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Compiling the Supply and Use Tables: The Sri Lanka Experience

by

Department of Census and Statistics

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Abstract

This paper presents the compilation of the 2006 Supply and Use Tables (SUTs) for Sri Lanka. The SUT is an effective tool that ensures the consistency of statistics on flows of goods and services based on the principle that total supply of each product is equal to its total uses. For Sri Lanka, this is the first experience in generating a SUT, with financial and technical assistance from the Asian Development Bank. The major challenges in preparing the SUT were data gaps and lack of data in some sectors for the necessary disaggregated levels. These were addressed by considering regional ratios; borrowing intermediate input ratios from Indian Input flows; using census, surveys, and administrative data; and, special mathematical methods. The paper mainly focuses on the classifications, data sources, and compilation methods used for preparing the SUT for Sri Lanka.

KEYWORDS AND PHRASES: System of National Accounts, SNA 93, supply and use tables, integrated set of accounts, input-output tables, use table, supply table, balancing of SUT, GDP, SUT, SNA, IO

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I. Introduction

The national accounts estimates of GDP in Sri Lanka are compiled by the production and income approaches; and by industrial origin according to the SNA 1993. The estimates of GDP by expenditure approach are compiled using GDP estimate from industrial origin as control total.

Balanced GDP (P) and GDP(E) estimates are obtained from the Supply and Use Table (SUT) would be far superior than GDP(P) and GDP(E) estimates computed without the SUT framework. ADB initiated a project (RETA 6483) to assist participating Developing Member Countries (DMCs) to increase their compliance to the SNA 93 recommendations by adopting the Supply and use framework.

The Department of Census and Statistics (DCS) in Sri Lanka is the central government agency responsible for the collections, compilation, analysis and dissemination of reliable and timely statistical data relating to the population and housing, agriculture, industries, trade and services, national accounts, prices and many other data related to social and economic activities of the country for the purpose of planning, policy, formulation and implementation of development programs. In order to achieve this, the DCS is administered by a Director General and has been organized with centrally located technical divisions, an island wide network of field offices with field officers attached to the district secretariats and divisional offices, and a host of branch offices in some important ministries and departments. The National Accounts Division in DCS compiles the national accounts. The cadre of the national Accounts Division at present is as follows.

Post	Number
Deputy Director (The Head)	1
Senior Statistician	1
Statistician	4
Statistical Officer	6
Statistical Assistant	8
Management Assistant Service	4
Peon	3

SUT preparation was undertaken by the National Accounts Division. Reference year for the SUT was 2006 and it was a new experience for the division's staff. Necessary technical assistance was given by the ADB SUT expert group by conducting several workshops during the last two years. Data gaps were identified as a major challenge in preparation of SUT. Those were solved by getting SUT experts assistance made available by the ADB. Published GDP figure was kept as a control value and Output and intermediate consumption were allowed to change considering regional averages. As this was the first experience in SUT preparation, the knowledge gained from this will be immensely beneficial in preparing future SUT.

II. The Current System of National Accounts

The compilation of National Accounts for Sri Lanka started in early 1950's by the DCS. The Central Bank of Sri Lanka also began publishing National Accounts estimates in 1959. Since 2007, the DCS has been responsible for compilation and dissemination of National Accounts Estimates. The Department releases the estimates on National Accounts annually

through the publication on "National Accounts of Sri Lanka". In 1950's the estimates consist of tables on production and expenditure accounts at current factor cost prices and constant prices. The estimates in real terms of the past data series were based on prices of 1958, 1963, 1975, 1990, 1998 and 2002. The current prices estimates are at current factor cost prices until 1975 and thereafter it was at current producers' prices. The contents of the publication gradually expanded since late 1960's. The National Accounts estimates are compiled based on the United Nations guidelines given in the System of National Accounts (SNA).

A. Estimation of Gross Domestic Product (GDP)

The DCS uses SNA 1993 for compiling the National Accounts for Sri Lanka. For the estimates of GDP, it is made by the industrial origin, the production approach, and the income approach which are generally employed depending on the data availability. The production approach is followed mainly by estimating the value added of agriculture, livestock, fisheries, manufacturing industries, mining and quarrying, electricity, gas and water while the income approach is mainly adopted for the post & telecommunication, banking, insurance, real estate and government sector. Indirect methods are also used in determining the output of construction.

Price indices and quantity indicators are used to obtain constant price estimates. The constant estimates, base year is 2002. The DCS releases Annual and Quarterly publications on National Accounts of Sri Lanka. Quarterly publication contains summarized Quarterly GDP information by thirteen sub sectors of the economy.

The annual publication contains more detailed national accounts tables. Those are the consolidated National Accounts tables which are computed disposable income, Gross Domestic Product on expenditure, capital finance and rest of the world accounts. Income and outlay accounts were computed for the sectors of general government and households. Production Accounts for total economy and GDP sub sectors are published in the annual publication. Reconciliation of key aggregates was compiled for GDP. Derivation of value added and cost component of value added have been compiled to produce detailed breakdown of value added. Supply and disposition tables were prepared to indicate balance accounts for agriculture sector only. The complete sequence of accounts recommended by SNA -93, are not prepared currently by the DCS.

B. Distribution of Gross National Income

Figures of aggregate domestic income when adjusted by net factor income from abroad gives the relevant estimates of Gross National Income. Gross Domestic Income is regarded as the sum of rewards accruing to the resident factors of production, which are engaged directly in the current production of goods and services (viz. Salaries and Wages for labour, rent, interests, profits and dividends for other factors of production).

Compensation of General Government is the net value of government services Sector value added (Contains the personal emoluments of the General Government excluding that of the Public trade Enterprise). In the case of private sector employees, estimates are based on Censuses, Surveys & administrative data and wage rates data that are obtained from the Department of Labour. Tax data are obtained from the Commissioner of Inland Revenue, while particulars of General Government Income and Interest on Public Debt are found in Government Accounts. Income from non - corporate enterprises is taken as a residual.

C. Expenditure on Gross Domestic Product At Current And Constant Prices

This table is prepared in conformity with the United Nations Classification of expenditure on Gross Domestic Product at Current and Constant prices. This includes information for sub - sectors of private final consumption, government consumption, Capital formation, imports of goods and services and exports of goods and services. More disaggregated information are given in separate tables for private final consumption and capital formation.

III. Supply and Use Framework: Basic Concepts

A. Size of matrix

- 51 products (Commodities) x 32 industries
- Industrial Classifications System is ISIC 3.1
- Product Classification System is CPC 1.1
- In addition to above classifications system COFOG, COICOP and HS Classifications were used.
- For valuation basic prices, producers' prices and purchasers' prices were taken into account.

B. Choice of the reference year

Sri Lanka has adopted base year as 2006 on the basis of data availability. DCS has completed many important as well as comprehensive surveys around this year. They are as follows:

- Household Income and Expenditure Survey 2006/2007
- Annual Survey of Industries 2007
- Annual Survey of Construction 2007
- Labour Force Survey 2006

IV. Sources and Methods

A. List of Data Sources:

- Household Income and Expenditure Survey 2006/2007
- Annual Survey of Industries 2007
- Annual Survey of Construction 2007
- Labour Force Survey 2006
- Census of Agriculture 2002
- Census of State and Semi Government Employment
- Crop cutting survey for Paddy cultivation seasonally
- Annual agriculture estimates statistics
- Price statistics

In addition to the above Surveys and Censuses, financial statement and administrative Data are used from government and private institutions mainly from the following institutions.

- Ministry of Fisheries
- Inland Revenue Department –Tax data

- Sri Lanka Customs – External trade data
- Ministry of Finance – Budget statement, Revenue and Expenditure
- Central Bank of Sri Lanka- BOP Data
- Tea Small Holdings Development Authority
- National Livestock Development Board
- Ministry of Livestock
- Coconut Cultivation Board
- Coconut Development Authority
- Timber Corporation
- Lanka Mineral Sand Corporation
- Water Supply and Drainage Board; Electricity Board
- Petroleum Cooperation
- Telecommunication and Media Institutions; Sri Lanka Telecommunication; Regulatory Commission; Port Authority; Sri Lankan air lines; Department of Motor Traffic – New Registration of vehicle; Department of Railway; Transport Commission
- Road development Authority
- Financial Institutions

B. Supply Side

1. Domestic production

Domestic production at basic price from usual 13 industrial Sectors of Annual National Accounts are broken up into ISIC- 3.1 industry sector wise using relevant Censuses, surveys and administrative data. Then each industrial sector production is categorized according to product classification of CPC 1.1. Industries are reported in Columns (ISIC3.1) and Products in rows (CPC 1.1)

CPC Category distributed as follows:

- Agriculture sector productions are included with 8 sub groups. (Row code 1 to 8)
- Industry sector production is included with 23 sub groups. (Row code 9 to 31)
- One CPC for construction.
- Rest 19 Sub groups are included under services sector production in given ADB table format.

2. Imports of goods and services and C.I.F/F.O.B adjustments

Imports of goods are estimated based on custom data maintained in HS scheme. Change of HS code to CPC using the correspondence mechanism. Imports of services are estimated based on BOP Statistics from Central Bank annual report. Value of Insurance and freight gathered from the BOP statistics have been subtracted from import of goods on pro-rata basis.

3. Valuation adjustments

i. Transport Cost and trade margin

We have estimated total trade and transport margin indirectly for the usual national account estimates. Due to lack of surveys related to trade and transport margin, we don't have data for these trade and transport margin by commodity wise. So, we estimated those margins for commodity by considering difference between purchaser value and producer value and pro-rata basis to total domestic production.

ii. Taxes less Subsidies products

Tax data is estimated based on the Inland Revenue Statistics, Custom data and State Accounts. We had to construct another matrix for distribution of tax values in trade part as Commodity wise (CPC category) by considering the total value of domestic Product, total imports and exports with the relevant tax field (taxes on domestic goods and services, Taxes on international trade, excise tax and so on). Other industry group tax values are also distributed according to the CPC category by considering relevant tax fields as they are related goods or services. Subsidies are estimated based on State Accounts.

C. Use Side

1. Intermediate Consumption

Intermediate consumption from usual 13 industrial Sectors of Annual National Accounts are broken up into ISIC- 3.1 industry sector wise using relevant Censuses, surveys and administrative data. But we don't have Intermediate consumption data for the needed commodity wise (CPC level) due to lack of intermediate consumption surveys. Therefore, we borrowed Indian input flow 2006-07 from India and applied similar industries ratios relevant to our economy from that input flow.

2. Final Demand

i. Private Consumption Expenditure

Private Consumption Expenditure could be derived from Household income and Expenditure Survey 2006/07.

ii. General Government Final Consumption

General Government final consumption values are based on government finance statistics.

Individual: - Expenditure on Education and Health is treated as individual consumption expenditure of general government

Collective: - The rest is treated as collective consumption expenditure of general government such as public administration and defense; Compulsory social security service, Recreational, Cultural and Sporting services, other services n.e.c.

iii. Non-profit Institutions Serving Household (NPISH)

No separate statistics are available for NPISH. It is imputed in households.

iv. Gross Domestic Capital Formation

Gross Fixed Capital Formation (GFCF)

GFCF consists of mainly construction, machinery, transport- equipment and land improvement and plantation development. We don't have a capital formation value for live animals (livestock). Main data sources for this sector are custom records (export & imports), government budget information, plantation development in the agriculture sector and construction sector output which related to the fixed capital.

Change in inventories

Changes in inventories are calculated as balancing item in general calculation in National Accounts and it includes statistical discrepancy also. So it is not possible to say what the size of statistical discrepancy is. In SUT, inventories of the industrial

production are calculated by considering the share of inventory to the total output in annual industry Survey which is published by the department.

Acquisition less disposable of valuables

In Sri Lanka, we don't calculate the Acquisition less disposable of valuables.

3. Exports of goods and Services

Exports of goods are based on customs data maintained in HS scheme. Change of HS code to CPC is done using the correspondence mechanism.

D. Uses of value added

1. Compensation

Compensation of employees is derived from economic Censuses, surveys, financial report of private institutions and administrative data of government services.

2. Taxes less subsidies

Data are sourced from the Inland Revenue Statistics, Custom data and State Accounts.

3. Depreciation

There is no Industry wise data for this sector.

4. Gross Operating Surplus

This is obtained as balancing item between gross value added and Compensation.

E. Balancing Process

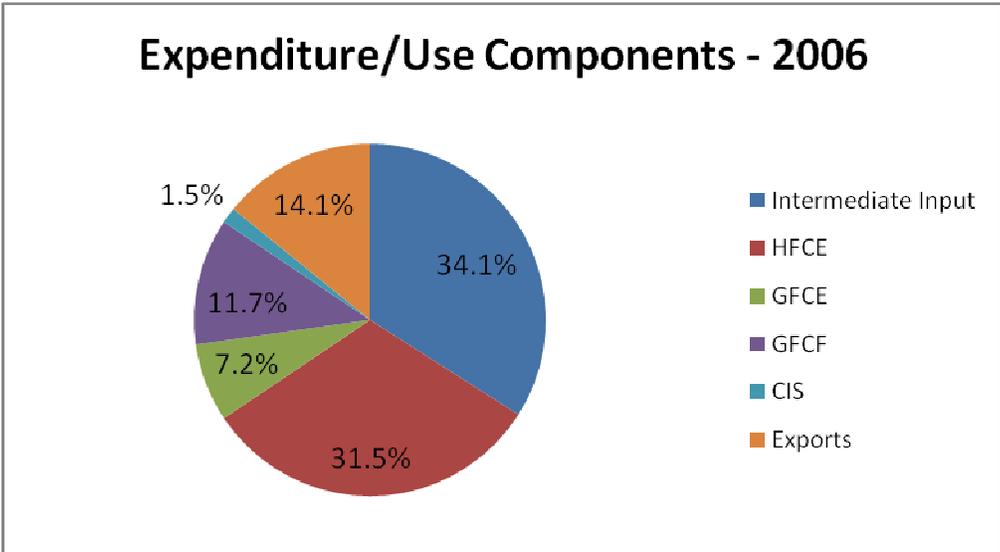
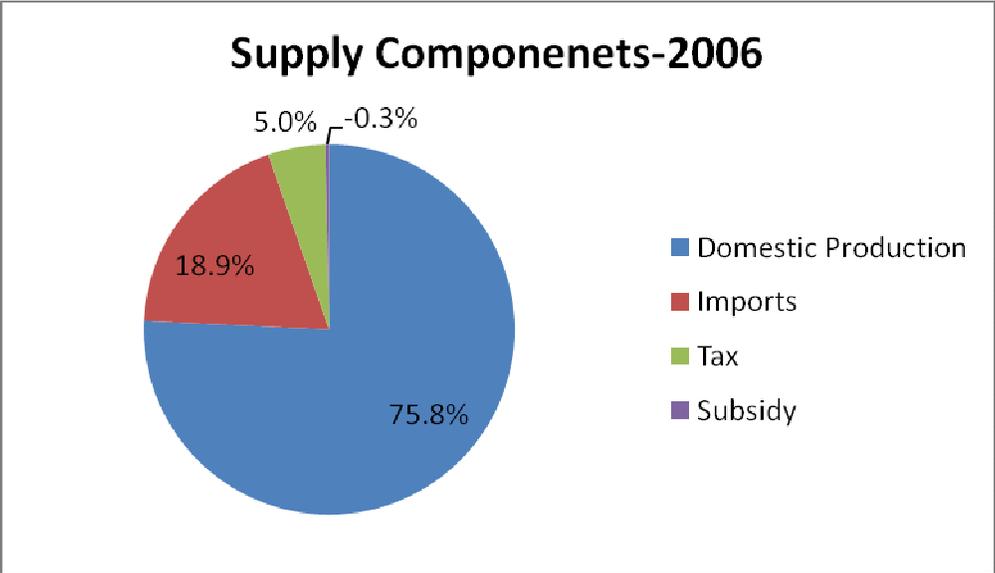
Manual balancing techniques were adopted for the SUT preparation. Published GDP was used as a control figure while adjusting intermediate Consumption and output values based on the South Asia regional average, and by using Surveys and administrative data.

V. The Supply and Use Tables: Results and Analysis

Total Supply of goods and services in year 2006 was estimated at Rupees Million 6,266,815 for Sri Lanka. Total Supply consist with 75.8% from Domestic output and 18.9% from imports while their Usage Consist with 34.1% from Intermediate consumption, 51.8% from Final Demand and the balance of 14.8% from exports as shown in the below table.

Supply Table		Use Table	
Domestic output		Intermediate Consumption	
	4,777,657		2,134,140
Imports	1,193,994	Final Demand	3,247,295
Goods	1,051,851	Exports	885,380
Services	142,143	Goods	716,578
Trade and Transport margin	0	Services	168,802
Taxes less subsidies on products	295,164		
Total Supply	6,266,815	Total Use	6,266,815

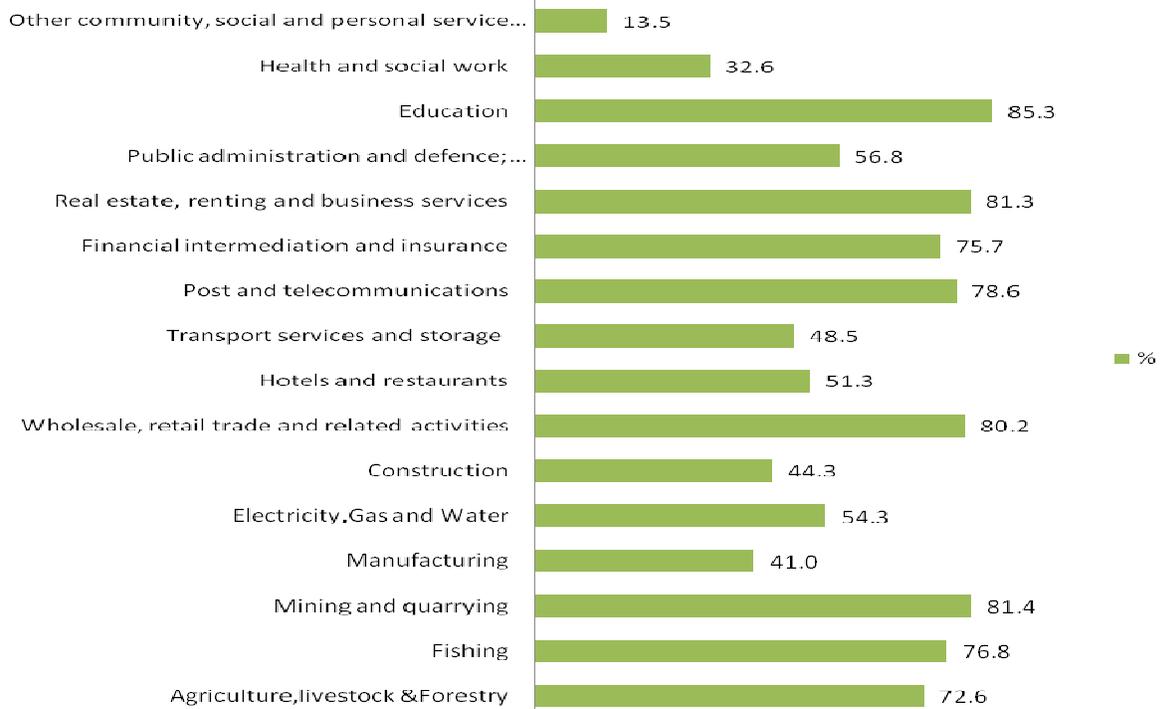
Percentage distribution of total Supply components are shown in the Chart below. Out of total supply, more than three fourth comes from Domestic production and other three components are indicated 18.9%, 5.0% and -0.3% respectively for import of goods and services, tax and subsidies.



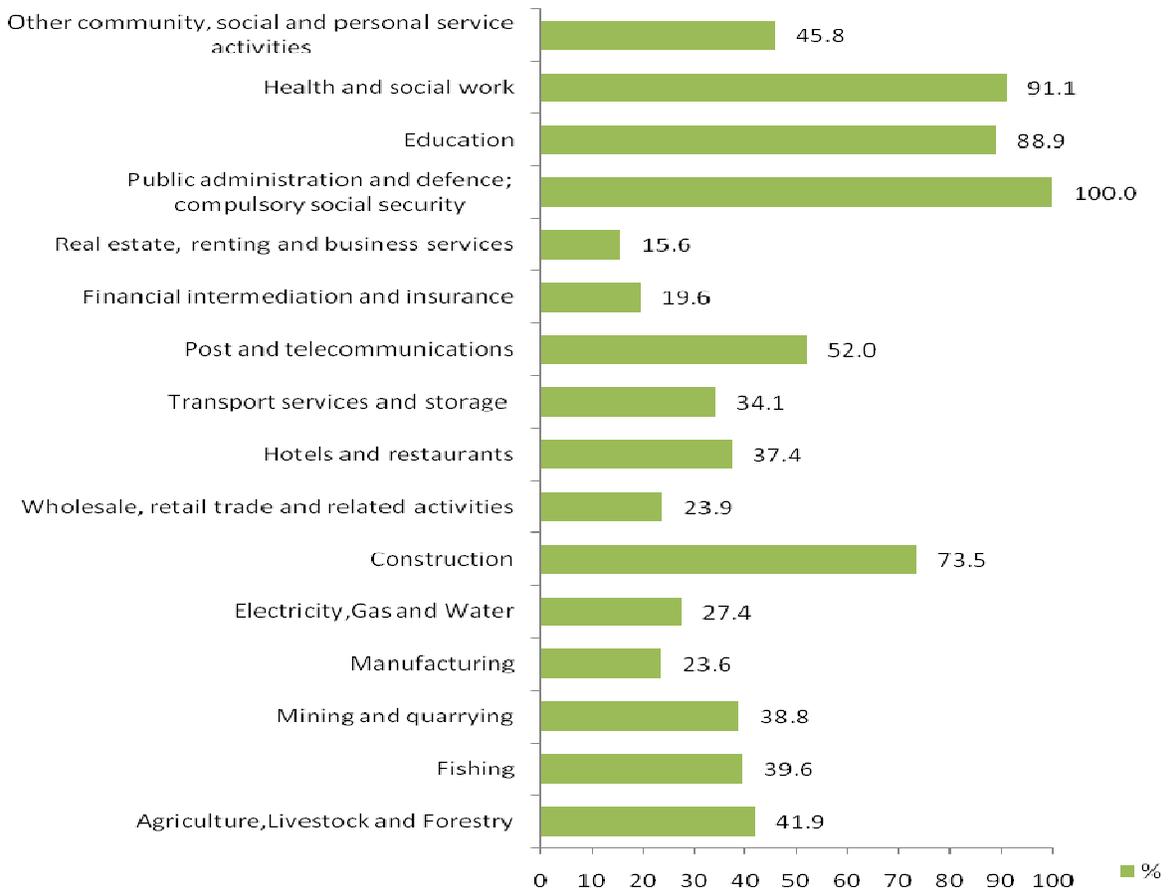
Value Added Components by Industry - 2006

Industry	Compensation of Employees (Rs.Mn.)	Taxes less Subsidies on Products and Imports (Rs. Mn.)	Gross Operating Surplus (Rs.Mn.)	Value Added (Rs.Mn)
Agriculture, hunting, forestry and related service activities	129,122	-11,289	179,086	296,919
Fishing, aquaculture and service activities incidental to fishing	14,332	0	21,886	36,218
Mining and quarrying	17,921	0	28,281	46,202
Manufacture of food products, beverages and tobacco	39,519	9,600	196,892	246,011
Manufacture of textiles; wearing apparel; dressing and dyeing of fur and related Activities	36,127	4,603	66,538	107,268
Manufacturing of wood and products of wood and; paper and paper products	2,295	2,324	2,479	7,098
Manufacture of rubber and plastics products	3,632	2,206	13,010	18,847
Manufacture of basic metals	169	1,309	593	2,071
Manufacture of fabricated metal products; office, accounting and computing machinery, radio, television and other related activities	7,024	2,248	24,766	34,038
Manufacture of motor vehicles, trailers and semi-trailers; other transport equipment	313	0	349	662
Other Manufacturing	37,005	9,294	102,681	148,981
Electricity, gas and water supply	19,051	3,005	50,401	72,457
Construction	156,663	3,819	56,351	216,833
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	107,022	211,723	340,912	659,657
Hotels and restaurants	5,461	1,969	9,158	16,587
Transport services and storage	105,723	-4,576	204,497	305,643
Post and telecommunications	20,409	3,859	18,856	43,124
Financial intermediation and insurance	46,397	9,019	190,777	246,193
Real estate, renting and business services	15,305	784	82,891	98,980
Public administration and defence; compulsory social security	191,482	0	0	191,482
Education	51,903	1,669	6,452	60,023
Health and social work	15,400	4,022	1,499	20,921
Other community, social and personal service activities	10,488	39,576	12,401	62,466
Gross Domestic Product	1,032,762	295,164	1,610,755	2,938,681

Value Added Ratio to the Output -2006



Compensation Of Employees Ratio to the Value Added - 2006



VI. Meeting the Challenges

For Sri Lanka, this is the first experience in generating a Supply and Use table. This exercise provides us many windows and aspects of reviewing the country's GDP estimates.

The table and the figures seem to be reasonable and consistent with the aggregate estimates of National Accounts. Based on the SUT, the aggregate estimates of National Accounts will be more accurate, reliable, and reduce over or under representations.

It also identified the required adjustments and rectifications to be made on the present surveys to satisfy data requirements for SUT compilation.

To overcome these challenges, it was necessary to build a close rapport, and progressive communication with the ADB as well as neighboring countries regarding SUT framework and National Accounts.

VII. The Way Forward

At present, a table named supply and disposition of commodities is presented in our annual publication only for the Agriculture sector. But that table is in preliminary form i.e. only one vector for each component.

SUPPLY and USE TABLE

Matrix Size: 8 x 3

Country: SRI LANKA

Reference Year: 2006

Currency: Mn Sri Lanka Rupees

Supply Table

Industry	Output of Industries			Domestic Output (DO)	Import of Goods and Services (M)	Total Supply at Basic Prices	Valuation			Total Supply at Purchaser's prices
	AFF	Industry	Services				TTM	Tax on products - Subsidies (T-S)	Total	
Products										
Agriculture, hunting, forestry and fishing	471,885			471,885	57,671	529,556	211,190	-4,287	206,903	736,459
Industry		1,967,342		1,967,342	994,751	2,962,093	747,053	243,007	990,060	3,952,154
Mining		56,740		56,740	126,517	183,257	35,170	11,517	46,687	229,944
Manufacturing		1,302,111		1,302,111	867,643	2,169,754	694,820	224,433	919,253	3,089,008
Electricity, Gas and Water		127,867		127,867	19	127,886	17,063	3,238	20,301	148,187
Construction		480,624		480,624	572	481,196		3,819	3,819	485,015
Services			2,338,430	2,338,430	141,571	2,480,001	-958,242	56,444	-901,799	1,578,202
Wholesale and Retail Trade			558,416	558,416		558,416	-558,416		-558,416	
Public Administration			337,358	337,358		337,358		-470	-470	336,888
Others			1,442,656	1,442,656	141,571	1,584,227	-399,826	56,914	-342,913	1,241,314
CIF/FOB adjustment on Imports										
Direct Purchases Abroad by Residents										
Total	471,885	1,967,342	2,338,430	4,777,657	1,193,994	5,971,651	0	295,164	295,164	6,266,815

Use Table

Industry	Intermediate Consumption of Industries			Total Intermediate Consumption	Final Uses (FU)					Total Use at Purchaser's prices
	AFF	Industry	Services		Household Consumption	Government Consumption	NPISHs	Gross Capital Formation	Export of Goods and Services	
Products										
Agriculture, hunting, forestry and fishing	32,829	150,442	28,132	211,403	417,426		44,352	63,279		736,460
Industry	80,243	839,888	488,339	1,408,470	1,120,760		766,596	656,327		3,952,154
Mining		165,256	1,128	166,384	4,221		12,767	46,572		229,944
Manufacturing	67,813	608,742	417,631	1,094,185	1,050,048		338,104	606,670		3,089,008
Electricity, Gas and Water	9,107	53,432	23,854	86,393	61,737			57		148,187
Construction	3,323	12,459	45,725	61,508	4,755		415,725	3,028		485,015
Services	14,387	114,953	384,927	514,267	435,428	451,439	11,294	165,774		1,578,201
Wholesale and Retail Trade										
Public Administration						336,888				336,888
Others	14,387	114,953	384,927	514,267	435,428	114,551	11,294	165,774		1,241,313
Direct Purchases in Domestic Market by Residents										
Direct Purchases Abroad by Residents										
Total	127,459	1,105,283	901,398	2,134,140	1,973,614	451,439	822,242	885,380		6,266,815

Value Added Components

	AFF	Industry	Services	VA at Basic Prices	VA at Purchaser's Prices
Gross Value Added	344,426	862,059	1,437,032	2,643,517	2,938,681
Compensation of Employees	143,454	319,719	569,589	1,032,762	1,032,762
Other Taxes on Production Minus Subsidies					
Gross Operating Surplus	200,972	542,340	867,443	1,610,755	1,610,755
Tax on products - Subsidies (T-S)					295,164

GDP Derivation by Approach

GDP (P)	=> DO - IC + (T-S)
GDP (E)	=> FU - M
GDP (I)	=> CE + OT + GOS +(T-S)