belonging to “in-work” group is 30.5 per cent. On the other hand, 5.0 per cent are unemployed and 28.3 per cent are involved in household work. The proportion of student is relatively large, about 28.3 per cent. The shares of males and females in age group 5 years and above are 51.9 per cent and 48.1 per cent respectively. For males, the “in-work” proportion is 54.4 per cent as against 4.6 per cent for females. Females involved in household work constitute 57.3 per cent while males doing such work are only 1.3 per cent. The shares of students are 29.5 per cent in males and 27.0 per cent in females. Among the poor, the “in-work” population is 29.2 per cent and
students 27.1 per cent. On the other hand, within the well-off "in-work" population is 31.4 per cent and student 29.3 per cent. The poor males who belong to "in-work" group are 53.0 per cent as compared to 4.7 per cent for poor females. Among the well-off, the "in-work" males and females constitute 55.6 per cent and 4.5 per cent respectively. In case of students, the shares are 28.2 per cent for the males and 25.9 per cent for the females among the poor while similar shares in case of well-off are 30.5 per cent and 27.9 per cent respectively (Table-22).

Table-22: Activity status of population (5 years and above)

<table>
<thead>
<tr>
<th>Activity</th>
<th>per cent</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
<td>April 96</td>
<td>December 95</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>poor</td>
<td>well-off</td>
<td>All</td>
<td>Poor</td>
</tr>
<tr>
<td>in-work total</td>
<td>30.5</td>
<td>29.2</td>
<td>31.4</td>
<td>30.5</td>
<td>30.5</td>
</tr>
<tr>
<td>male</td>
<td>54.4</td>
<td>53.0</td>
<td>55.6</td>
<td>55.4</td>
<td>55.6</td>
</tr>
<tr>
<td>female</td>
<td>4.6</td>
<td>4.7</td>
<td>4.5</td>
<td>4.2</td>
<td>4.6</td>
</tr>
<tr>
<td>unemployed total</td>
<td>5.0</td>
<td>6.0</td>
<td>4.3</td>
<td>5.1</td>
<td>5.6</td>
</tr>
<tr>
<td>male</td>
<td>6.8</td>
<td>7.6</td>
<td>6.1</td>
<td>6.5</td>
<td>7.1</td>
</tr>
<tr>
<td>female</td>
<td>3.2</td>
<td>4.2</td>
<td>2.2</td>
<td>3.6</td>
<td>4.0</td>
</tr>
<tr>
<td>household work</td>
<td>28.3</td>
<td>28.2</td>
<td>28.3</td>
<td>29.2</td>
<td>29.0</td>
</tr>
<tr>
<td>male</td>
<td>1.3</td>
<td>1.5</td>
<td>1.2</td>
<td>1.7</td>
<td>1.3</td>
</tr>
<tr>
<td>female</td>
<td>57.3</td>
<td>56.0</td>
<td>58.6</td>
<td>58.0</td>
<td>57.6</td>
</tr>
<tr>
<td>student total</td>
<td>28.3</td>
<td>27.1</td>
<td>29.3</td>
<td>28.0</td>
<td>26.2</td>
</tr>
<tr>
<td>male</td>
<td>29.5</td>
<td>28.2</td>
<td>30.5</td>
<td>29.1</td>
<td>26.9</td>
</tr>
<tr>
<td>female</td>
<td>27.0</td>
<td>25.9</td>
<td>27.9</td>
<td>27.0</td>
<td>25.5</td>
</tr>
<tr>
<td>unable to work</td>
<td>7.9</td>
<td>9.5</td>
<td>6.7</td>
<td>7.2</td>
<td>8.7</td>
</tr>
<tr>
<td>male</td>
<td>8.0</td>
<td>9.7</td>
<td>6.6</td>
<td>7.3</td>
<td>9.1</td>
</tr>
<tr>
<td>female</td>
<td>7.9</td>
<td>9.2</td>
<td>6.8</td>
<td>7.2</td>
<td>8.3</td>
</tr>
</tbody>
</table>

**Roof Materials**

On main houses, brick/cement built roofs are found in case of 2.8 per cent households. The proportion of poor and well-off households having such roofs on their main houses are 1.9 per cent and 3.5 per cent respectively. The c.i sheet roofs are, however, more common; the share of households having such roofs is 57.9 per cent. Among the poor, the c.i sheet roofs are found in case of 48.8 per cent of the households and among the well-off 65.4 per cent households. Straw roofs are found in case of 31.1 per cent households. Such roofs are reported in case of 42.2 per cent poor households and 22.0 per cent well-off households. Bamboo/wood is the roof materials of 3.2 per cent households. Such roof are found in case of 2.5 per cent poor and 3.7 per cent well-off households (Table 23).
Table-23: Roof materials of main houses

<table>
<thead>
<tr>
<th>Materials</th>
<th>% of households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
</tr>
<tr>
<td></td>
<td>All</td>
</tr>
<tr>
<td>Brick/cement</td>
<td>2.8</td>
</tr>
<tr>
<td>c.i. sheet</td>
<td>57.9</td>
</tr>
<tr>
<td>straw</td>
<td>31.1</td>
</tr>
<tr>
<td>bamboo/wood</td>
<td>3.2</td>
</tr>
<tr>
<td>others</td>
<td>5.0</td>
</tr>
<tr>
<td>total</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 14: Household Distribution by CI Sheet Roofs

Fuel for cooking

The proportion of households using leaves/cowdung for cooking purposes is 67.1 per cent. On the other hand, wood is used by 30.8 per cent and others 2.1 per cent of the households.

The proportion of poor households using leaves/cowdung for cooking is 78.8 per cent as compared to 57.4 per cent for well-off households. The use of wood has been reported by 19.4 per cent of poor households and 40.2 per cent of well-off households (Table-24).

Table-24: Fuel used for cooking

<table>
<thead>
<tr>
<th>Fuel</th>
<th>% of households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
</tr>
<tr>
<td></td>
<td>All</td>
</tr>
<tr>
<td>leaves/cowdung</td>
<td>67.1</td>
</tr>
<tr>
<td>wood</td>
<td>30.8</td>
</tr>
<tr>
<td>others</td>
<td>2.1</td>
</tr>
<tr>
<td>total</td>
<td>100</td>
</tr>
</tbody>
</table>


Health and sanitation

Diseases

The proportion of household members suffering from various diseases in the preceding month of the survey is 8.4 per cent. Among the poor, the proportion is 7.7 per cent while among the well-off, it is 8.9 per cent (Table-25).

Table-25: Household members suffering diseases

<table>
<thead>
<tr>
<th>Category</th>
<th>% suffered during preceding month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
</tr>
<tr>
<td>all</td>
<td>8.4</td>
</tr>
<tr>
<td>poor</td>
<td>7.7</td>
</tr>
<tr>
<td>well-off</td>
<td>8.9</td>
</tr>
</tbody>
</table>

Source of Drinking water

Access to pure drinking water in the rural community is reported by most households. The use of tube-well water is found in case of 95.0 per cent of both poor and well-off households (Table 26).

Table-26: Drinking water by source

<table>
<thead>
<tr>
<th>Source</th>
<th>% of households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
</tr>
<tr>
<td></td>
<td>All</td>
</tr>
<tr>
<td>tube-well</td>
<td>95.0</td>
</tr>
<tr>
<td>well</td>
<td>2.5</td>
</tr>
<tr>
<td>pond</td>
<td>1.2</td>
</tr>
<tr>
<td>others</td>
<td>1.3</td>
</tr>
<tr>
<td>total</td>
<td>100</td>
</tr>
</tbody>
</table>
Water for cooking purposes

Pond water is the main source of water for cooking in case of 43.7 per cent households followed by tube-well water 40.0 per cent. Water from well is used by 3.7 per cent households. 45.9 per cent well-off households and 40.9 per cent poor households use pond water for cooking. Tube-well water is used by 42.0 per cent poor and 38.4 per cent well-off households for cooking.

Table-27: Sources of cooking water

<table>
<thead>
<tr>
<th>Source</th>
<th>April 97</th>
<th>% of households</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
</tr>
<tr>
<td>tube-well</td>
<td>40.0</td>
<td>42.0</td>
<td>38.4</td>
<td>39.1</td>
</tr>
<tr>
<td>well</td>
<td>3.7</td>
<td>4.3</td>
<td>3.2</td>
<td>3.9</td>
</tr>
<tr>
<td>pond</td>
<td>43.7</td>
<td>40.9</td>
<td>45.9</td>
<td>44.5</td>
</tr>
<tr>
<td>others</td>
<td>12.6</td>
<td>12.8</td>
<td>12.5</td>
<td>12.5</td>
</tr>
</tbody>
</table>

Sanitation

The sanitary and slab latrines are used by 26.8 per cent households. The poor and the well-off households reporting use of such latrines are 15.9 per cent and 35.9 per cent respectively. There are 45.2 per cent households who use katcha latrines. The share of poor using katcha latrines is about 45.0 per cent which is the same for well-off households. The proportion of households using other methods which includes open spaces is 28.0 per cent. Such proportion is 38.9 per cent for the poor and 18.9 per cent for the well-off.
Table-28: Sanitation coverage by type

<table>
<thead>
<tr>
<th>Type</th>
<th>April 97</th>
<th>April 96</th>
<th>December 95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>poor</td>
<td>well-off</td>
</tr>
<tr>
<td>sanitary and slab latrine</td>
<td>26.8</td>
<td>15.9</td>
<td>35.9</td>
</tr>
<tr>
<td>katcha</td>
<td>45.2</td>
<td>45.2</td>
<td>45.2</td>
</tr>
<tr>
<td>others</td>
<td>28.0</td>
<td>38.9</td>
<td>18.9</td>
</tr>
</tbody>
</table>

Figure 17: Sanitation by Coverage

**Education**

**Education of household heads**

The proportion of households with heads in “never read” category is 57.4 per cent. Within the poor, such households have a proportion of 69.0 per cent and in the well-off 47.8 per cent. The household heads having SSC+ education are found in case of 7.4 per cent households, varying between 2.9 per cent for the poor and 11.2 per cent for the well-off (Table-29).

Table-29: Educational status of household heads

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>% of household</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 97</td>
</tr>
<tr>
<td></td>
<td>All</td>
</tr>
<tr>
<td>never read</td>
<td>57.4</td>
</tr>
<tr>
<td>class i-v</td>
<td>23.6</td>
</tr>
<tr>
<td>class v-ix</td>
<td>11.6</td>
</tr>
<tr>
<td>SSC+</td>
<td>7.4</td>
</tr>
<tr>
<td>total</td>
<td>100</td>
</tr>
</tbody>
</table>

79
**Income and expenditure by level of education**

Both income and expenditure show increasing trends with the level of education. For “never read” category, monthly per capita income and expenditure are Tk 585 and Tk 495 respectively. For poor households in this category, income is Tk 382 and expenditure Tk 328 compared to Tk 852 and Tk 715 respectively of well-off households. On the other hand, households having heads with education of SSC+ have income of Tk 1269 and expenditure of Tk 855. The poor households with heads having education of class SSC+ have income of Tk 618 and expenditure of Tk 372. On the other hand, for the same category in well-off group, income is Tk 1419 and expenditure Tk 966 (Table-30).

**Table 30: Income and Expenditure by Education Level of Household Heads**

<table>
<thead>
<tr>
<th>Education Status</th>
<th>April '97</th>
<th>April '96</th>
<th>December '95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
</tr>
<tr>
<td><strong>per capita per month income (Tk.)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never read</td>
<td>585</td>
<td>382</td>
<td>852</td>
</tr>
<tr>
<td>Class I-V</td>
<td>676</td>
<td>438</td>
<td>849</td>
</tr>
<tr>
<td>Class VI-IX</td>
<td>1046</td>
<td>381</td>
<td>1332</td>
</tr>
<tr>
<td>SSC+</td>
<td>1269</td>
<td>618</td>
<td>1419</td>
</tr>
<tr>
<td>Total</td>
<td>720</td>
<td>402</td>
<td>1001</td>
</tr>
<tr>
<td><strong>per capita per month expenditure (Tk.)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never read</td>
<td>495</td>
<td>328</td>
<td>715</td>
</tr>
<tr>
<td>Class I-V</td>
<td>570</td>
<td>346</td>
<td>733</td>
</tr>
<tr>
<td>Class VI-IX</td>
<td>669</td>
<td>351</td>
<td>805</td>
</tr>
<tr>
<td>SSC+</td>
<td>855</td>
<td>372</td>
<td>966</td>
</tr>
<tr>
<td>Total</td>
<td>564</td>
<td>335</td>
<td>766</td>
</tr>
</tbody>
</table>

**Poverty Incidence by Education Status**

The poor in 'never read' category constitute 56.8 per cent. In contrast, in households having heads with education of class SSC+, the proportion of the poor is much lower, 18.8 per cent (Table 31).

**Table 31: Poverty Incidence by Education of Household Heads**

(headcount measure in per cent)

<table>
<thead>
<tr>
<th>Education Status</th>
<th>April '97</th>
<th>April '96</th>
<th>December '95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never read</td>
<td>56.8</td>
<td>57.8</td>
<td>54.6</td>
</tr>
<tr>
<td>Class I-V</td>
<td>42.2</td>
<td>43.8</td>
<td>41.2</td>
</tr>
<tr>
<td>Class VI-IX</td>
<td>30.0</td>
<td>31.4</td>
<td>27.4</td>
</tr>
<tr>
<td>SSC+</td>
<td>18.8</td>
<td>17.2</td>
<td>13.8</td>
</tr>
</tbody>
</table>
9. Gender Dimensions

Women headed households constitute 8.7 per cent of the total households. Of these 72.9 per cent of the households have heads in 'never read' category. In contrast, households having heads with education class I-V are 18.1 per cent and class VI-IX 7.3 per cent. The proportion of households with heads having SSC+ education, on the other hand, is 1.7 per cent. The share of poor women-headed households in 'never read' category is 77.4 per cent compared to 69.0 per cent for well-off women-headed households. In case of SSC+ education, the poor and well-off households with women-heads are 0.8 per cent and 2.6 per cent respectively (Table 32).

Table 32: Women-headed Households by Education Status

<table>
<thead>
<tr>
<th>Education Status</th>
<th>% of households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April '97</td>
</tr>
<tr>
<td></td>
<td>All</td>
</tr>
<tr>
<td>Never read</td>
<td>72.9</td>
</tr>
<tr>
<td>Class I-V</td>
<td>18.1</td>
</tr>
<tr>
<td>Class VI-IX</td>
<td>7.3</td>
</tr>
<tr>
<td>SSC+</td>
<td>1.7</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

Income and Expenditure

The per capita monthly income of households headed by women is Tk. 701, which is 2.8 per cent lower than the overall average income of Tk 720.8. On the other hand, the per capita monthly expenditure of these households is Tk 560 which is 2.1 per cent more than the overall average expenditure of Tk 571.5. For 'never read' category, the income and expenditure are Tk 644 and Tk 501 respectively. In case of the poor in the same category, income is Tk 405 and expenditure Tk 310. In contrast, the well-off in the category have income of Tk 943 and expenditure Tk 739.

The households with heads having SSC+ education, have average income of Tk 946 and expenditure Tk 757. Such income and expenditure for the poor households are Tk 332 and Tk 340 and for the well-off households Tk 1225 and Tk 947 respectively.

Figure 18: Per Capita Monthly Expenditure
Table 33: Income and Expenditure of Women-headed Households

<table>
<thead>
<tr>
<th>Education Status of head</th>
<th>Per capita per month income (Tk)</th>
<th>Per capita per month expenditure (Tk)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April '97</td>
<td>April '96</td>
</tr>
<tr>
<td>Never read</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class I-V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class VI-IX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSC+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Poverty Incidence

The incidence of poverty among women-headed households in 'never read' category is 55.6 per cent. On the other hand, the incidence for household heads with SSC+ education is low, only 31.3 per cent (Table 34).

Table 34: Poverty Incidence of Women-headed Households by Education of Households Heads

<table>
<thead>
<tr>
<th>Education Status</th>
<th>April '97</th>
<th>April '96</th>
<th>December '95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never read</td>
<td>55.6</td>
<td>55.2</td>
<td>56.0</td>
</tr>
<tr>
<td>Class I-V</td>
<td>48.1</td>
<td>20.8</td>
<td>33.8</td>
</tr>
<tr>
<td>Class VI-IX</td>
<td>29.8</td>
<td>4.9</td>
<td>20.0</td>
</tr>
<tr>
<td>SSC+</td>
<td>31.3</td>
<td></td>
<td>20.0</td>
</tr>
</tbody>
</table>

10. Crisis and Crisis Coping

Of the total households, 8.7 per cent report having encountered crises. Of them, those reporting crisis due to death of main income earner constitute 4.5 per cent. The large scale expenditure, in particular medical expenditure, is reported by 34.1 per cent households. The crisis encountered for loss of crops in reported by 17.1 per cent and dowry payment by 4.9 per cent of the households. Among the poor those incurring large-scale medical expenditure are 24.2 per cent as compared to 41.7 per cent for well-off households. The death of main income earner is reported by 4.8 per cent poor households and
4.3 per cent well-off households. Dowry payment are reported by 5.6 per cent poor households and 4.3 per cent well-off households.

Figure 19: Poverty Incidence Among Women Headed Households

Crisis Coping
Borrowing and sale of land and other assets are the common coping measures adopted by large number of households. The former measure is adopted by 38.3 per cent while the latter by 21.3 per cent households. Among the poor, borrowing is resorted to by 41.1 per cent households. The well-off households who adopted this measure constitute 36.2 per cent. Households who are forced to sell land and other assets to overcome crises are 17.7 per cent among the poor and 23.9 per cent among the well-off.

Table 35: Incidence of Crisis

<table>
<thead>
<tr>
<th>Nature of Crisis</th>
<th>April '97</th>
<th>April '96</th>
<th>December '95</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Poor</td>
<td>Poor Well-off</td>
<td>All Poor Well-off</td>
</tr>
<tr>
<td>Death of main income earner</td>
<td>4.5 4.8 4.3</td>
<td>3.2 1.5 4.3</td>
<td>4.2 3.1 5.1</td>
</tr>
<tr>
<td>Large medical expenditure</td>
<td>34.1 24.2 41.7</td>
<td>24.9 23.0 26.2</td>
<td>25.5 25.6 25.4</td>
</tr>
<tr>
<td>Loss of crops</td>
<td>17.1 17.7 16.6</td>
<td>29.3 24.4 32.4</td>
<td>27.4 24.7 29.5</td>
</tr>
<tr>
<td>Dowry payment</td>
<td>4.9 5.6 4.3</td>
<td>7.0 7.4 8.6</td>
<td>5.2 2.6 7.1</td>
</tr>
<tr>
<td>others</td>
<td>39.4 47.7 33.1</td>
<td>35.6 43.7 28.5</td>
<td>37.7 44.0 32.9</td>
</tr>
</tbody>
</table>
Table 36: Crisis Coping Measures by Households

<table>
<thead>
<tr>
<th>Measures</th>
<th>April '97</th>
<th></th>
<th>April '96</th>
<th></th>
<th>December '95</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>All</td>
<td>Poor</td>
<td>Well-off</td>
<td>All</td>
<td>Poor</td>
</tr>
<tr>
<td>Spending from saving</td>
<td>10.1</td>
<td>6.5</td>
<td>12.9</td>
<td></td>
<td>10.1</td>
<td>3.7</td>
</tr>
<tr>
<td>borrowing</td>
<td>38.3</td>
<td>41.1</td>
<td>36.2</td>
<td></td>
<td>35.7</td>
<td>43.0</td>
</tr>
<tr>
<td>sale of land &amp; other assets</td>
<td>21.3</td>
<td>17.7</td>
<td>23.9</td>
<td></td>
<td>9.3</td>
<td>6.7</td>
</tr>
<tr>
<td>others</td>
<td>30.3</td>
<td>34.7</td>
<td>27.0</td>
<td></td>
<td>44.9</td>
<td>46.6</td>
</tr>
</tbody>
</table>

Figure 20: Crisis Coping Measures of Rural Households
Annex-1

BANGLADESH

MAP SHOWING PRIMARY SAMPLING UNITS (PSUs)
UNDER PMS FOR RURAL BANGLADESH

Scale 1 : 3000000

LEGEND

- Primary Sampling Unit (PSU)

Bay of Bengal
CIRDAP

The Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP) is a regional, inter-governmental, autonomous institution, established in July 1979 at the initiative of the countries of the Asia-Pacific Region and the Food and Agriculture Organization (FAO) of the United Nations with support from several other UN bodies and donors. Its member countries include Afghanistan, Bangladesh (Host State), India, Indonesia, Lao PDR, Malaysia, Myanmar, Nepal, Pakistan, the Philippines, Sri Lanka, Thailand and Vietnam.

The main objectives of CIRDAP are to (i) assist national action; (ii) promote regional cooperation, and (iii) act as a servicing institution for its member countries for promotion of integrated rural development through research, action research, pilot project, training and information dissemination. Amelioration of rural poverty in the Asia-Pacific region has been the prime concern of CIRDAP. The Centre is committed to the WCARRD Follow-up Programmes. The programme priorities of CIRDAP are set under four areas of concern: (1) agrarian development; (2) institutional/infrastructural development; (3) resource development including human resources; and (4) employment.

Operating through designated Contact Ministries and Link Institutions in member countries, CIRDAP promotes technical cooperation among nations of the region. It plays a supplementary and reinforcing role in supporting and furthering the effectiveness of integrated rural development programmes in the Asia-Pacific region.