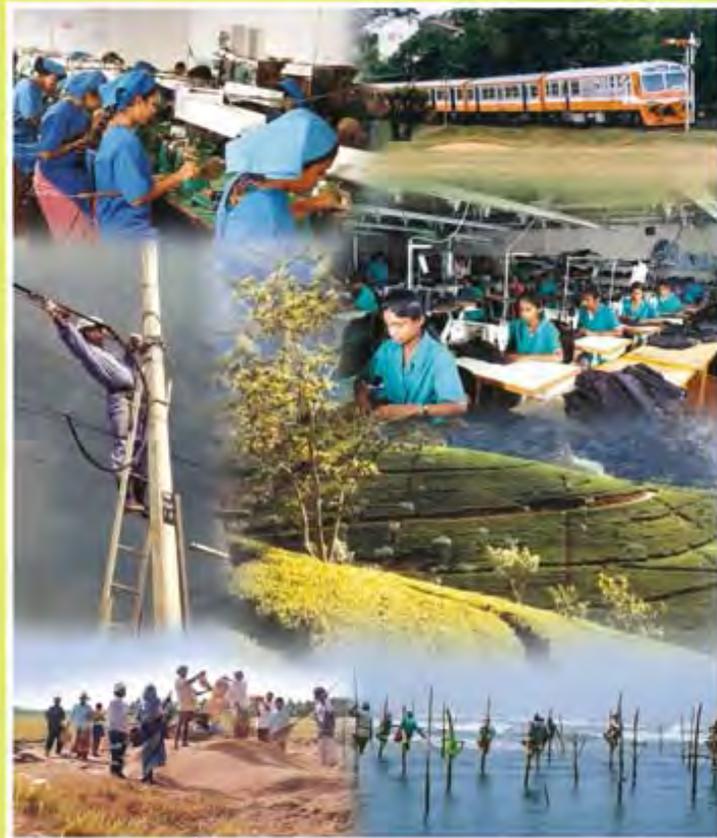


## A Framework for Social Accounting Matrices (SAMs) for Sri Lanka



Athula Naranpanawa  
Jayatilleke S. Bandara

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**INSTITUTE OF POLICY STUDIES**

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## Table of Contents

	Page
List of Tables .....	i
List of Figures .....	i
List of Acronyms .....	ii
Preface .....	iii
Abstract .....	iv
1. Introduction .....	1
2. A Brief Introduction to SAM .....	1
3. Macroeconomic Accounting Framework .....	4
3.1 Sectorwise Accounts: Income, Expenditure and Savings .....	5
3.2 The Macro Aggregates .....	7
4. Construction Methodology by Major Blocks .....	9
4.1 Structure of the 1995 <i>Macro-SAM</i> .....	9
4.2 Numerical Construction of the 1995 <i>Macro-SAM</i> .....	12
4.3 Structure of the 1995 <i>Micro-SAM</i> .....	13
4.4 Numerical Construction of the 1995 <i>Micro-SAM</i> .....	16
5. Concluding Remarks .....	22
References .....	22
Appendix A .....	25

### List of Tables

Table 4.1: Schematic Structure of the <i>Macro-SAM</i> of Sri Lanka .....	11
Table 4.2: 1995 <i>Macro-SAM</i> of Sri Lanka (Rs. Million) .....	14
Table 4.3: Activities and Commodities in the 1995 <i>Micro-SAM</i> .....	17
Table 4.4: Proportion of Employed Population by Industry and Occupation – All Sectors .....	20

### List of Figures

Figure 4.1: Economy-wide Circular Income Flow .....	9
Figure 4.2: Schematic View of Household Disaggregation .....	19

## List of Acronyms

CBSL	Central Bank of Sri Lanka
CFSES	Consumer Finances and Socio Economic Survey
CGE	Computable General Equilibrium
CIE	Centre for International Economics
DCS	Department of Census and Statistics
ILO	International Labour Organization
IFPRI	International Food Policy Research Institute
I-O	Input Output
MIMAP	Micro Impact of Macro Adjustment Policies
SNA93	System of National Accounts 1993
UN	United Nations

## Preface

This research paper, part of the IPS research programme on “Economy-Wide Modelling for Policy Analysis”, presents a Social Accounting Matrix (SAM) of Sri Lanka for the year 1995 with a detailed explanation of the methodology. The SAM is also available electronically. This Sri Lankan SAM presents a comprehensive economy-wide database and shows details of all the major activities of the Sri Lankan economy such as consumption, production, external trade, accumulation and income distribution. Nearly three decades after the seminal work of Graham Pyatt and others on the first Sri Lankan SAM, in fact, one of the world’s first SAMs (published by the Cambridge University Press, 1977), the IPS is proud to release the second detailed SAM for Sri Lanka with a detailed document and a framework of compilation of SAMs for Sri Lanka. Although only the 1995 SAM is described in this paper, the methodological framework of the 1995 SAM can be used to update it for recent years.

From a policy analysis viewpoint, the release of the new SAM can be considered as timely. In the contemporary policy formulation, Sri Lanka is giving extra emphasis on poverty and income disparity. In order to undertake policy analysis related to poverty reduction and income disparity, a better understanding of the economic structure with socio-economic dimensions is necessary. SAM is in fact a popular data framework used for analyzing poverty and income distribution issues because it contains many interconnected socio-economic components.

Government statistical offices and research institutions in many developing countries compile SAMs for their economies at a regular interval as a national statistical requirement and for the purpose of providing detailed databases for policy analysis as well as economy-wide modelling focusing on poverty and income distribution.

Unfortunately, the compilation of SAMs for the Sri Lankan economy has been neglected for three decades even though Sri Lanka has a proud record of developing one of the first SAMs in the world. This has also been a main constraint in developing a poverty-focussed economy-wide model of the Sri Lankan economy for policy analysis. The main purpose of publication of this SAM is to fill this research vacuum. The publication is an outcome of the collaboration of the IPS with the Griffith University in Australia.

Saman Kelegama  
Executive Director  
Institute of Policy Studies

January 2006

## Abstract

The use of Social Accounting Matrices (SAMs) has a long history similar to the input-output (I-O) accounting approach. A detailed SAM focusing on the structure of an economy and the link between production, income distribution and institutions can be used directly for policy analysis as well as a database for an economy-wide economic model. Although a large number of SAMs have been developed for many other developing countries in recent years under the International Food Policy Research Institute (IFPRI) and the Micro Impact of Macro Adjustment Policies (MIMAP) research projects, not a single detailed SAM has been compiled for Sri Lanka (except for a few aggregated SAMs) for the last two decades or so. Therefore, there has been an urgent need to compile a SAM for Sri Lanka to develop effective policies and to undertake effective economic policy analyses using an economy-wide modelling framework.

To fulfill the above need, the paper introduces a systematic framework to construct a SAM for the Sri Lankan economy following the methods developed in compiling recent SAMs for some other developing countries. This paper develops a framework and the procedures for compiling a SAM for Sri Lanka. To illustrate this framework, a disaggregated SAM is developed with 1995 as the base year. The paper has introduced a set of internal balancing relationships consistent with macroeconomic aggregates in the economy. On the basis of these balancing relationships, the paper develops a Macro-SAM (or aggregated SAM) as the first step and a detailed Micro-SAM (or disaggregated SAM) as the second step. Although the SAM is compiled for the year 1995, the procedures can easily be applied to a compilation of a new SAM for the Sri Lankan economy.

## 1. Introduction

A large number of Social Accounting Matrices (SAMs) have been developed for many developing countries in recent years as a tool and database in analyzing distributional and poverty issues. Despite the fact that there are recently developed and published SAMs available for many developing countries,<sup>1</sup> there is no readily available SAM developed for Sri Lanka for a recent year. The most recently developed disaggregated SAM for Sri Lanka is for the base year 1980 compiled by Mertens (1984). However, this is not even available for the purpose of policy analysis in Sri Lanka. In order to overcome this problem the study developed a framework for a disaggregated SAM using available macro and micro data for the base year 1995. Since a SAM would have many potential uses other than implementing a computable general equilibrium (CGE) model, it could be considered as another important statistical database. The main objective of this paper is, therefore, to develop and describe the procedures of compilation of a SAM for Sri Lanka.

The remainder of this paper is organized as follows. Section 2 presents a brief overview on the structure of a SAM and historical overview of construction of SAMs in Sri Lanka. The process of introducing a framework for SAMs in Sri Lanka begins with a description of the macroeconomic framework in Section 3. This is followed by a construction of macro-SAM and micro-SAM by major blocks in Section 4. The final Section presents concluding remarks.

## 2. A Brief Introduction to SAM

A SAM can be considered as an extension of the input-output accounting framework that incorporates inter-industry transactions plus a detailed income distributional accounting in an economy. Therefore, similar to input-output tables the origin of SAM can be traced back to Quesnay's (1759) *tableau economique*. As Kehoe (1996, p. 1) has noted, social accounting was heavily influenced by the work on national accounts by Kuznets (1937) and that on input-output tables by Leontief (1941) in the last century. The work of Meade and Stone (1941) for the Economic Section of the British Cabinet Office can be treated as the starting point of modern SAMs. This work was followed by the work of Stone (1947). His research resulted in the conventions for United Nations' (1953, 1968) System of National Accounts. The currently used System of National Accounts 1993 (SNA93) is an extension of the previous one (see Kehoe, 1996 for details). The SNA93 contains a separate chapter on SAMs and it has defined a SAM as "the presentation of SNA accounts in a matrix which elaborate the linkages between a supply and use table and institutional sector accounts" (UN, 1993, p. 461). Therefore, SAMs are very close to national accounts and I-O tables. It is an extension of an I-O table which demonstrates the entire circular flow of income at a meso-level with the following features:

---

<sup>1</sup> Under the MIMAP project, SAMs have been developed for other developing countries. The IFPRI has also compiled SAMs for many developing countries (see the web pages of these two for details).

- Extra breakdown of the household sector with more details than national accounts;
- It has a disaggregated presentation of labour market with various categories of labour; and
- Extra breakdown of production activities with an embodied input-output table.

Technically a Social Accounting Matrix (SAM) is a structured data matrix, which depicts the double entry book keeping system of different activities within and outside the economy. In economic terms, it is a comprehensive economy-wide data framework which represents the economy with a social dimension of a country of a particular period (usually a year). The motivation for constructing a SAM basically emerged from the need to reconcile the Input-Output (*I-O*) data and the national income accounts within a unified statistical framework (Robinson, 1989).<sup>2</sup> As King (1985) notes, the principle behind SAM is similar to double entry book-keeping in accounting. A SAM consists of a set of accounts, in each of which the income and the expenditure should balance. What should be an income to one industry must be the expenditure from another industry. Thus, it resembles traditional national accounts; nevertheless it contains much more information. For example, Pyatt (1988) describes a SAM as follows:

There is only one fundamental law of economics: for every income there is a corresponding outlay or expenditure. The law is the equivalent for economists of the physicists' law of energy conservation. It plays a similar role in defining the completeness of a model or analytic formulation: no theory or model can be correct unless it is complete in the sense that all incomes and outlay are fully accounted for. A social accounting matrix, or SAM, is a simple and efficient way of representing this fundamental law (p. 329).

In line with the above fundamental law in economics, Pyatt, et al., (1977) noted that a SAM framework should satisfy two basic rules:

- (a) In a SAM matrix, for every row there should be a corresponding column. The system is completed only if the row and column totals are equal.
- (b) Every entry is considered as a receipt when it is read along the row, while it is treated as an expenditure in its column context.

Therefore, SAMs satisfy a variant of Walras's law wherein the system will be balanced when all but one account is balanced (Reinert and Roland-Holst, 1997).

In general, a number of main features of a SAM can be identified as follows:

- A SAM is a square matrix with separate accounts in which the incomings and outgoings are recorded as entries of corresponding rows and columns;

---

<sup>2</sup> See Pyatt and Round (1977,1979,1985); Pyatt (1985,1988,1991); Thorbecke (1985); King (1985); Reinert and Roland-Holst (1997); and Chulu and Wobst (2001) for a detailed discussion on SAMs.

- It is a comprehensive economy-wide database because it shows details of all the economic activities of an economy such as consumption, production, external trade, accumulation and income distribution;
- It is flexible both in disaggregation and the emphasis on a particular part of the economy; and
- Most importantly, the centre of a SAM is households and income distribution among households.

In summary an appropriately designed and disaggregated SAM can successfully be used

- To present a comprehensive and coherent information system bringing together different data sources to identify basic structural features of an economy;
- To reconcile different data sets to improve quality of existing data by filling data gaps to show the structural interdependence between economic structure and income distribution in an economy at macro and meso level;
- To undertake policy analysis using well known SAM multipliers; and
- To provide a data for economy-wide modelling particularly focusing on income distribution and poverty.

There is no standardised method in designing and constructing a SAM. Different compilers are using different methods. This study follows the method of Warr and Azis (1997). There are two types of SAMs based on the level of aggregation of various accounts within the SAM, i.e., *Macro-SAM* and *Micro-SAM*. The *Macro-SAM* provides a highly aggregated version of all accounts without detailing sectoral and institutional breakdowns. In other words, it is a special way of presenting the national accounts in matrix form. Moreover, there are different ways of structuring *Macro-SAMs*.<sup>3</sup> In contrast, *Micro-SAM* provides comprehensive details of the socioeconomic structure of the economy, particularly with detailed representation of sectors and institutions. However, the level of disaggregation is largely dependent on the availability of data and the area of focus.

Sri Lanka was the first developing country for which a SAM was developed (Pyatt, et al., 1977). This SAM consisted of 48 sectors with the year 1970 considered as the base year. Unfortunately, Sri Lankan policy analysts did not update this at regular intervals. However, a few attempts have been made to construct SAMs for Sri Lanka in later years. Mertens (1984) constructed a 20 sector SAM for the base year of 1980, which has subsequently been used in Gutkind (1988). This SAM closely followed the general outline specified in the pioneering 1970 SAM. Maasland (1990) and Herath (1994) constructed highly aggregated SAMs consisting of 4 and 6 sectors respectively. Both these SAMs were constructed for CGE models and the year 1981 was considered as the base year.<sup>4</sup> However, there are several drawbacks in using those SAMs in policy analysis and model building: (a) the Sri Lankan economy has

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<sup>3</sup> For example see Chulu & Wobst (2001).

<sup>4</sup> Bandara and Kelegama (forthcoming) present a historical overview of construction of SAMs for Sri Lanka.

undergone significant changes following the liberalization process initiated in November 1977, however the full effects of the liberalization process had not been felt by the economy in 1981; (b) the level of disaggregation in terms of industries and commodities in the previous SAMs, particularly the ones that were produced during the early 1980s was inadequate in analysing industry level effects; (c) the economy has evolved over time and the socio-economic structure has changed substantially during the process of liberalization thus yielding notable changes to inter-industry transactions, technological coefficients, composition of occupational labour categories and income distribution. Therefore, construction of a SAM for a base year which reflects the economic structure reasonably is inevitable to carry out policy analysis. Hence, this study attempts to bridge the gap by constructing a 38 sector SAM for Sri Lanka for the base year 1995. The choice of 1995 as the base year for the SAM was largely due to the availability of a most recent disaggregated *I-O* table (DCS, 1998a) and the availability of a comprehensive household level income and expenditure survey data (CBSL, 1999) for Sri Lanka.

### 3. Macroeconomic Accounting Framework

As noted in the previous section, a SAM is a square matrix which presents monetary flows that reflect payments and receipts of all transactions between various agents in the economy. Moreover, it should also follow a macroeconomic accounting framework which enables one to compute various macro identities that are consistent with the available national accounts. The macroeconomic accounting framework can be expressed in the form of algebraic equations which could be used in computing various macro identities.<sup>5</sup> In specifying the macroeconomic framework the study divides all agents in the economy into four sectors;

- household (*h*),
- commercial enterprises (*e*),
- government (*g*), and
- the rest of the world (*r*).

Let  $Y_i$  be income,  $E_i$  be expenditure and  $S_i$  be savings in sector  $i$ . Furthermore, all transactions between different sectors will be denoted by  $T_{ij}$  which indicates the direction of flow from sector  $i$  to sector  $j$ . For example, the notation  $T_{hg}$  denotes total transfers from household sector  $h$  to the government sector  $g$ , while  $T_{gh}$  denotes total transfers from government sector  $g$  to the household sector  $h$ .

The macroeconomic identities are derived by taking into account the budget constraints of all agents. However, in the enterprises sector it is assumed that their income is equal to the expenditure, as all net revenue would be allocated to owners of factors of production. Thus, there will be zero savings in the enterprises sector. In the following subsection the four sectors are considered individually.

---

<sup>5</sup> This study adopts a structure of a macroeconomic accounting framework presented by Warr and Azis (1997).

### 3.1 Sectorwise Accounts: Income, Expenditure and Savings

#### The household sector

The household sector consists of three main accounts, household income, household expenditure and household savings, denoted by  $Y_h$ ,  $E_h$  and  $S_h$ , respectively. The households derive their income mainly from labour income ( $Y_f$ ) and distributed profits and other transfers from the enterprises ( $T_{eh}$ ), which are generated within the production activities. In addition to these incomes, they also receive income such as transfers from the government ( $T_{gh}$ ) and transfers from the rest of the world ( $T_{rh}$ ). The total net transfers received by the household sector is denoted by ( $\check{T}_h$ ). Thus, household income could be algebraically expressed by the following identity:

$$Y_h = Y_f + T_{eh} + T_{gh} + T_{rh} \quad (1)$$

and

household expenditure can be represented by

$$E_h = C + T_{hg} + T_{hr} \quad (2)$$

where C = consumption.

Household savings can be written as

$$S_h = Y_h - E_h \quad (3)$$

Substituting (1) and (2) in (3), we have

$$S_h = Y_f - C + \check{T}_h \quad (4)$$

$$\check{T}_h = (T_{gh} - T_{hg}) + (T_{rh} - T_{hr}) + T_{eh}$$

Hence, three main accounts of the household sector can be expressed by equations (1), (2) and (4).

#### The commercial enterprise sector

The commercial enterprise sector consists of two main accounts, i.e., enterprise income and expenditure. In contrast to the household sector, it is assumed that their income is equal to the expenditure, thus having zero savings in the enterprises sector. The commercial enterprise sector income and the expenditure are denoted by  $Y_e$  and  $E_e$  respectively. The commercial enterprises derive their income mainly from operating surplus which is generated by deducting consumption of fixed capital (depreciation) ( $S_d$ ) from the total capital income ( $Y_{ov}$ ) within the production activities. The interest payments by the government,

$T_{ge^t}$  and transfers from the rest of the world  $T_{re^t}$  are the other components of their income. Thus, commercial enterprise income and expenditure could be algebraically expressed by the following identity:

$$Y_e = Y_{os} - S_D + T_{ge} + T_{re} \quad (5)$$

and

$$E_e = T_{eh} + T_{eg} + T_{er} \quad (6)$$

According to the assumption stated above:

$$Y_e = E_e \quad (7)$$

Hence, the commercial enterprise income and expenditure can be expressed by equation (5) and (6) respectively.

### The government sector

Similar to the household sector, the government sector has three accounts: total government receipts (income), total government outlays (expenditure) and government savings. Total Government receipts are denoted by  $Y_g$  while total government outlays and savings are denoted by  $E_g$  and  $S_g$ , respectively. The total government receipts are derived mainly from indirect taxes  $I_t$ , income tax from the households  $T_{hg}$  and profit taxes and transfers from the enterprises  $T_{eg}$ . The total net transfers received by the government sector is denoted by  $\check{T}_g$ . Thus, government income could be algebraically expressed as:

$$Y_g = I_t + T_{hg} + T_{eg} \quad (8)$$

and

$$E_g = G + T_{gh} + T_{ge} \quad (9)$$

where G=government consumption expenditure.

Government savings can be written as

$$S_g = Y_g - E_g \quad (10)$$

Substituting equations (8) and (9) in (10), we have

$$S_g = I_t - G + \check{T}_g \quad (11)$$

where

$$\check{T}_g = (T_{hg} - T_{gh}) + (T_{eg} - T_{ge})$$

Hence, total government receipts, outlays and savings can be defined by equations (8), (9) and (11), respectively.

### The rest of the world sector

The rest of the world sector consists of three main accounts, i.e., total receipts of foreigners from domestic agents, total payments from foreigners to domestic agents and foreign savings. Total receipts of foreigners from domestic agents are denoted by  $Y_r$  while total payments from foreigners to domestic agents and foreign savings are denoted by  $E_r$  and  $S_r$ , respectively. Total receipts of foreigners from domestic agents are mainly derived through imports,  $M$ , transfers from the enterprises ( $T_{er}$ ) and the transfers from the households ( $T_{hr}$ ). The total net transfers received by the rest of the world sector is denoted by  $\check{T}_r$ . Thus, total income of foreigners from domestic agents could be algebraically expressed by the following identity:

$$Y_r = M + T_{er} + T_{hr} \quad (12)$$

and foreigners' payments to domestic agents can be defined as

$$E_r = X + T_{rh} + T_{re} \quad (13)$$

where  $M$  = total imports and  $X$  = total exports.

Foreign savings can be written as

$$S_r = Y_r - E_r \quad (14)$$

Substituting equations (12) and (13) in (14), we have

$$S_r = M - X + \check{T}_r \quad (15)$$

where

$$\check{T}_r = (T_{er} - T_{re}) + (T_{hr} - T_{rh})$$

Hence, total receipts of foreigners from domestic agents, total payments from foreigners to domestic agents and foreign savings can be defined by equations (12), (13) and (15) respectively.

### 3.2 The Macro Aggregates

In this section, the study derives some macro aggregates, namely, GDP at factor cost ( $Y^{FC}$ ), GDP at market price ( $Y$ ) from the income side as well as from the expenditure side and investment and savings equilibrium. The macro aggregates can be obtained as follows. By summing the equations (4), (11), and (15) one obtains:

$$S_h + S_g + S_r = Y_f - C + I_t - G + M - X + T_{er} - T_{re} + T_{eh} + T_{eg} - T_{ge} \quad (16)$$

Since, by definition the commercial enterprise income equals expenditure,  $Y_e = E_e$ , or

$$Y_{os} - S_D + T_{ge} + T_{re} = T_{eh} + T_{eg} + T_{er} \quad (17)$$

and by rearranging the above equation one can obtain the following equation

$$Y_{os} - S_D = T_{er} - T_{re} + T_{eh} + T_{eg} - T_{ge} \quad (18)$$

Thus, by substituting  $Y_{os} - S_D$  in to the right hand side of equation (16) and rearranging we can obtain the following equation

$$S_h + S_g + S_r + S_D = Y_f - C + Y_{os} + I_t - G + M - X \quad (19)$$

Since, GDP at factor cost ( $Y^{FC}$ ) can be defined as follows

$$Y^{FC} = Y_f + Y_{os} \quad (20)$$

and

GDP at market price ( $Y$ ) can be given, on the income side, by

$$Y = Y^{FC} + I_t \quad (21)$$

and by substituting GDP at market price ( $Y$ ) in the right hand side of equation (19) we can obtain the following equation

$$S_h + S_g + S_r + S_D = Y - C - G + M - X \quad (22)$$

As the definition of GDP at market price, on the expenditure side, can be given as

$$Y = C + I + G + X - M \quad (23)$$

and by rearranging the above equation we obtain the following equation

$$I = Y - C - G + M - X \quad (24)$$

Thus, by substituting  $I$  into the right hand side of equation (22) we can obtain the following equation

$$S_h + S_g + S_r + S_D = I \quad (25)$$

where  $I$  denotes the total value of gross investment at market prices. Thus, equation (25) presents the investment and savings equilibrium.

The macroeconomic framework described in this section would form the basis of constructing the *Macro-SAM*, which is described in the next section. Thus, the following section would explain details of various macro accounts in the SAM including data sources and compilation methodology.

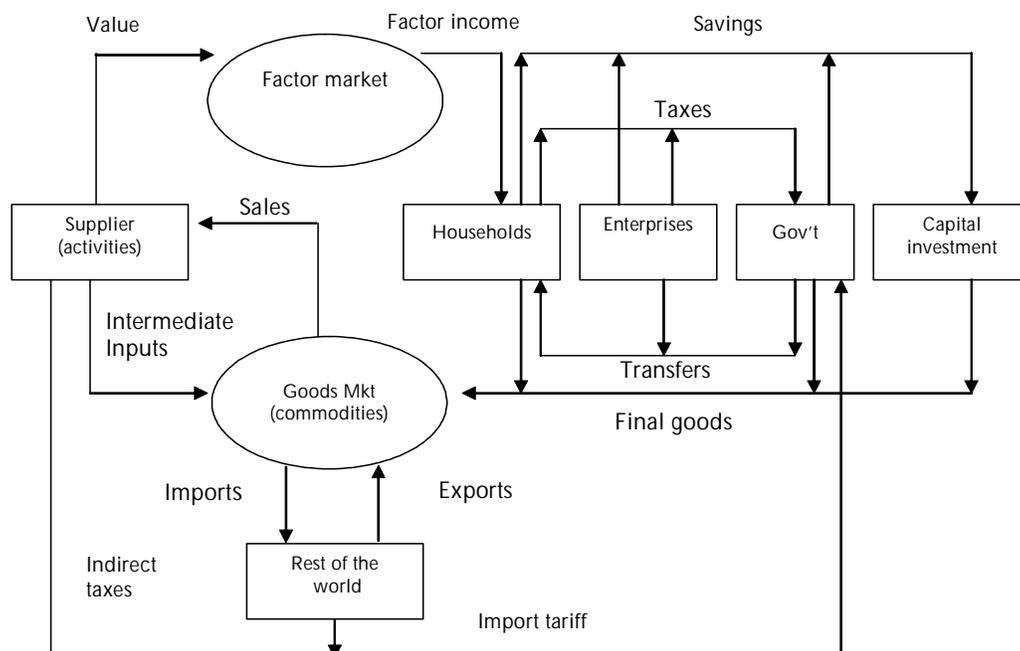
#### 4. Construction Methodology by Major Blocks

As noted in Section 2 there are two types of SAMs based on the level of aggregation of various accounts within the SAM. The *Macro-SAM* presents the highly aggregated version of all accounts where sectoral and institutional details are absent. In contrast, *Micro-SAM* presents a more disaggregated version of accounts, particularly with detailed representation of sectors and institutions. In this study, a *Macro-SAM* is developed in the first instance and then it creates a 95 x 95 *Micro-SAM* by disaggregating various accounts in the *Macro-SAM*.

##### 4.1 Structure of the 1995 *Macro-SAM*

A simplified version of the Macro SAM accounting framework following the discussion in Section 3 can be presented in Figure 4.1. It demonstrates the simple circular flow of income. As Chung-I Li (2002, p. 2) has described, “it traces the circular flow of incomes from producers/suppliers through factor payments to households and back to product markets through expenditures on final goods (or sales from activities)”. Furthermore, it links four accounts, i.e., producers, governments, the rest of the world and the capital account. These transactions related to Sri Lanka for the year 1995 are quantified in this section.

**Figure 4.1**  
Economy-wide Circular Income Flow



Source: Adapted from Chung-I Li (2002).

The 1995 *Macro-SAM* for Sri Lanka is a square matrix comprising of 9 sectors which represent separate accounts in the economy. The 9 sectors used are activities, commodities, factors, households, enterprises, government, savings/investment, rest of the world and the total. In line with the macroeconomic framework discussed above, the schematic structure of the 1995 *Macro-SAM* of Sri Lanka is presented in Table 1. As noted in Section 2 there are different ways of structuring *Macro-SAMs*. The *Macro-SAM* structure considered in this paper (given in Table 4.1) is the most widely used structure and is derived from modifying the schematic *Macro-SAM* structures developed by Nielsen (2001) for Vietnam and Pradhan *et al.*, (2001) for India.

### Activities

Following through the accounts in Table 4.1 by reading along columns (1) and (2), one may observe that the activities account which describes the production activities, purchase intermediate inputs from commodities account and factors such as labour and capital from factor account. Moreover, producers must pay indirect taxes i.e., turnover taxes, import duties etc. to the government account (here we refer to net indirect taxes which can be derived by deducting government subsidies).

### Commodities

The commodities account in column 2 reveals that producers must pay the activities on domestically produced commodities and also pay the rest of the world on imported commodities. The ultimate destinations of the output of these production activities are given along the row 2 of the commodities account. Thus, the output is sold domestically as intermediate inputs, final private consumption by households, final government consumption and investment purposes. Furthermore, the output is sold in the foreign market in the form of exports.

### Factors

The factor account in column 3 is related to two factors of production, labour and capital.<sup>6</sup> The factor income is generated through two main sources, namely, labour income created by wages and capital income formed by operating surplus of different industries. Furthermore, the factor income could be allocated to three accounts: as wages into household account, as operating surplus into enterprises account and as consumption of fixed capital (depreciation) into savings/investment account.

### Households

The household account in column 4 is spent on final private consumption, as income tax paid to government and transfers to rest of the world. The household income is mainly generated through factor income, distributed profits and other transfers from enterprises, government transfers such as *Samurdhi* welfare payments and foreign transfers mainly in the form of migrant remittances.

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<sup>6</sup> It identifies land as a factor in agricultural industries. Thus, land rent would be allocated to agricultural industries by splitting the capital based on the shares of a previous Sri Lankan IO database (CIE, 1992).

Table 4.1  
Schematic Structure of the Macro-SAM of Sri Lanka

Activities	Commodities	Factors	Households	Enterprises	Government	Savings/ investment	Rest of the world	Total
	Sales							
<b>Commodities</b>	Intermediate inputs		Final private consumption (C)		Final government consumption (G)	Investment expenditure (I)	Exports (X)	<b>Gross Output</b>
<b>Factors</b>	Value added ( $Y^{FC}$ )							<b>Demand</b>
<b>Households</b>		Factor income ( $Y_f$ )		Distributed profits, other transfers ( $T_{ep}$ )	Transfers ( $T_{gh}$ )		Foreign transfers ( $T_{rw}$ )	<b>Factor income</b>
<b>Enterprises</b>		Factor income ( $Y_{op}$ )			Interest payments ( $T_{gp}$ )		Foreign transfers ( $T_{rw}$ )	<b>Household income</b>
<b>Government</b>	Taxes on intermediate, import duties (I)		Income tax ( $T_{hp}$ )	Profits taxes, transfers ( $T_{ep}$ )				<b>Enterprise income</b>
<b>Savings/ investment</b>		Depreciation ( $S_d$ )	Household savings ( $S_h$ )		Government savings ( $S_g$ )		Foreign savings ( $S_r$ )	<b>Government revenue</b>
<b>Rest of the world</b>	Imports (M)		Transfers to the rest of the world ( $T_{rw}$ )	Transfers to the rest of the world ( $T_{ep}$ )				<b>Savings</b>
<b>Total</b>	<b>Cost of production</b>	<b>Factor expenditure</b>	<b>Household expenditure</b>	<b>Enterprise expenditure</b>	<b>Government expenditure</b>	<b>Investment</b>	<b>Foreign exchange inflow</b>	<b>Foreign exchange outflow</b>

Source: Compiled by the authors.

### **Enterprise sector**

The enterprise income mainly flows from the income generated through the gross operating surplus, government interest payments and foreign transfers, whereas the enterprise expenditure takes the form of distributed profit and other transfers to households, corporate or profits taxes to government and transfer payments to rest of the world.

### **Government sector**

Government income is mainly created through indirect taxes from production activities, income tax from households and corporate or profit taxes from enterprises. This income is then distributed to households in the form of transfer payments, to enterprises as interest payments and to the commodities account as final government consumption.

### **Rest of the world sector**

Rest of the world account generates income through the payments on imported goods and services and transfer payments from households and enterprises. This income in turn would be spent on exports and foreign transfers to households and enterprises.

### **Savings/investments**

Household savings and government savings together form total domestic savings, whereas if depreciation and foreign savings are added into that, it becomes total savings. These savings are sufficient to finance the investment in various production sectors. Thus, total savings equals total investment expenditure in the economy. Warr and Azis (1997) note that this reflects a counterpart of Walres' law within a SAM.

## **4.2 Numerical Construction of the 1995 *Macro-SAM***

Following the schematic *Macro-SAM* structure described above, a numerical *Macro-SAM* was compiled by integrating two main statistical data sources, the Sri Lankan *input-output (I-O)* data (DCS, 1998a) and *National Accounts* for the year 1995 (DCS, 1998b). Hence, this framework not only utilizes a more comprehensive set of data but also helps in reconciling these two data sources. The numerical *Macro-SAM* for the base year 1995 is presented in Table 4.2. For example, values for intermediate inputs, factor income for households, factor income for enterprises (gross operating surplus) and the total sales have been taken from the 1995 *I-O* data table. However, household savings and profit taxes and transfers were estimated as residuals while distributed profits and other transfers from enterprises to households, income tax, government transfers to households and interest payments have been estimated using data from *National Accounts* for the year 1995. The rest of the data are directly taken from the *National Accounts* for the year 1995. Moreover, these numerical values in the *Macro-SAM* are in market prices.

As the *I-O* data tables and the *National Accounts* come from the same government statistical department (DCS), there were no major problems regarding balancing the *Macro-SAM*. The *Macro-SAM* was

balanced after eliminating minor discrepancies by adjusting residually estimated household savings and profit taxes and transfers cells.

Numerical *Macro-SAM* would elicit valuable information regarding the static macro economic structure of a given economy. For example, as can be seen in Table 4.2, the third cell in column (1) of the Sri Lankan *Macro-SAM* provides the value added component of the economy or the GDP at factor cost, which is Rs. 570,675 million. This comprises total labour payments or factor income of households (Rs. 221,927 million), capital payments or factor income of the enterprises (Rs. 315,075 million) and depreciation or capital consumption (Rs. 33,673 million). This decomposition of value added components are given along the third column. Similarly, GDP at market price from expenditure side (Rs. 662,384 million) can be obtained by subtracting total imports (Rs. 301,543 million), found on the penultimate cell in the second column, from the summation of values in the second row across all columns except column one: household consumption (Rs. 468,496 million), Government consumption (Rs. 97,244 million), total investment (Rs. 60,452 million) and exports (Rs. 237,735 million).

It is important to check the balance of the matrix as well as to compute macro identities described in Section 2 in order to check the consistency of the values in *Macro-SAM* with the 1995 *National Accounts* published by the *Department of Census and Statistics*, Sri Lanka. These macro identities, computed based on numerical values in the *Macro-SAM*, are presented in Table A1 in *Appendix A*. They are consistent with those from *National Accounts*. Furthermore, for the purpose of comparison, Table A2 in *Appendix A* provides numerical values of various income and expenditure balance sheets for 1995 as given in the *Consolidated Accounts, National Accounts of Sri Lanka* (DCS, 1998b).

### 4.3 Structure of the 1995 *Micro-SAM*

After constructing the 1995 *Macro-SAM* for Sri Lanka, the next step was to construct the *Micro-SAM* for the same base year. This was achieved by disaggregating the main accounts in the *Macro-SAM* and the non-zero data entries in that matrix to provide a detailed view of all flows in the economy. Carrying out this operation required more detailed disaggregated data regarding many accounts which could clearly represent the socio-economic structure of the country in that base year. New information was gathered using relevant disaggregated input-output accounts, household income and expenditure surveys, labour force surveys and various other industry surveys. In this process, non-zero entries in the *Macro-SAM* served as control totals in the disaggregation procedure. Moreover, numerical values in the *Micro-SAM* are in market prices.

The level of disaggregation would be determined by several factors: among them the objective of the analysis and the availability of data play a crucial role. In this study, the main purpose of building a *Micro-SAM* was to address the issue of income distribution and poverty within a CGE model. Hence, more emphasis was given to disaggregating the factor account in terms of different occupational labour categories and household account in terms of different household income groups. Furthermore, as many

Table 4.2  
1995 Macro-SAM of Sri Lanka (Rs. Million)

Activities	Commodities	Factors	Households	Enterprises	Government	Savings/ investments	Rest of the world	Total
Activities	1227493							1227493
Commodities	565109		468496		97244	160452	237735	1529036
Factors	570675							570675
Households		221927		294080	39230		40891	596128
Enterprises		315075			6399		10868	332342
Government	91709		27166	20312				139187
Savings/ investments		33673	94394		-3686		36071	160452
Rest of the world	301543		6072	17950				325565
<b>Total</b>	<b>1227493</b>	<b>570675</b>	<b>596128</b>	<b>332342</b>	<b>139187</b>	<b>160452</b>	<b>325565</b>	

Source: Compiled by the authors based on 1995 I-O table (DCS, 1995) and National Accounts of Sri Lanka (DCS, 1998).

studies are aimed at looking into the implications at industry level, highly disaggregated industry and commodity accounts were required.

The 1995 *Micro-SAM* can be viewed as a matrix which contains income and expenditure flows of 94 economic agents in the economy. Theoretically, there are a large number of agents who make choices with respect to their economic behaviour. However, in this *Micro-SAM* the study simplifies them into 94 representative agents who make economic decisions with respect to the Sri Lankan economy. These agents are:

- 38 industries producing 38 commodities (there is a one-to-one relationship between commodities and industries);
- 5 households who are the owners of factors of production. They also receive and dispatch transfer payments to and from government and the rest of the world;
- 8 occupational labour categories;
- 38 importers who import commodities from rest of the world;
- 1 exporter who exports Sri Lankan products to rest of the world;
- 1 investor who makes capital;
- 1 enterprise who represents commercial firms;
- 1 government;
- 1 rest of the world which trades with Sri Lanka and also makes and receives transfer payments.

The *Micro-SAM* at 1995 prices (in million of rupees) for the Sri Lankan economy is presented in Table A3. Reviewed below is the disaggregation procedure and relevant data sources in compiling *Micro-SAM* which comprises 94 economic agents.

Disaggregation of Activities and Commodities accounts were carried out based on the 1995 *I-O* table. An *I-O* table can be defined as a matrix that shows the flow of goods and services produced from each sector (industry) of the economy to different sectors (industries) of the economy within a specified period of time such as a year. Along the columns are shown the cost of production of a particular industry which includes different types of raw material inputs, labour inputs, capital inputs and net indirect taxes etc. The rows give the destination of the gross output produced by an industry. The portion of gross output is utilised as intermediate inputs to other industries and the balance is directly used by final users. These final users can be subdivided into different categories based on private consumption, government consumption, investment and exports.

The original 1995 *I-O* table consisted of 47 industries. However, for this study, those industries were aggregated to 38 industries which include 11 agricultural industries, 16 manufacturing industries, 1 mining industry and 10 services industries. Moreover, these activities produce 38 commodities; thus, there are no multi-product industries and multi-industry commodities. The main purpose of aggregation

was to overcome the data limitation with respect to different labour categories and household expenditure patterns of some industries and commodities. For instance, in the original *I-O* table there were 3 industries to represent the tea growing industry, i.e., tea growing-high elevation, tea growing- medium elevation and tea growing -low elevation. These were aggregated to represent a single tea growing industry. Similarly industries such as vegetables, fruits, highland crops, potato, betel and arecanuts and miscellaneous agricultural products were aggregated to a single industry called other agricultural crops. Furthermore, two milling industries, rice milling and flour milling, were aggregated to a single milling industry. However, the plantation developments industry that was present in the original *I-O* table was split into three plantation agricultural industries, tea growing, rubber growing and coconut growing, according to their share of gross output. The industry on tourist shops and travel agents was aggregated with the wholesale and retail industry. In the original *I-O* table there was only a single sector to represent textile and garments industries. Since, these two industries are key industries within the Sri Lankan manufacturing sector and since a substantial number of rural and urban low income households were employed in these industries, they were treated as two separate industries by disaggregating based on the information drawn from various *industry surveys* and the unpublished *1994 I-O table* (Ministry of Finance, 2001). Table 4.3 presents the different activities and commodities in the 1995 *Micro-SAM*.

The aggregated 1995 *I-O* database consists of several matrices and vectors. They include domestic flow matrix, which presents the inter-industry transactions of intermediate commodities and shows the flow of domestic commodities into various industries for current production (38 x 38 matrix); the household consumption vector, which describes the flow of commodities into single households sector; the investment vector, which presents the commodities utilised in capital creation; the government consumption vector, which describes the commodities consumed by the government; the exports vector, which presents the commodities exported from Sri Lanka; and other vectors such as for wages, gross operating surplus, indirect taxes, subsidies, imports, import duties and stock adjustments.

#### 4.4 Numerical Construction of the 1995 *Micro-SAM*

The principal data source used in disaggregating other accounts, mainly the household account and the factor account, was the *Consumer Finances Survey*, conducted by the Central Bank of Sri Lanka for the years 1996/97 (CBSL, 1999). This survey was carried out using a sample of 8880 households within a stratified 3 staged sampling design. Households are divided into 13 strata using 3 sectors - Rural, Urban and Estate- and 5 zones. Direct personal interviews of household members have been carried out to gather data which encompasses a wide array of vital socio-economic information.

The original 1995 *I-O* table presents a single vector for a wage bill of each industry. However, when constructing the *Micro-SAM* it was necessary to disaggregate this wage bill into different occupational labour categories found in the economy. The present study disaggregates labour into the following 8 occupational labour categories distinguished by main occupations in line with the *international standard classification of occupations (ISCO-68)* (ILO, 1968):

**Table 4.3**  
**Activities and Commodities in the 1995 *Micro-SAM***

<b>Activities</b>	<b>Description</b>	<b>Commodities</b>
<b><u>Agricultural Industries</u></b>		
1 <i>Teagrow</i>	Tea growing	<i>Teagrow</i>
2 <i>Rubgrow</i>	Rubber growing	<i>Rubgrow</i>
3 <i>Cocgrow</i>	Coconut growing	<i>Cocgrow</i>
4 <i>Paddy</i>	Paddy growing	<i>Paddy</i>
5 <i>Mexcrop</i>	Minor export crops	<i>Mexcrop</i>
6 <i>Tobacco</i>	Tobacco growing	<i>Tobacco</i>
7 <i>Othe_agri</i>	Other agricultural crops	<i>Othe_agri</i>
8 <i>Livestock</i>	Livestock and poultry	<i>Livestock</i>
9 <i>Firewood</i>	Firewood	<i>Firewood</i>
10 <i>Forestry</i>	Forestry	<i>Forestry</i>
11 <i>Fishing</i>	Fisheries	<i>Fishing</i>
<b><u>Mining Industry</u></b>		
12 <i>Mining</i>	Mining	<i>Mining</i>
<b><u>Manufacturing Industries</u></b>		
13 <i>Teapro</i>	Tea processing	<i>Teapro</i>
14 <i>Rubpro</i>	Rubber processing	<i>Rubpro</i>
15 <i>Cocopro</i>	Coconut processing	<i>Cocopro</i>
16 <i>Milling</i>	Grain milling	<i>Milling</i>
17 <i>Foodbev</i>	Food and beverage industry	<i>Foodbev</i>
18 <i>Textile</i>	Textile industry	<i>Textile</i>
19 <i>Garments</i>	Garments industry	<i>Garments</i>
20 <i>Wood</i>	Wood products, furniture and fittings	<i>Wood</i>
21 <i>Paper</i>	Paper and printing	<i>Paper</i>
22 <i>ChmFerti</i>	Chemicals and fertilizer	<i>ChmFerti</i>
23 <i>Petroleum</i>	Petroleum products	<i>Petroleum</i>
24 <i>RubProduct</i>	Rubber products	<i>RubProduct</i>
25 <i>NMominpr</i>	Non-metallic mineral products	<i>NMominpr</i>
26 <i>Base_metal</i>	Basic metal products	<i>Base_metal</i>
27 <i>Feb_metal</i>	Fabricated metal products	<i>Feb_metal</i>
28 <i>Othe_Manu</i>	Other manufacturing industries	<i>Othe_Manu</i>
<b><u>Service Industries</u></b>		
29 <i>Electricity</i>	Electricity and water	<i>Electricity</i>
30 <i>Construct</i>	Construction	<i>Construct</i>
31 <i>Trade</i>	Wholesale and retail trade	<i>Trade</i>
32 <i>Hotels</i>	Hotels, bars and restaurants	<i>Hotels</i>
33 <i>Transport</i>	Transport	<i>Transport</i>
34 <i>Commun</i>	Communication	<i>Commun</i>
35 <i>Banking</i>	Banking and insurance	<i>Banking</i>
36 <i>Dwellings</i>	Ownership of dwellings	<i>Dwellings</i>
37 <i>Pubadmin</i>	Public administration and defence	<i>Pubadmin</i>
38 <i>Other_serv</i>	Personal, social and community services	<i>Other_serv</i>

**Source:** Compiled by the authors based on 1995 I-O table (DCS, 1998a).

- Professional, technical and related workers (*PTW*);
- Administrative and managerial workers (*AMW*);
- Clerical and related workers (*CLW*);
- Sales workers (*SALW*);
- Service workers (*SERW*);
- Agricultural, animal husbandry, fisheries and forestry workers (*AGW*);
- Production and related transport equipment operators and labourers (*LPW*);
- Other workers (*OW*);

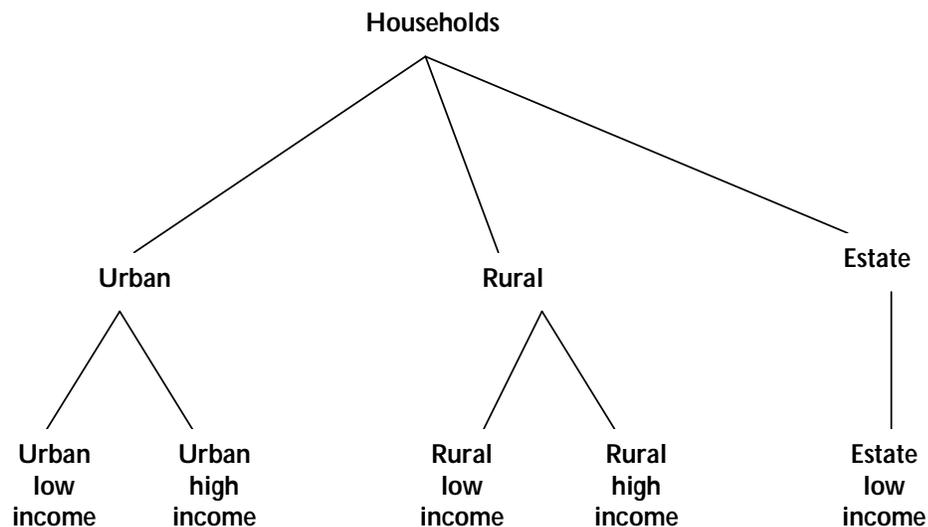
Hence, in order to create the wage matrix (of order 8 x 38), it was necessary to allocate the total wage bill among 8 occupational labour categories. This is achieved by utilising data from different sources such as *Labour Force Surveys*, (DCS, various issues), *CFS 1996/97* and *Industry Surveys* (DCS, various issues). Information on employed population within 23 industries with respect to the above given occupational categories was available in the *CFS 1996/97*. Based on that information, proportions for employed population by industry and occupation was compiled. Table 4.4 presents the estimated proportions of employed population by industry and occupation for 23 industries. Furthermore, using the information from labour force surveys, industry surveys and also the industry-wise wage bill shares in the 1995 *I-O* table, proportions of employed population by industry and occupation for 38 industries were generated by disaggregating the proportions compiled for 23 industries.

Using the *CFS*, for the years 1996/97 (CBSL, 1999), households have been categorised into five socio-economic groups, i.e., urban low income households, rural low income households, estate low income households, urban high income households and rural high income households. These household groups are defined based on two factors: firstly, on the basis of geographical location (rural, urban and estate workers involved in tea, rubber and coconut plantations) and secondly, on the basis of income level (low income groups are defined based on whose income falls below Rs.15,000 /household/month). Figure 4.2 illustrates the disaggregation approach of household groups.

The *CFS 1996/97* has categorised the households listed in the sampling frame into three sectors – urban, rural and estate, where households residing in the municipal and urban council areas are grouped under urban households, the estate sector consists of households in the tea, rubber and coconut plantation areas, and the rural sector thus consists of households which do not belong to either the urban or rural sectors. Furthermore, the *CFS 1996/97* data provide information on the income generation as well as the expenditure patterns of the above three sectors. Moreover, data give information on various socio-economic factors at different household income levels within the three sectors, i.e., for instance, income levels have been defined on the basis of income classes ranging from Rs. 0-250/household /month being the first group and over Rs. 35,000/household/month as the last group. Furthermore, there are about 25 income classes falling in between. Thus, this study has divided each of the three sectors - urban, rural and estate, into two groups taking income class of Rs. 0-15,000 /household/ month as the

low-income group and the income class of Rs. 15,001-over 35,000/household/month as the high-income group. In this demarcation, Rs. 15,000/household/month was taken as the cut-off line on the basis of rough estimations of average cost of living of a household that was prevailing in the year 1995. However, in the estate sector, the high income group was aggregated with the urban high income group as high income estate sector workers mainly come from the estate management and in most cases they and their families reside in urban areas. Finally, this household classification yields 5 household groups based on geographic location and the household monthly income level, i.e, urban low income households (*ULIHH*), rural low income households (*RLIHH*), estate low income households (*ELIHH*), urban high income households (*UHIHH*) and rural high income households (*RHIHH*).

**Figure 4.2**  
**Schematic View of Household Disaggregation**



Once the different household groups have been defined, the next task is to allocate the income generated by different sources into relevant households. This was carried out based on the information gathered from the *CFS 1996/97*. Thus, wage income received by 8 occupational labour categories within 38 industries have been allocated among 5 household groups based on the proportions estimated from CFS data. Moreover, gross operating surplus generated by different industries has been allocated among 5 household groups in a similar manner based on the proportions obtained from *CFS* data. Government transfer payments such as *Samurdhi* payments and the transfers from rest of the world mainly consisting of migrant remittances have also been allocated to different household groups based on the proportions calculated from *CFS* data.

The next step is to outline the expenditure patterns of the different household groups, including the spending on private consumption of 38 commodities, income tax payments to government and the

Table 4.4  
Proportion of Employed Population by Industry and Occupation - All Sectors

Industry	PTW	AMW	CLW	SALW	SERW	AGW	LPW	OW
Agriculture	0.003	0.000	0.006	0.002	0.007	0.935	0.011	0.037
Forestry and Logging	0.029	0.000	0.029	0.086	0.057	0.343	0.400	0.057
Fishing	0.000	0.006	0.006	0.039	0.000	0.910	0.006	0.032
Crude Petroleum and Natural Gas Production	0.125	0.000	0.125	0.125	0.125	0.000	0.500	0.000
Mining	0.000	0.000	0.017	0.051	0.006	0.006	0.809	0.112
Manufacture of Food, Beverages & Tobacco	0.004	0.008	0.021	0.080	0.059	0.067	0.653	0.107
Textile, Wearing Apparel & Leather Industries	0.008	0.015	0.028	0.017	0.024	0.005	0.869	0.032
Manufacture of Wood and Furniture	0.000	0.006	0.006	0.010	0.003	0.081	0.829	0.065
Manufacture of Paper & Paper Products	0.016	0.032	0.079	0.048	0.016	0.000	0.683	0.127
Manufacture of Chemicals Rubber and Plastic	0.045	0.082	0.100	0.045	0.091	0.009	0.491	0.136
Manufacture of Non Metallic Minerals	0.010	0.000	0.031	0.015	0.010	0.000	0.800	0.133
Basic Metal Industries	0.000	0.000	0.034	0.000	0.000	0.000	0.897	0.069
Manufacture of Fabricated Metal Products	0.055	0.000	0.047	0.094	0.024	0.000	0.756	0.024
Other Manufacturing Industries	0.032	0.021	0.021	0.021	0.000	0.000	0.842	0.063
Electricity, Gas and Steam	0.071	0.010	0.141	0.040	0.071	0.020	0.576	0.071
Construction	0.022	0.004	0.005	0.009	0.025	0.010	0.809	0.115
Trade	0.008	0.005	0.038	0.848	0.024	0.012	0.038	0.028
Restaurants and Hotels	0.038	0.000	0.051	0.127	0.658	0.006	0.082	0.038
Land Transport and Storage	0.016	0.009	0.193	0.022	0.043	0.006	0.617	0.094
Communication	0.108	0.000	0.708	0.000	0.031	0.000	0.138	0.015
Banking	0.152	0.085	0.436	0.170	0.060	0.004	0.071	0.021
Public Administration and Defence	0.068	0.043	0.427	0.002	0.327	0.002	0.064	0.066
Other Services	0.384	0.003	0.071	0.019	0.157	0.007	0.127	0.234

Source: Compiled by the authors based on the CFS 1996/97 (1999) survey data on employed population by industry and occupation - all sectors.

transfer payments to the rest of the world. Allocation of household expenditure by different household groups on 38 commodities was carried out based on the budget shares calculated from the data on food, non-food and consumer durable expenditure patterns found in the *CFS* data. Income taxes and rest of the world transfers were also allocated based on proportions estimated from *CFS* data.

Let  $Y^F$  = wage income;

$C_{si}$  = private consumption of the  $i^{\text{th}}$  household group on commodities produced by  $s$  industry;

$T_{gi}$  = transfers from government  $g$  to the  $i^{\text{th}}$  household sector;

$T_{ig}$  = transfers from the  $i^{\text{th}}$  household sector to government  $g$ ;

$Y_i$  = income of the  $i^{\text{th}}$  household group; and

$E_i$  = expenditure of the  $i^{\text{th}}$  household group

where household sectors  $i = 1, \dots, m$ ; occupational labour categories  $n = 1, \dots, h$ ; industries  $s = 1, \dots, k$ ; government  $g = 1$ ; enterprises  $e = 1$ ; and rest of the world  $r = 1$ . Then the income and expenditure mapping of different household groups can be expressed as follows:

$$Y_i = \sum_{s=1}^k \sum_{n=1}^h Y_{sni}^F + T_{ei} + T_{gi} + T_{ri} \quad (26)$$

$$E_i = \sum_{s=1}^k C_{si} + T_{ig} + T_{ir} \quad (27)$$

Thus, aggregated household income and aggregated household expenditure can be written as:

$$Y = \sum_{i=1}^m Y_i \quad (28)$$

$$E = \sum_{i=1}^m E_i \quad (29)$$

Aggregated household savings is given by

$$S = Y - E \quad (30)$$

In the *Micro-SAM* compilation process, the study has used *Macro-SAM* values as control totals. There were no major discrepancies found in the balancing process. However, the minor imbalances were eliminated by using a biproportional matrix balancing technique known as RAS<sup>7</sup> - an iterative algorithm of biproportional adjustment, which is a widely used methodology to balance or update SAMs.

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<sup>7</sup> For description of RAS method in comparison with other widely used matrix balancing techniques, see McDougall (1999).

## 5. Concluding Remarks

In this paper, the study developed a framework for the compilation of a SAM of the Sri Lankan economy with an application to the year 1995. As noted in the introduction, there is no readily available disaggregated SAM for the Sri Lankan economy. The authors believe that the effort in this paper in developing a new SAM for the Sri Lankan economy will help in many ways for statistical and analytical purposes. Statistically it will provide a consistent and coherent database which link national accounts, input-output structure and income distribution. It can also be used for analytical purposes such as analyzing distribution issues using SAM multipliers and developing poverty focused and distributional focused CGE models for the Sri Lankan economy.

In this concluding section, it is important to highlight the limitations of this study. As repeatedly mentioned this is an attempt to develop a framework to compile a SAM for Sri Lanka. There are still problems with data sources and gaps. The disaggregation of the household sector is not sufficient for some studies. The production activities can also be disaggregated on the basis of the availability of new I-O tables. However, the authors believe that this attempt will lay the foundation for future developments of SAMs for Sri Lanka.

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## APPENDIX A:

Table A1: Values for Macroeconomic Identities Based on Data from the Numerical Macro-SAM for Sri Lanka for the Year 1995

Macro identity	Numerical Values (Rs Million)
Household income	
$Y_h = Y_f + T_{eh} + T_{gh} + T_{rh}$	$596128 = 221927 + 294080 + 39230 + 40891$
Household expenditure	
$E_h = C + T_{hg} + T_{hr}$	$501734 = 468496 + 27166 + 6072$
Household savings	
$S_h = Y_h - E_h$	$94394 = 596128 - 501734$
or	
$S_h = Y_f - C + \check{T}_h$	$94394 = 221927 - 468496 + 340963$
where,	
$\check{T}_h = (T_{gh} - T_{hg}) + (T_{rh} - T_{hr}) + T_e$	$340963 = (39230 - 27166) + (40891 - 6072) + 294080$
Commercial enterprise sector income	
$Y_e = Y_{os} - S_D + T_{ge} + T_{re}$	$332342 = 348748 - 33673 + 6399 + 10868$
Commercial enterprise expenditure	
$E_e = T_{eh} + T_{eg} + T_{er}$	$332342 = 294080 + 20312 + 17950$
Total Government receipts	
$Y_g = I_t + T_{hg} + T_{eg}$	$139187 = 91709 + 27166 + 20312$
Government expenditure	
$E_g = G + T_{gh} + T_{ge}$	$142873 = 97244 + 39230 + 6399$
Government savings	
$S_g = Y_g - E_g$	$-3686 = 139187 - 142873$
or	
$S_g = I_t - G + \check{T}_g$	$-3686 = 91709 - 97244 + 1849$
where,	
$\check{T}_g = (T_{hg} - T_{gh}) + (T_{eg} - T_{ge})$	$1849 = (27166 - 39230) + (20312 - 6399)$
Total receipts of foreigners	
$Y_r = M + T_{er} + T_{hr}$	$325565 = 301543 + 17950 + 6072$
Foreigners' payments	
$E_r = X + T_{rg} + T_{rh} + T_{re}$	$289494 = 237735 + 40891 + 10868$
Foreign savings	
$S_r = Y_r - E_r$	$36071 = 325565 - 289494$
or	
$S_r = M - X + \check{T}_r$	$36071 = 301543 - 237735 + (-27737)$
where,	
$\check{T}_r = (T_{er} - T_{re}) + (T_{hr} - T_{rh})$	$-27737 = (17950 - 10868) + (6072 - 40891)$
$S_h + S_g + S_r + S_D = Y_f - C + Y_{os} + I_t - G + M - X$	$[94394 + (-3686) + 36071 + 33673] = [221927 - 468496 + 348748 + 91709 - 97244 + 301543 - 237735]$
GDP at factor cost	
$Y^{FC} = Y_f + Y_{os}$	$570675 = 221927 + 348748$
GDP at market price (income side)	
$Y = Y^{FC} + I_t$	$662384 = 570675 + 91709$
$S_h + S_g + S_r + S_D = Y - C - G + M - X$	$[94394 + (-3686) + 36071 + 33673] = [662384 - 468496 - 97244 + 301543 - 237735]$
GDP at market price (expenditure side)	
$Y = C + I + G + X - M$	$662384 = 468496 + 160452 + 97244 + 237735 - 301543$
$I = S_h + S_g + S_r + S_D$	$160452 = 94394 + (-3686) + 36071 + 33673$

Table A2: Sri Lanka National Accounts Balance Sheet for 1995 (Rs Million)

Gross Domestic Product		Income	Expenditure
Value-added at factor costs		570675	468496
Indirect taxes		95944	97244
Less: Subsidies		4235	168363
			-7911
			237735
			301543
Total (GDP at market price)		662384	662384
National Disposable Income		Income	Expenditure
Compensation of employees and operating surplus		537002	468496
Indirect taxes		95944	97244
Net compensation of employees/ property and entrepreneurial income from rest of the world		-7082	90709
Less: Subsidies		4235	
Net Current Transfers from rest of the world		34820	
Total (Disposable income)		656449	656449
Capital Accounts		Income	Expenditure
Net domestic savings		90709	168363
Consumption of fixed capital		33673	-7911
Foreign savings		36070	
Total		160452	160452
Rest of the world		Income	Expenditure
Imports of goods and services		301543	237735
Net compensation of employees/ property and entrepreneurial income from abroad		7082	36071
Net Current Transfers from abroad		-34819	
Total		273806	273806

Source: National Accounts of Sri Lanka (DCS, 1998).