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Social accounting matrix

Constructing a social accounting matrix: Comparisons across eleven countries

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Constructing a social accounting matrix: Comparisons across eleven countries

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Preface

A social accounting matrix (SAM) is a data system of an economy, which includes both social and economic data. The 1993 System of National Accounts (1993 SNA) defines a SAM as 'the presentation of SNA accounts in a matrix which elaborates the linkages between supply and use tables and institutional sector accounts'.

The aims of this paper are to compare the methods and findings of the 1998 SAM for South Africa with the experiences of other countries in the compilation of their own SAM, in order to establish whether the methodologies used in other countries may be applied in the South African context, and whether Statistics South Africa (Stats SA) has the capacity, data availability and technical skills to apply these methodologies. The main focus of the latest SAM for South Africa (i.e. for the 1998 reference year) was on households and their expenditure patterns. The population was divided into: four population groups using self-perceptions based on the apartheid-based classifications of people in South Africa to understand the contribution that was made by previous disadvantages to the recent situation in the country in 1998, and twelve economic groups using percentiles divisions based on total household expenditure. The most important characteristics and a summary of methodologies used in other countries and recommendations will follow at the end of the paper.

In addition, the paper aims to encourage discussions amongst key role-players to ensure that the next SAM meets the needs of its users using the most possible scientific methods.

Pretoria
February 2005

Abbreviations and symbols used

ABS	Average budget shares
Census '96	1996 population census
CPI	Consumer price index
CPS	Cumulated production structure
CGE	Computable general equilibrium
c.i.f.	Cost of insurance and freight
CSO	Central statistics office
EFS	Expenditure and food survey
EUROSTAT	Statistics Office of the European Community
FES	Family expenditure survey
f.o.b.	Free on board
GAMS	General algebraic modeling system
GDP	Gross domestic product
GFCF	Gross fixed capital formation
GLSS	Ghana living standard survey
GSO	General Statistics Office
HBS	Households budgets survey
HDS	Housing demand survey
IES	Income and expenditure survey
HHMH	Household metropolitan high income
IMF	International Monetary Fund
ISWGNA	Inter-Secretariat Working Group on National Accounts
LCMS	Living conditions monitoring survey
LFS	Labour force survey
LSC	Large scale farmers
MBS	Marginal budget shares
MEMBOT	Macro economic model for Botswana
MERRISA	Macroeconomic reform and regional integration in Southern Africa
MIMIC	Micro macro model to analyse the institutional context
N/a	Not applicable
NAM	National accounting matrix
NPIs	Non-profit institutions
NPISHs	Non-profit institutions serving households
OECD	Organisation for Economic Co-operation and Development
ONS	Office for National Statistics
R	Rand
ROW	Rest of the world
Rub	Roubles
SA	South Africa
SAM	Social accounting matrix
SARB	South African Reserve Bank
SC	Supply column
SEA	Socio-economic accounts
SIC	Standard Industrial Classification of all Economic Activities
SNA	System of National Accounts
SR	Supply row
Stats SA	Statistics South Africa

SU-tables	Supply and use tables
Tsh	Tanzania shillings
UC	Use column
UNSTAT	Statistics division and regional commissions of the United Nations
UK	United Kingdom
UR	Use row
VA	Value added
VLSS	Vietnam living standard survey
ZAMSAM	Zambia social accounting matrix
ZK	Zambia kwacha

Table of contents

List of tables

1. Introduction

A Social Accounting Matrix (SAM) is a data system of an economy that includes both social and economic data. The 1993 System of National Accounts (1993 SNA) defines a SAM as '…the presentation of SNA accounts in a matrix which elaborates the linkages between supply and use tables (SU-tables) and institutional sector accounts'. A SAM illustrates accurately the circular process of demand leading to production, production leading to income, which in turn leads back to demand.

A SAM provides a framework, and consistent data for economy-wide models, for a detailed classification of accounts, based on categories such as industries, working persons and institutional sub-sectors, including various socio-economic household groups.

The presentation of national accounts in a matrix has had a long and distinguished tradition. In the 1993 SNA, the accounting structure was explained on the basis of an illustrative matrix covering the full system. Emphasis was given to the system as a basis for supply and use analysis in an input–output framework. The input–output framework is a widely used matrix framework to provide detailed and coherently arranged information on the flow of goods and services, and on the structure of production costs. Disaggregated linkages between accounts for goods and services, and the production and generation of income, are further developed in the 1993 SNA's SU-tables, through a specification of output regarding categories of goods and services by industry. However, these matrices do not incorporate the interrelations between value-added and final expenditures.

By extending SU-tables to show the entire circular flow of income at a meso-level, one captures an essential feature of a SAM. In many instances, SAMs have been applied to an analysis of interrelationships between structural features of an economy and the distribution of income and expenditure among household groups. On the one hand, SAMs are closely related to national accounts, in that their typical focus is on the role of people in the economy. This is reflected, among other factors, by extra breakdowns of the household sector, and a disaggregated representation of labour markets, for example distinguishing between various categories of employed persons. On the other hand, SAMs usually encompass somewhat less detailed SU-tables. The design and construction method of SAMs is not standardised according to the SNA, in order to give countries the flexibility to design a SAM according to their specific situations.

A SAM incorporates and reconciles, within the same framework, data from various sources such as the SU-tables, integrated economic accounts, balance of payment accounts, households surveys, balance sheets of various companies, the population census, etc. A given society can be described through a SAM at various levels including global, multi-country, single-country, regional or sub-regional level, depending on analytical needs.

1.1 The South African SAM: 1998

Statistics South Africa (Stats SA) compiled a SAM for the reference year 1998 according to the 1993 SNA. Prior to that period, Stats SA compiled a SAM for 1988 according to the 1968 SNA. The main focus of the 1998 SAM was on households. Their consumption expenditure was broken down into four population (i.e. black African, coloured, Indian or Asian and white) and 12 expenditure groups. The classification of the four population groups was based on self-perception, and they place the SAM within the context of previous disadvantages on the apartheid era. The classification by 12 expenditure groups is based on a percentile analysis by household surveys.

The basic features of the South African SAM are as follows:

- The South African input–output framework is chiefly concerned with the description of the interdependence of industries that are reflected in their transactional interrelationships. The SAM, on the other hand, describes the interdependence between a wider spectrum of economic sectors and industries as well as wider variety of information about employment, capital, households, population groups and regional economies. Thus the purpose of a SAM is to quantify the circular flow of economic activity as widely as possible. An input–output framework focuses on the different production activities of the economy. By contrast, a SAM emphasises the activities of households and producers at a national level as well as at urban and rural levels. One of the strengths of a SAM is its detailed coverage of, inter alia, the accounts of the household sector.
- A SAM divides the household sector into meaningful sub-groups so that the significance of each of them becomes apparent. A SAM is also useful as a means of demonstrating the economic welfare of the various population groups in South Africa, and of enabling the analysis of such welfare.
- A SAM framework provides a considerable amount of information about income distribution in South Africa, thus supplementing the conventional national accounting system.
- A SAM can only be compiled at fairly long intervals, owing to the volume of work involved in its compilation, and the unavailability of regular SAM tables means that it cannot be used to draw comparisons with conditions prevailing at other times.

1.1.1 Main data sources

A SAM reflects the economic relationships between the sectors of the economy by identifying monetary transactions (expenditure and receipts) between them. It also provides a consistent framework for the study of economic as well as demographic and social variables.

The main data sources for the 1998 SAM were the 1998 integrated economic accounts from the South Africa Reserve Bank (SARB), the 1996 population census (Census '96), the 1998 supply and use tables and the 1995 income and expenditure survey (IES), all from Stats SA and published and unpublished data from SARB.

1.1.1.1 Integrated economic accounts[1]

The integrated economic accounts are at the centre of the accounting framework, and contain three groups of accounts, namely:

- Transaction accounts with the goods and services account being particularly important
- A full sequence of accounts for institutional sectors and the total economy, which are divided into current accounts, accumulation accounts and balance sheets
- A full sequence of accounts for the rest of the world, which are divided into current accounts, accumulation accounts and balance sheets.

Taken together, the full sequence of accounts of institutional sectors, the rest of the world accounts and the goods and services account give a comprehensive picture of the whole economy.

A transaction account brings together all transactions of the same type in what is known as a dummy account. For example, the transaction account for interest shows, on the debit (left) side, the interest receivable by the different institutional sectors and the rest of the world, and, on the credit (right) side, interest payable by the same sectors and the rest of the world.

Current accounts record production of goods and services, generation of income by production, the subsequent distribution and redistribution of income among institutional units, and the use of income for the purpose of consumption or saving. The right side of these accounts shows resources, while the left side shows the use of resources.

Accumulation accounts show changes in assets, liabilities and net worth that occur as a result of:

- Transactions–interactions between institutional units by mutual agreement
- Other changes in the volume of assets and liabilities, e.g. discovery and depletion of subsoil assets, destruction of assets by natural disaster or war
- Change in prices.

These accounts show changes in assets on the left and changes in liabilities and net worth on the right.

Balance sheets show the values of the stock of assets and liabilities held by institutional units or sectors at the beginning and end of an accounting period. These accounts show assets (e.g. equipment, bank deposits, loans held by creditors) on the left and liabilities (e.g. loans outstanding for debtors) and net worth on the right.

1.1.1.2 1996 population census

The 1996 population census (Census '96) applied a uniform method for the collection of enormous mass of information. Households were visited and details obtained about all its members from representative, who were either interviewed or filled in the questionnaire in the language of their choice. There were 40,6 million people in South Africa in 1996 according to Census '96. The census divided the people of the country into four population groups: black African, white, Indian or Asian and coloured people. The black African population constituted 77% of the South African population, followed by whites (11%) and coloured (9%); Indians and Asians constituted the smallest proportion group with 3%.

[1] Compiled by the South African Reserve Bank

1.1.1.3 Supply and use tables

The structure of the supply and use tables is explained by means of an aggregated set of tables. In order to simplify references to these SU-tables, the columns of the supply table (see Table 1) are labelled SC (supply column) and the rows SR (supply row), while the columns of the use tables (see Table 2) are labelled UC (use column) and the rows UR (use row). The intersection of a row and a column is denoted by a colon separating the two applicable numbers, e.g. SC1:SR1.

The supply table shows the origin of the resources of goods and services, depicting products in rows (SR) and industries in columns (SC). In the columns, information is shown on the output of each industry according to an industrial classification (SIC[2]), imports, taxes less subsidies on products and trade and transport. In the rows, the various types of products are presented according to a product classification[3]. An additional row is added for the adjustment of direct purchases by South African residents abroad.

The use table shows uses of goods and services and gives information on the cost structure of the various industries. In the rows, the various types of products are presented according to the product classification. Additional rows are added for the adjustment of direct purchases by South African residents abroad and direct purchases in the domestic market by non South African residents. The table is divided into three sections, each with its own characteristics.

The first section shows the goods and services used as intermediate consumption, at purchasers price, by industry in columns and by product in rows (UR1-UR5). The second section shows the components of final demand (column UC9), namely exports, household consumption expenditure, general government consumption expenditure, fixed capital formation, changes in inventories and the residual item at purchaser's price. The third section elaborates on the production costs of producers other than intermediate consumption expenditure (column UC2-UC7 and row UR7), namely compensation of employees, taxes less subsidies on production and imports, consumption of fixed capital and net operating surplus/mixed-income.

1.1.1.4 Income and expenditure survey

The income and expenditure survey (IES) determines the average expenditure patterns of households in different areas of the country. This survey forms the basis for the determination of the 'basket' of consumer goods and services used for the calculation of the consumer price index (CPI).

The IES is a five-yearly household survey. It measures the detailed income and expenditure of households. The previous survey was conducted through interviews with household heads or responsible adults and the enumerator completed the questionnaire during this interview. It covered a sample of 30 000 households, of which 29 595 co-operated, 16 903 in urban areas and 12 692 in non-urban areas.

The questionnaire covered income from all sources by all members of the household. Income was divided into two categories, namely regular and other income. Regular income is a form

[2] SIC: Standard Industrial Classification of all Economic Activities (Fifth Edition)
[3] A product classification, which is closely related to the SIC, was developed for South Africa

of income which is depended on for the redemption of current expenditure. It includes salaries and wages, profit from own business, pension and interest. Other income includes sales and trade-ins of possessions, fringe benefits received from the employers, lump sum such as retirement gratuities, insurance policies paid out and gifts received.

Expenditure in the IES questionnaire was defined as purchases during the survey period. Expenditure incurred on food, housing and transport while on holiday is shown with other holiday spending. Respondents were requested to exclude expenditure incurred in carrying out their occupations.

Table 1: Framework of the supply of products at basic prices: 1998 (R million)

	Column no.	SC1	SC2	SC3	SC4	SC5	SC6	SC7	SC8	SC9	SC10
		(SC2+SC3+ SC4)			(SC8+ SC9+ SC10)	Output of industries			(SC5+ SC6+ SC7)		
Row no.	Supply of products	Total supply at purchasers' prices	Taxes less subsidies on products	Trade and transport margins	Total supply at basic prices	Primary industry	Secondary industry	Tertiary industry	Total industry	Imports	[4]c.i.f./ f.o.b. adjustment on imports
SR1	**Primary products**	**148 364**	841	7 229	**140 294**	123 550	109		**123 659**	16 635	
SR2	**Secondary products**	**826 089**	53 786	122 433	**649 870**	3 345	506 495		**509 840**	140 030	
SR3	**Tertiary products**	**605 250**	10 423	(129 662)	**724 489**	231	26 318	685 505	**712 054**	21 409	(8 974)
SR4	**c.i.f./f.o.b. adjustment on imports**	–			–					(8 974)	8 974
SR5	**Direct purchases by residents**	**12 532**			**12 532**					12 532	
SR6	**Total output at basic prices**	**1 592 235**	**65 050**	–	**1 527 185**	**127 126**	**532 922**	**685 505**	**1 345 553**	**181 632**	–

Source: Stats SA, Report No. 04-03-02 (1998)

c.i.f: cost of insurance and freight
f.o.b: free on board.

Table 2: Framework of the use of products at purchasers' prices: 1998 (R million)

	Column no.	UC1	UC2	UC3	UC4	UC5	UC6	UC7	UC8	UC9
		(UC7+UC9)			Intermediate consumption by industry			(UC4+ UC5+ UC6)	(UC2+ UC3+ UC7)	
Row no.	Supply of products	Total supply at purchasers' prices	Taxes on products	Subsidies on products	Primary industry	Secondary industry	Tertiary industry	Total industry	Total economy	Components of final demand
UR1	**Primary products**	**148 364**			2 703	63 088	1 440	**67 231**		81 133
UR2	**Secondary products**	**826 089**			35 211	222 157	101 156	**358 524**		467 565
UR3	**Tertiary products**	**605 250**			21 486	74 441	149 417	**245 344**		359 906
UR4	**Direct purchases residents**	**12 532**								12 532
UR5	**Direct purchases non-residents**	–								–
UR6	**Total uses at purchasers' prices**	**1 592 235**			**59 400**	**359 686**	**252 013**	**671 099**		**921 136**
UR7	**Gross value added/ GDP**		70 669	(5 619)	67 726	173 236	433 492	**674 454**	**739 504**	
UR8	**Total output at basic prices**				**127 126**	**532 922**	**685 505**	**1 345 553**		

Source: Stats SA, Report No. 04-03-02 (1998)

1.1.2 National accounting matrix

A national accounting matrix (NAM) can be elaborated by expanding the individual cells to show how the kinds of transactions between the different economic subjects involved in each cell will vary according to the nature of the account. A detailed NAM can be turned into a SAM by further expanding the cells, by introducing more detailed classifications.

A NAM shows how the SU-tables, the distribution and use of income accounts, the accumulation accounts and the rest of the world accounts, initially presented in the form of a simple accounting framework, can be presented in matrix form. Each account is presented by row and column.

There are ten descriptions of individual accounts in the aggregate NAM, namely:

- Goods and services account (Account 0)
- Production account (Account I)
- Generation of income account (Account II.1.1)
- Allocation of primary income account (Account II.1.2)
- Secondary distribution of income account (Account II.2)
- Use of disposable income account (Account II. 4)
- Capital account (Account III.1)
- Financial account (Account III.2)
- Current transaction of ROW (Account V.II)
- Capital transactions of ROW (Account V.III.1).

The names of the accounts appear in the column and row headings. The number of the various accounts is shown alongside their names.

A SAM is built within the basic framework of a NAM, with each entry of the NAM expanded into a sub-matrix whose rows and columns identify groups of transactors or categories of transactors. By using the entries of the NAM as control totals, the expansion provides a coherent set of sub-matrices where the accounting of the transactors or transaction is shown. A NAM and a SAM elaborate on the linkages between SU-tables and institutional sector accounts.

Table 3: The South African national accounting matrix: 1998 (R million)

Integrated Economic Account (classification)	Code	0. Goods and services (products) 1	I. Production (industries) 2	II.1.1. Generation of income (race and occupations) 3	II.1.2. Allocation of primary income (institutional sectors) 4	II.2. Secondary distribution of income (institutional sectors) 5	II.4. Use of disposable income (race and percentiles) 6	III.1. Capital 7	III.1. Capital 8	III.2. Financial (financial intermediaries) 9	V. Rest of the world: II. Current 10	V. Rest of the world: III.1. Capital 11	Residual 12	TOTAL
0. Goods and services (products)	1	Trade and transport margins 0	Use/ Intermediate consumption 671 101				Final consumption expenditure 607 082	Changes in inventories 1/ -2 634	Gross fixed capital formation 125 876		Exports of goods and services 190 189		622	1 592 238
I. Production (industries)	2	Supply/ Output 1 345 556												1 345 556
II.1.1 Generation of income (race and occupation)	3		*Domestic net value added,* at basic prices 577 868								Compensation of employees from ROW 503			578 371
II.1.2 Allocation of primary income (institutional sectors)	4	Taxes less subsidies on products 65 050		*Net generated income,* at basic prices 576 072	Property income: resident sector 365 643						Property income from ROW ROW 6 690			1 013 455
II.2 Secondary distribution of income (institutional sectors)	5				*Net national income* 625 587	Current transfers: resident sector 331 589					Current transfers from ROW 334		-622	956 888
II.4 Use of disposable income race and percentile)	6					*Net disposable income* 620 872	Adj. for change in net equity hh. on resident pension funds 27 228				Adj. for change in net equity of hh. on pension funds from ROW 0			648 100
III.1 Capital	7						*Net saving* 13 790	Capital transfers 2/ 0		Borrowing 334 315		Capital transfers from ROW 2/ 134		348 237
	8		Consumption of fixed capital 96 587					Net fixed capital formation 29 289						125 876
III.2 Financial (financial intermediaries)	9							Lending 321 139				*Net lending* of ROW 13 174		334 315
V.II Rest of the world, current	10	Imports of goods and services 181 632		Compensation of employees to ROW 2 299	Property income to ROW 22 225	Current transfers: to ROW 4 427	Adj. for change in net equity of hh. on pension funds to ROW 0							210 583
V.III.1 Rest of the world, capital	11							Capital transfers to ROW 2/ 443			*Current external balance* 12 867			13 308
TOTAL	12	1 592 238	1 345 556	578 371	1 013 455	956 888	648 100	348 237	125 876	334 315	210 583	13 308	0	

1/ Including acquisition less disposals of valuables.

2/ Including acquisitions less disposals of non-produced non-financial assets.

1.2 Comparison of 1988 and 1998 SAM in South Africa

Table 4 outlines the characteristics of the 1988 and 1998 SAMs. The characteristics are compared in respect of the methodology and classification systems used as well as the level of detail available for various variables.

Table 4: Comparison of the most important characteristics of the 1988 and 1998 SAMs

1988 SAM	1998 SAM
Compiled according to the 1968 SNA	Compiled according to the 1993 SNA
Compiled according to the Standard Industrial Classification of all Economic Activities (Fourth Edition)	Compiled according to the Standard Industrial Classification of all Economic Activities (Fifth Edition)
Emphasis on income distribution	Emphasis on income distribution
23 Industries Agriculture, hunting, forestry and fishing Coal mining Gold mining Other mining activities Manufacturing of food, beverages and tobacco products Manufacturing of textiles, clothing and leather products Manufacturing of wood and wood products, including furniture Manufacturing of paper and paper products, printing and publishing Manufacturing of chemicals and chemical products Manufacturing of non-metallic mineral products Basic metal industries Manufacturing of metal products, machinery and transport equipment Other manufacturing industries Electricity, gas and water Building construction Civil engineering and other construction Wholesale and retail trade Catering and accommodation services Transport and storage Communication Financing, insurance, real estate and business services Community, social and personal services Other	27 Industries Agriculture, hunting, forestry and fishing Mining of coal and lignite Mining of gold and uranium ore Other mining activities Manufacturing of food products, beverages and tobacco products Manufacturing of textiles, clothing and leather products (except footwear) Manufacturing of footwear Manufacturing of petroleum, chemical, rubber and plastic products Manufacturing of other non-metallic mineral products Manufacturing of metal products, machinery and office equipment Manufacturing of electrical machinery and apparatus Manufacturing of radio, television and communication equipment Manufacturing of transport equipment Manufacturing of wood and wood products, including furniture, articles of straw and plaiting materials, paper and paper products, publishing, printing and reproduction of recorded media and recycling Electricity, gas, steam and hot water Collection, purification and distribution of water Construction Wholesale and retail trade Hotels and restaurants Transport and storage Post and telecommunications Financial intermediation and insurance Real estate activities Business services General government Health and social work Other community, social and personal services

Table 4: Comparison of the most important characteristics of the 1988 and 1998 SAMs (continued)

1988 SAM	1998 SAM
Quintiles calculated on annual household per capita income	Quintiles calculated on total annual household expenditure
Different cut-off points were used for each quintile in each population group, namely: All population groups Q1 R1 – R375 Q2 R376 – R912 Q3 R913 – R1 962 Q4 R1 963 – R5 192 Q51 R5 193 – R10 528 Q52 R10 529 + White Q1 R1 – R5 594 Q2 R5 595 – R9 441 Q3 R9 442 – R14 028 Q4 R14 029 – R21 272 Q51 R21 273 – R31 650 Q52 R31 651 + Coloured Q1 R1 – R733 Q2 R734 – R1 388 Q3 R1 389 – R2 319 Q4 R2 320 – R4 323 Q51 R4 324 – R6 730 Q52 R6 731 + Asian Q1 R1 – R1 594 Q2 R1 595 – R2 805 Q3 R2 806 – R4 406 Q4 R4 407 – R7 511 Q51 R7 512 – R10 719 Q52 R10 720 + Black Q1 R1 – R286 Q2 R287 – R631 Q3 R632 – R1 225 Q4 R1 226 – R2 607 Q51 R2 608 – R4 462 Q52 R4 463 +	The same cut-off points were used for percentiles in all the population groups, namely: All population groups P1 R1 – R540 P2 R541 – R5 700 P3 R5 701 – R8 496 P4 R8 497 – R10 716 P5 R10 717 – R12 996 P6 R12 997 – R15 828 P7 R15 829 – R19 992 P8 R19 993 – R26 556 P9 R26 557 – R37 884 P10 R37 885 – R57 816 P11 R57 817 – R75 840 P12 R75 841 +
6 Quintiles (calculated on household per capita income) Q1 0-20% of the population Q2 21-40% of the population Q3 41-60% of the population Q4 61-80% of the population Q51 81-90% of the population Q52 91-100% of the population	12 Percentiles (calculated on total household expenditure) P1 0 – 5% of the population P2 6 – 10% of the population P3 11 – 20% of the population P4 21 – 30% of the population P5 31 – 40% of the population P6 41 – 50% of the population P7 51 – 60% of the population P8 61 – 70% of the population P9 71 – 80% of the population P10 81 – 90% of the population P11 91 – 95% of the population P12 96 – 100% of the population

Table 4: Comparison of the most important characteristics of the 1988 and 1998 SAMs (concluded)

1988 SAM	1998 SAM
Four population groups White Coloured Asian Black	Four population groups White Coloured Indian or Asian Black African
Gender dimension not included explicitly	Gender dimension included in external matrix
Rural/urban dimension not included	Rural/urban dimension included in external matrix
Skill levels not included	Four skill levels (linked to occupational group) included Legislators, senior officials and managers (4) Professionals (4) Technicians and associate professionals (3) Clerks (2) Service workers and shop and market sales workers (2) Skilled agricultural and fishery workers (2) Craft and related trade workers (2) Plant and machine operators and assemblers (2) Elementary occupations (excluding domestic) (1) Domestic worker (1) Occupation unspecified (1)

Source: Stats SA, Report No. 04-03-02 (1998)

1.3 Advantages of using a SAM

There are many advantages of compiling a SAM, some of which are outlined below:

- SAMs link traditional macro-economic indicators such as the GDP to indicators of socio-economic concern, e.g. unemployment and income distribution, in an overall framework that enables the balancing of data from various data sources.
- An aggregated SAM offers a bird's eye view of the economy, as it integrates data of supply and use tables and sector accounts in a single table. Moreover, its matrix format enables the use of matrix algebra in economic analysis.
- A SAM, in enabling multiple factoring and multiple sectoring, offers a flexible framework for the description of the economic process.
- A SAM enhances the reliability of statistical data by balancing data from a great variety of sources at a relatively low level of aggregation.
- A SAM contributes towards increased relevance, reliability and efficiency in national accounts. A SAM highlights the relevance of economic and social indicators because they are derived from meso-level information system. Reliability is enhanced through more data being confronted at a meso-level so that more logical identities can be checked components add to totals, accounts balance, and price and quantities multiply to values. Efficiency is served by the application of uniform units, classifications and concepts throughout a statistical system.
- A SAM pinpoints gaps in the available datasets and discrepancies in the survey concepts. In a situation where basic information and other statistical resources are scarce, it becomes more important to make the best possible use of whatever data available. Integrating outcomes of all kinds of costly censuses and surveys into a consistent overall framework may increase both their relevance and their reliability. This applies particularly to household surveys and population censuses. Generally, carefully acquired consistency at the meso-level leads to a higher degree of accuracy at the macro level. Naturally, if there are too many gaps in the basic data, the reliability of the SAM remains dubious. In this

way, building a SAM will also pinpoint gaps in the available datasets and discrepancies in the survey concepts. This should then have a streamlining feedback effect on both economic and social basic statistics.

- A SAM serves as a benchmark dataset. As the processing of censuses and surveys is time-consuming, and as the construction of a detailed SAM also tends to involve a substantial input of human resources, SAMs for South Africa have generally become available with a lag of several years. If SAMs are built for those years for which main surveys or censuses are held they can serve as benchmark datasets, updated yearly or even quarterly, with the help of relevant indicators, to obtain the necessary timeliness without giving up too much in terms of reliability. A matrix framework is especially suitable in this regard in view of the availability of various updating and reconciliation algorithms that apply matrix algebra.
- Policy issues can be monitored and related to each other. The integration of more basic data entails the possibility of more policy issues being monitored and analysed interrelatedly. Above all, the linkages of employment and income distribution aspects to more macro-oriented objectives such as GDP growth, balance of payments equilibrium and stable price levels come within reach with a SAM.
- SAMs are suitable for use in a macroeconomics teaching course. In view of their concise and conveniently arranged description of interrelationships between economic processes, their function as a systematic database for the joint derivation of monetary and non-monetary aggregate indicators and their close connection to flexible, economy-wide models of varying degree of complexity, South Africa's SAMs are suitable for use in a macro economics teaching course.
- Modelling: A SAM can be used as a conceptual framework to explore the impact of exogenous changes on such variables as exports, certain categories of government expenditure, and investment of the whole interdependent socio-economic system, for example, the resulting structure of production, factorial and household income distribution. The South African SAM can be used to explore issues related to income distribution because of its finer disaggregation of private household expenditure into relatively homogeneous social-economic categories that are recognisable for policy purposes and exhibit relatively stable characteristics. This type of disaggregation allows the SAM to be used to analyse the effects of government policies on income distribution.
- A SAM will lead to a more reliable description of inequalities among household groups. Since household surveys tend to underestimate not only total incomes or expenditure, but also inequality among households both within and between population groups, a reconciliation of these sources with demographic statistics, SU-tables, wage surveys, profit and loss statements, government accounts, a balance of payments summary and financial data in a SAM will lead to a more reliable description of inequalities among household groups.
- A SAM provides a dependable summary of 'structural' poverty. It is rather hazardous to count the poor in order to measure poverty on the basis of national accounts. On the other hand, a SAM, which contains an elaborate classification of households, may provide a dependable summary of "structural" poverty. It will identify subgroups in which the households are typically poor; show which needs cannot be properly met in these groups, and, above all, allow for analyses concerning the causes and consequences of these circumstances.

2. An overview of the 1993 SNA

The 1993 SNA is the result of a decade-long, resource-intensive process that took place under the auspices of the Inter-Secretariat Working Group on National Accounts (ISWGNA). This group consists of the Statistical Office of the European Community (EUROSTAT), the International Monetary Fund (IMF), the Organisation for Economic Co-operation and Development (OECD), the United Nations Statistical Division (UNSTAT) and regional commissions of the United Nation's Secretariat and the World Bank.

The SNA is a set of international guidelines for the development of a country's economic accounts and for the reporting of such statistics to international organisations in a manner comparable across countries. The 1993 SNA, the most recent version, consists of a coherent, consistent and integrated set of macroeconomic accounts, balance sheets and tables based on a set of internationally agreed concepts, definitions, classifications and accounting rules. It provides a comprehensive accounting framework within which economic data can be compiled and presented in a format designed for the purpose of economic analysis, decision-making and policy-formulation. In addition, the SNA provides for satellite extensions of the basic accounting structure that uses alternative concepts, and incorporates a broader range of social and economic indicators.

The system is built around a sequence of interconnected flow accounts or integrated economic accounts linked to different types of economic activities taking place within a given period of time, together with balance sheets that record the values of the stock of assets and liabilities held by institutional units or sectors at the beginning and end of the period. Each flow account relates to a particular activity such as production or generation, distribution, redistribution or use of income. Each account is balanced by total resources and uses as recorded on the two sides of the account. The balancing item from one account is carried forward as the opening balance in the following account, thereby making the sequence of accounts an articulated whole. There is also a strong link between the flow accounts and the balance sheets, as all the changes occurring over time that affect the assets or liabilities held by institutional units or sectors are systematically recorded in one or another of the flow accounts. The closing balance sheet is fully determined by the opening balance sheet and the transactions or other flows recorded in the sequence of accounts.

2.1 Institutional units and sectors

The 1993 SNA distinguishes between two types of units and two methods of subdividing the economy for different analytical purposes, namely:

- Institutional units and sectors, and
- Establishments and industries.

An institutional unit is an economic entity capable, in its own right, of owning assets, incurring liabilities and engaging in economic transactions with other entities. Either a complete set of accounts, including balance sheets, must exist for an institutional unit, or it must at least be possible, in principle, and meaningful to compile such a set of accounts. The 1993 SNA distinguishes between four main categories of institutional units:

- corporations (including quasi-corporations)
- government units (including social security funds)

- households
- non-profit institutions (NPIs).

The four main categories of institutional units can be grouped into two types with regard to how they are formed. Households, covering the individuals making up the households, constitute one type. The other categories constitute together the other type, namely legal and social entities such as corporations, non-profit institutions and government units.

In order to describe income, expenditure, financial flows and balance sheets, institutional units are grouped into sectors on the basis of their principal functions, behaviour and objectives. There are five main institutional sectors:

- non-financial corporations
- financial corporations
- general government, including social security funds
- households
- non-profit institutions serving households (NPISHs).

Table 5 gives a cross-classification of institutional units by category and sector.

Table 5: Institutional units cross-classified by category and sector

Sector / Category	Non-financial corporations sector	Financial corporations sector	General government sector	Household sector	NPI serving household sector
Corporations	Non-financial corporations	Financial corporations			
Government units			Government units		
Households				Households	
Non-profit institutions	Non-financial market NPIs	Financial market NPIs	Non-market NPIs controlled and financed by government		Non-market NPIs serving households

Source: 1993 system of nation accounts

2.2 Establishments and industries

An institutional unit (an enterprise) such as a corporation may be engaged in different kinds of production activities in different locations, producing various kinds of goods and services. For the purpose of analysing production in detail, it is necessary to use a more homogenous unit than the enterprise. This smaller unit is the establishment, defined as an enterprise or part of an enterprise, which is situated in one location and engaged in one main type of productive activity. The principal activity must generate the major part of the value added of an establishment. The output of the principal activity consists of principal products and must be suitable for delivery to other units.

An establishment can also be engaged in secondary activities, which generate a minor part of its value added. The output of secondary activities consists of secondary products that, like principal products, must be suitable for delivery to other units.

Finally, establishments are also engaged in ancillary activities. The output of such activities is not intended for use outside the enterprise. They are supporting activities, e.g. keeping records, purchasing materials and equipment, cleaning and maintaining buildings and premises and promoting sales.

An enterprise may contain one or more establishments. On the other hand, an establishment can belong to only one enterprise. Establishments are units that provide data for the detailed analysis of production and production processes. They are distinct from institutional units – except in cases where an enterprise has only one establishment – in that they cannot in their own right own assets, incur liabilities or engage in economic transactions with other entities. Furthermore, it is not possible to compile a complete set of accounts including balance sheets for an establishment. The only data that can be meaningfully compiled for an establishment are:

- Those items that include the production and generation of income
- Gross fixed capital formation and changes in inventories
- Stock of fixed capital and land
- Number and types of employees and hours worked.

3. Construction of a social accounting matrix in industrialised countries

The construction of a SAM differs from one country to another, depending on the purpose for which it is constructed. This section describes the experience of two industrialised in the construction of a SAM.

3.1 Construction of a SAM for the United Kingdom: 1993

The United Kingdom (UK) SAM links together the macro-statistics of national accounts with the micro-statistics of the labour market and households to show the interrelationships between economics and statistics. The UK has a long history of producing SAMs. An official SAM was produced by the Office for National Statistics (ONS) in 1996 for the 1993 reference year. This SAM was compiled in accordance with the recommendations of the 1993 SNA.

A SAM and the compilation of national accounts are built on the same framework. Although the presentation of national accounts is normally done through a simple accounting framework and that of a SAM in a matrix form, the concepts, classifications and accounts are the same. ONS produces supply and use tables annually as part of national accounts. These tables represent the goods and services account and the production account in a matrix form. The matrix representation records supplies of different kinds of goods and services from domestic industries and imports, and how they are allocated between various intermediate or final uses, including exports. Supply and use tables can be used as a framework for reconciling and balancing the various expenditure, income and production estimates assembled for the accounts, including the determination of the level of the GDP.

The sequence of sector accounts describes the economic process as follows:

- Generation of income
- Allocation of primary income account
- Secondary distribution of income account
- Redistribution of income-in-kind account
- Use of income account
- Use of disposable income account
- Use of adjusted disposable income account
- Capital account
- Financial account
- Other changes in assets account.

Traditionally, the sequence starts with the goods and services account, but may be started anywhere in the process of compiling the accounts. One of the advantages of a SAM is that its presentation clearly illustrates how this economic process is embedded in the SNA.

A second advantage of a SAM is its social breakdown. A large number of economic interactions occur within the household sector. National accounts cannot show these, since they treat the household sector as one group. The UK SAM breaks the cells involving ‘returns for labour’ and the household sector into smaller groups to show the effect of the differential behaviour of these groups.

The UK SAM is labour-oriented, that is, labour input is broken down by education and gender and household sectors main source of income. It is possible to construct labour accounts using micro data from the labour market, which show the supply and demand for labour in one balanced framework. National accounts already contain some labour market information. A labour–oriented SAM provides the framework to confront the national accounts labour market information with the labour accounts, thus fostering greater integration between the two.

Although SAMs have some advantage over the traditional presentation of national accounts for cross-sectional data, they do not lend themselves to easily presented time series.

3.1.1 Main data sources

The construction of the UK SAM was done by using a top-down approach in two stages. The first step was to create a national accounting matrix (NAM) by representing the traditional UK national accounts in a matrix form. The second stage disaggregated certain cells of the matrix, using household surveys and expanding the NAM to a full SAM.

In the UK, non-profit institutions serving households (NPISHs) transactions are published in combination with those of the household sector, as is the case in South African SAM. This decision, which is in accordance with the National Statistics Code of practice and its associated quality requirements, reflects the lack of data currently available to accurately distinguish between the two sectors. However, some provisional information is available for certain parts of the NPISH and household accounts. It is this provisional data that has informed the process of separation of the NPISH flows from the published account for this exercise, thereby resulting in a separate household sector, upon which framework the first version of the UK SAM is dependent.

Users need to be aware that the bases of these estimates are weak and should be regarded as experimental and used with caution. ONS is working on producing improved estimates for NPISH for the national accounts, but it will be a few years before these are ready for inclusion in national statistics.

To extend the NAM to a SAM requires further breakdown of individuals into their occupational category and household groups classified by their main source of income. The main data sources used to provide the further breakdown are the labour force survey (LFS) and the family expenditure survey (FES), now the expenditure and food survey (EFS). The LFS provides information on age, educational qualifications, industries, earnings and number of hours worked by employees, including the self-employed. The EFS, which is the UK household budget survey, provides information on other sources of income such as self-employment and investment income, transfer and expenditure.

When the national accounts are presented in the form of a simple accounting framework in the SNA, they show both resources and uses by the type of transaction and the actors involved at a fairly high level of aggregation. The NAM shows rather more than the amount paid by one sector to another. In other words we need to know not only how much interest is received by or paid out by the sector, but also the sources or receipts thereof.

There are three redistribution accounts (property income, current transfers and capital transfer) with cells in each. There is a cell on the diagonal, for example Cell 4,4 in Table 6 gives the property income payments to and from UK residents only. Two other cells complement this diagonal cell. Cells 4,10 and 10,4 display the property income payments to and receipts from the rest of the world.

Table 6: UK aggregated national accounts matrix: 1993

Account		Goods & services	Production	Generation of income	Allocation of primary income	Secondary distribution	Use of disposable income	Capital	GFCF[5]	Financial	ROW current[6]	ROW capital	Stats adjust	Total
	Classifica-tion	Products	Industries	Primary input categories	Institutio-nal sectors	Institutio-nal sectors	Institutional sectors	Institutional sectors	Industries	Financial assets				
Goods & Services	**Products**	Trade & transport margin 0	Intermediate consumption 775 797				Final consumption expenditure 638 964	Change in inventories 1 613	Gross fixed capital formation 125 762		Exports of goods & services 223 091			1 765 227
Production	**Industries**	Output 1455 417												1 455 417
Generation of income	**Primary input categories**										Compen-sation of employees from ROW 911			590 892
Allocation of primary income	**Institution al sectors**	Taxes less subsidies on product 78 123		Property income 269 643							Property income & taxes-subsidies on production from ROW 91 621			1 029 461
Secondary distribution	**Institution al sectors**					Current transfer 512 537					Current transfer from ROW 16 069			1 198 461

[5] GFCF: Gross Fixed Capital formation
[6] ROW: Rest of the world

Table 6: UK aggregated national accounts matrix: 1993 (continued)

Account	Classification	Goods & Service	Production	Generation of income	Allocation of primary income	Secondary distribution	Use of disposable income	Capital	GFCF	Financial	ROW current	ROW capital	Stats adjust	Total
Use of disposable income	**Institutional sectors**						Adj for the change in net equity of household on pension funds reserve 14 824				Adj for the change in net equity of household on pension funds reserve from ROW 0			**682 813**
Capital	**Institutional sectors**							Capital transfer 14 693		Net incurrence of liability 550 187		Capital transfer from ROW 1 367	2 458	**568 705**
Gross fixed capital formation	**Industries**		Consumption of fixed capital 89 639					Net fixed capital formation 36 123						**125 762**
Financial	**Financial assets**							Net acquisition of financial assets 544 672				Net lending of the ROW 5 515		**550 187**

Table 6: UK aggregated national accounts matrix: 1993 (concluded)

Account	Classification	Goods & services	Production	Generation of income	Allocation of primary income	Secondary distribution	Use of disposable income	Capital	GFCF	Financial	ROW current	ROW capital	Stats adjust	Total
ROW current		Imports of goods & services 231 687		Compensation of employees to the ROW 818	Property income & taxes subsidies on production to the ROW 89 927	Current transfer to ROW 17 971	Adj for the change in net equity of household on pension funds reserve to the ROW -2							**340 401**
ROW capital								Capital transfer to the ROW 631			Current external balance 8 709		-2 458	**6 882**
Total		**1 765 227**	**1 455 417**	**590 892**	**1 029 461**	**1 198 497**	**682 813**	**597 732**	**125 732**	**550 187**	**340 401**	**6 882**		

Source: Office of National Statistics of United Kingdom

3.1.2 National accounting matrix

Going from NAM to SAM involves disaggregating certain cells (see Table 6). These cells are (3,2), (4,3), (4,4), (4,10), (10,4), (5,5), (5,10), (10,5), (1,6), (6,6) and (7,6). Since the UK SAM is labour oriented, in cell (3,2) individuals are categorised according to their gender and educational level. Households were categorised according to their main source of income in the rest of the cells listed.

The labour input is classified by sex and educational level of individuals who supply their labour status. There are three educational levels: lower, middle and higher. The labour force survey collected all the information about employment status, industries, educational level and earnings for employees necessary to provide this disaggregation.

In the pilot SAM, households are classified according to four income groups: wages and salaries, mixed income (including property income), old age related income, and other transfer income. This disaggregation is provided by the family expenditure survey (FES), which collects details of income and source of income for each adult household member.

Wages and salaries income consists of wages and salaries and income-in-kind (e.g. company cars). Mixed income (including property income) consists of imputed rentals, self-employment and investment income. Income related to old age is defined as occupational pensions and those benefits related to old age. Other transfer income comprises the remaining benefits and other income such as inter-household transfer through alimony and child maintenance payments.

3.1.3 Comparisons with the South African SAM

3.1.3.1 Differences

- The United Kingdom SAM is labour-oriented, whereas South African SAM focuses mainly on household groups.
- The United Kingdom data sources are the labour force survey, family expenditure survey, expenditure food survey, supply and use tables, while South African data sources are population census, supply and use tables, income and expenditure survey and integrated economic accounts.
- The UK population is divided into four household groups and further disaggregated into four main income sources, while the South African population is divided into four population groups and twelve expenditure groups.
- The UK SAM consists of four household groups, three income groups, three educational levels and four sectors, whereas the South African SAM consists of four population groups, 12 expenditure groups, 11 occupational groups, four skill levels, 27 products and 27 industries.
- The UK constructed a SAM with labour accounts, while South Africa is currently busy with the feasibility study of extending the development of a SAM through this approach.

3.1.3.2 Similarities

- Both United Kingdom and South Africa compile their SAMs according to the 1993 SNA.
- Although there are five institutional sectors according to the 1993 SNA (see Table 5), both South Africa and United Kingdom, combine households and non-profit institutions serving the household sector due to lack of data to provide an accurate distinction between the two sectors.
- Both the UK and South Africa constructed national accounting matrix (total aggregated economy matrix).
- Both countries used SAMs to understand contribution of the household sector to economy.

3.2 Construction of a SAM for Netherlands: 1994

Statistics Netherlands constructed a SAM for the reference year 1994, in an attempt to balance data from the national accounts, the labour accounts and the socio-economic accounts. This SAM was constructed according to the 1993 SNA.

3.2.1 Main data source

The main data source for the 1994 SAM was the national accounting matrix from Statistics Netherlands. The supply and use tables were used to construct the cumulated production structure matrix (CPS). Population is divided into household type and educational level, and labour market position is based on the labour force survey, the labour accounts and national accounts.

Table 7: Data sources for the 1994 SAM

Data block	Data sources
Cumulated production structure matrix	National accounts (SU-tables)
Households and labour markets	LFS, labour and national accounts
Income distribution	Socio-economic accounts
Institutional data	Internal CPS sources
National accounting matrix	National accounts

3.2.1.1 Households and the labour market

The micro model to analyse the institutional context (MIMIC) distinguishes between 40 types of households (this is the model Netherlands used to analysis their SAM). These households add up to the total population. For the household model, a dataset for the population aged 15 years and older is constructed (subdivided) by gender, educational level, labour market position and type of household. Households are divided into five groups, couples, single parents, single persons (persons without children), pensioners (persons aged 55 to 65 years) and students. Couples consist of the breadwinner (i.e. the individual with the higher personal income) and a partner (with the lower personal income). They are subdivided into families with children and families without children. Individuals within each household may differ with respect to their skill level and job status, i.e. having a job or receiving some kind of social benefit.

Household behaviour in each household type is derived from the maximisation of a utility function, subject to a time and budget constraint. This procedure results in an optimal allocation of time devoted to paid work in the formal and informal sectors, housekeeping, schooling and training and leisure. The allocation of time determines the total income per household type. Labour intensive services can be bought on the formal and black markets; the split depends on relative prices. The price of black consumer goods follows from an equilibrium condition on the black labour market.

The labour market position is divided into five groups: the employed and those receiving a disability and unemployment assistance benefits. Those who receive a disability benefit and other non-participants include people in early retirement schemes, students and aged persons. For the employed, Statistics Netherlands further distinguishes between the number of hours worked. These data were used to calculate the participation rates per option of labour supply (i.e. small jobs, part-time jobs, large part-time jobs and overwork jobs).

The 1993 labour force survey was used as a primary data source for the 1994 SAM. The system file of this micro dataset contains weights that can be used to aggregate the results of the survey to the macro population. Unlike other micro datasets, e.g. the housing demand survey, using the LFS ensures a close link to the labour market data. Moreover, the aggregation procedure is based on population, which appropriately matches the flow figures of the national accounts. The aggregation procedure results in an initial distribution of the (population) household type by labour market position and gender. Moreover, low and high education levels can be distinguished.

For a number of reasons the preliminary results are, however, not consistent with the labour market data of the labour accounts, national accounts and other official data on, for instance, the number of the disabled population. In order to make data (preliminary results) correspond to other official data on the number of people per labour market position, Statistics Netherlands adjusted the LFS outcome to the required macro outcome, leaving the distribution by household type, gender and education level unchanged.

These adjustments resulted in a consistent dataset that roughly matches the available data. However, the appropriate data input format for MIMIC necessitates two other adjustments. Firstly, in MIMIC simultaneous labour supply decisions of partners and breadwinners are modelled. As educational levels are related to labour supply decisions, the educational levels of both men and women living in families have to be distinguished. This distinction was introduced using data from the 1993 housing demand survey. According to this survey, 79,9% of all highly educated women living in families without children had highly educated men, compared to 21,1% of those living in families with children.

Finally, in MIMIC breadwinners and partners are distinguished, rather than men and women. The required classification was reached by labelling all men in families as breadwinners, except for women in families contributing more than 50% to household income. In that case women were considered breadwinners.

For employment, Statistics Netherlands used labour accounts and national accounts for 1969 to 1993 as primary data sources. MIMIC defines employed persons as those persons with jobs. However, in the definition adopted by Statistics Netherlands, only people who work at least twelve hours per week or are willing to do so are considered to be part of the labour force.

For MIMIC, employment data should be subdivided by production sector and educational level of the employee. The labour accounts contain data on employment by gender, educational level and industry, both in employed and full-time equivalents. Both the level and the distribution by industries do not fully match similar data in the national account. In MIMIC people are classified as unskilled whenever their labour market position can be considered weak. As such, "unskilled" does not refer to educational level. The distribution by gender was constructed by considering 16,4% of all employed women to have a weak labour market position. The male part can then be constructed residually. Employment data are broken down by industry using the unpublished data from Statistics Netherlands.

As both the national accounts and labour accounts do not contain data on unemployment, the LFS was used as source for unemployment. Statistics Netherlands defines an unemployed person as a person who is actively looking for a job of at least twelve hours a week. The person should be available to start immediately.

3.2.1.2 Cumulated production structure matrix

The cumulated production structure (CPS) matrix disaggregates the goods market to the industries level and describes the direct relation between final demand categories and primary inputs. Statistics Netherlands used supply and use tables, which have 60 industries, for the sectoral disaggregation of the goods market. Supply and use tables were transformed into a CPS (with 60 industries) which aggregated these industries into six.

3.2.1.3 Income distribution and institutional data

The main data sources for the compilation of data on the income and expenditure of households are socio-economic accounts (SEA). This partially integrated framework provides consistent information on income and expenditure for about 50 household groups. In the SEA, total wages and salaries received by type of household are compiled from the micro tax data. The income data included in the SEA are based on the income statistics of Statistics Netherlands, while the data on final consumption expenditure are derived from the budget survey of Statistics Netherlands. Furthermore, the SEA has in principle been made consistent with the income data for the household sector, included in the system of national accounts.

Furthermore, additional estimates have been included. The expenditure of persons in institutions was mentioned. Examples of additional estimates are (imputed) service charges of banking and insurance, and expenditures for the replacement and repair of goods that are covered by non-life insurance claims.

3.2.2 National accounting matrix

Aggregate income over individual agents (household and firms) should equal the macroeconomic national accounts data on income. To establish this consistency, a NAM for the Netherlands was constructed. The NAM enables a concise description of the well-known sequence of transactions, namely production, income distribution, spending and saving between various agents in the economy.

Table 8 shows a highly condensed version of the 1994 NAM for the Netherlands. The NAM used in the MIMIC is much more detailed. The NAM follows more or less the sequence of transactions of conventional national accounting. The first two transactions reflected are called the goods and services account per sector. Most of the other transactions are related to

the primary and secondary distribution of income. The resulting balancing item per sector is called net lending. Changes in financial assets and liabilities, that show the complementary effect of net lending on the financial holdings of a sector, are not registered in the NAM. As MIMIC was primarily used to address problems related to labour market performance, only current account transactions were recorded.

The national accounts transactions related to the change in assets and liabilities are registered on the financial account. The NAM deviates slightly from the national accounts as published by Statistics Netherlands. For example, in contrast to the national accounts, transactions related to pensions (premiums and benefits) were registered in the current account and not in the financial account. This procedure consequently influences the balancing item of the current account (net lending).

Table 8: The national accounting matrix: 1994 (billion euros)

Transactions	Agents			
	Households	Enterprises	Public sector	Foreign sector
Goods and services (domestic)	-139,189	282,251	12,247	132,815
Goods and services (foreign)	-22,530	-92,551	-2,745	117,826
Gross wages	119,428	-97,919	-21,509	-
Other income	53,010	-46,117	-6,893	-
Social security premiums (employer)	20,429	15,555	-4,874	-
Subsidies	-	7,905	-7,905	-
Indirect taxes	-	-33,738	33,738	-
Social benefits	74,768	0,449	-78,675	3,458
Direct taxes	-35,421	-8,753	44,175	-
Social security premiums	-50,777		50,777	
Pensions (benefits)	13,255	-13,568		0,313
Pensions (premiums)	-33,466	33,497	-	0,032
Capital transfer	-1,157	2,541	-2,205	0,821
Net lending	0,349	18,441	-8,363	-10,428

Source: Statistics Netherlands

3.2.3 Analysis

The Netherlands used its applied general equilibrium models, MIMIC, to analyse long term effects of (fiscal) policy proposals that are intended to affect the labour market. In 1996 it was decided to revise the 1994 version of the model (Gelauff and Graafland, 1994). As the new model would call for additional data, the revision necessitated the construction of a base-year dataset for the model as well. This enabled Statistics Netherlands to explore the feasibility of using new and probably improved datasets, e.g. a new labour force survey and a SAM.

During the last two decennia, Europe and a number of other OECD countries have witnessed mass unemployment. In most countries, unemployment was concentrated among the lowly skilled. Often, the high rate of unemployment went together with a larger incidence of long-term unemployment. Also in the Netherlands (long-term) unemployment has dominated the labour market for a long time. Only recently, the rate of registered unemployment has

dropped, reaching the pre-eighties level of 2,7% in January 2000. But even now, when labour market tensions grow, the incidence of long-term unemployment is still much higher than in the early seventies. This indicates that the labour market still features structural barriers to a full-time employment situation.

Other distinct features of the Dutch labour market include a very high and rising number of disabled people, which to some extent may represent another aspect of structural unemployment, and relatively low participation rates of women and people over 55 years. The slow adjustment of the participation rate of women to those in other OECD countries is mainly reflected in the relatively low share in the total number of hours of paid work. The rise in the participation rate of women from 40% in 1983 to 63% in 1998 (even exceeding the 58% average for the European Union) is strongly mitigated by the relatively high proportion of women in part-time employment.

In the Netherlands, the number of women in part-time employment is 55%, compared to 28% for the European Union and 19% for the United States in 1998 (OECD, 1999). Although some people might favour the abundance of opportunities to work part-time, the low volume of female labour supply contributes to potential labour tensions. In particular, the ageing of the population may require an increase in the labour force in order to provide the necessary care for the elderly and to strengthen the economic basis for the social welfare system for the aged.

3.2.4 Comparisons with the South African SAM

3.2.4.1 Differences

- While the South African SAM breaks down the population into four groups, the Netherlands SAM makes a breakdown of five household groups.
- The Netherlands household groups were further disaggregated into the sources of income, while the South African households were broken down into expenditure groups.
- The major data sources for the Netherlands SAM were supply and use tables, the cumulated production structure, socio-economic accounts, LFS, households and the labour market, and income distribution. For the South African SAM major data sources were SU-tables, income and expenditure survey, population census and integrated economic accounts.
- Netherlands SAM consists of five household groups, five labour markets, seven educational levels, six industries and four institutional sectors.
- The Netherlands extend their SAM with labour accounts whereas, South Africa is currently busy with the feasibility study for extending SAM through the same approach.

3.2.4.2 Similarities

- Both countries SAMs were compiled according to the 1993 SNA.
- Both Netherlands and South African SAMs were divided into a national accounting matrix and a full SAM.
- Both SAMs focus mainly on the households groups.

4. Construction of a social accounting matrix in developing countries

This section describes the experience of eight developing countries in the construction of a SAM.

4.1 Construction of a SAM for Russia: 1993

The Russian statistical office (Goskomstat) published national accounts by institutional sector based on 1995 collections of data for the first time in 1997. This compilation is an important achievement. Russia constructed an aggregated social accounting matrix from its national accounts and the flow of funds using a matrix balancing method. The elimination of statistical discrepancies also made it possible to apply matrix algebraic operations to the SAM. Russia's SAM was constructed according to the 1993 SNA.

4.1.1 Main data sources

The Russian SAM consists of 23 accounts divided into five groups: production factors, (domestic) institutional sectors, production, (domestic) investment and saving, and the rest of the world accounts. Russia introduced production factor accounts (which do not exist in the SNA) and regarded them as an innovation for simplifying the compilation of the Russian SAM. Each account comprises rows and columns. The entries in a row indicate the inflows (resources) to the corresponding account and those in column the outflows (uses) from it. The production factor accounts map the value added generated in the production account onto the institutional sectors.

The institutional sector accounts include direct and indirect taxes, other current transfers, and property income in addition to the usual institutional sectors. Tax accounts are introduced to show tax flows separately. Indirect tax is treated as if it is entirely charged at the stage of production (see Cell 8,21 Table 9). The institutional sector accounts show the current transactions of the institutional sectors, while the saving accounts indicate the capital transactions of the institutional sectors.

The rest of the world (ROW) belongs to the institutional sectors. However it is obviously convenient to separate ROW from the domestic sectors. The ROW-goods account corresponds to the goods and services balance in the balance of payments, while the ROW-financial account shows the rest of the balance of payment. Cell (22,23) in Table 10 indicates current surplus. If Russia had a current deficit, it would appear in Cell (22,23). Cell (22,23) can be interpreted in the following way: 'ROW-goods' export 'money' that 'ROW-financial' financed, so that ROW can import (Cell 22,20) more than ROW exports (Cell 22,20).

All empty cells have zero values, although the zeros are omitted for simplicity. The cells are zero either when the cells happen to be zero or when the transactions corresponding to the cells are not defined. Cell (5,14) is an exceptional case, as it does not usually have a corresponding transaction. It has, however, a non-zero value to record a negative net saving by non-financial corporation sector. The negative net saving can be recorded either in Cell (14,5) with a minus symbol or in Cell (5,14) without a minus symbol.

Table 9: Unadjusted aggregated SAM for Russia: 1995 (trillion roubles)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	LI	**CI**[7]	**Hh**	**Gov**	**Co**	**Fs**	**DT**	**IT**	**PpI**	**Oct**	**CCs**	**Hhs**	**Gos**	**Cos**	**FsS**	**CpT**	**Iiv**	**FIV**	**Gds**	**Fin**	**VA**	**R-G**	**R-F**[8]	**Total**
1																				708		1		**709**
2																				323				**323**
3	707	154		142		6			61	6														**1076**
4		2	129		156			186	24	15														**511**
5		157												72										**229**
6		10	4						1															**15**
7			38				116		2															**156**
8																				186				**186**
9			1	33	66																		18	**118**
10			5	3	9																		4	**21**
11																				414				**414**
12			136								9					15								**160**
13				24							47					4								**75**
14											357					56			54					**467**
15						12					1								81					**94**
16												16	56	5									14	**91**
17												2		51										**53**
18												13	37	272	2									**324**
19												91	8										37	**136**
20			736	306								4	3				53	323		950		428		**2803**
21																					1630			**1630**
22																				362			66	**428**
23	2			3			32									16								**53**
24	**709**	**323**	**1049**	**511**	**231**	**18**	**148**	**186**	**88**	**21**	**414**	**125**	**104**	**400**	**2**	**91**	**53**	**323**	**135**	**2943**	**1630**	**428**	**139**	
Do	0	0	27	0	-2	-3	8	0	30	0	0	35	-29	67	465	3	0	1	1	-140	0	0	-86	

Source: Russian statistical office

[7] LI: labour income, CI: capital income (operating surplus), Hh: household, Gov: government, Co: non-financial corporations, Fs: financial sector, DT: direct tax, IT: indirect tax, PpI: property income, Oct: other current transfer, CCs: capital consumption, HhS: household saving, Gos: government saving, CoS: non-financial corporations saving, Fss: financial sector saving, CpT: capital transfer, Iiv: inventory investment, Fiv: fixed investment, Gds: gross domestic savings, Fin: financial investment, VA: value added, R-G: ROW-goods, R-F: ROW-financial

Table 10: Balanced aggregated SAM for Russia: 1995 (trillion roubles)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	LI	**CI**	**Hh**	**Gov**	**Co**	**Fs**	**DT**	**IT**	**PpI**	**Oct**	**CCs**	**Hhs**	**Gos**	**Cos**	**FsS**	**CpT**	**Iiv**	**FIV**	**Gds**	**Fin**	**VA**	**R-G**	**R-F**	**Total**
1																				722			1	**723**
2																				324				**324**
3	721	155		144	6				58	4														**1088**
4		2	129				156	186	23	15														**511**
5		156												78										**234**
6		11	4																					**15**
7			38		116	2																		**156**
8																				186				**186**
9				34	70																		18	**122**
10			5	3	8																		3	**19**
11																				326				**326**
12			166								9					16								**191**
13				21							38					4			47					**110**
14											278					59			118					**455**
15						13					1													**14**
16												15	65	5									12	**97**
17												2		53										**55**
18												12	42	319					2				1	**376**
19												158			14									**172**
20			746	306	34							4	3				55	376				410		**1934**
21																					1558			**1558**
22																				376			34	**410**
23	2			3					41	0						18			5					**69**
24	**723**	**324**	**1088**	**511**	**234**	**15**	**156**	**186**	**122**	**19**	**326**	**191**	**110**	**455**	**14**	**97**	**55**	**376**	**172**	**1934**	**1558**	**410**	**69**	
D0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Source: Russian statistical office

4.1.2 Analysis

Russia used a distance minimisation matrix balancing method to balance its SAM. A typical problem of distance minimisation matrix balancing is formulated as:

$$\text{Min} \sum_{ij} a_{ij}^2 (x_{ij} - a_{ij})^2 \qquad (i,j = 1,2 \ldots n)$$
$$\text{s.t} \quad x_{ik} = x_{kj} \qquad (k = 1,2 \ldots n),$$

where: a_{ij} is an element of the initial matrix
x_{ij} is the corresponding element of the balanced matrix
k is a column vector.

This is an optimisation problem to find the matrix that is nearest to the initial matrix and whose i^{th} row sum equals i^{th} column sum. The objective function defines the distance as the sum of the percentage changes from the initial elements to the balanced elements. As Nakamura (1996) suggests, the percentage distance may be preferable because of its neutrality.

All distance minimisation methods search for the matrix that is nearest to the initial matrix and satisfies the constraints. If no constraint is imposed, the initial matrix is chosen as the optimal one. For the 1995 Russian national accounts, the initial unadjusted SAM is regarded as being unreliable. It is therefore difficult to think that the balanced Russia SAM is becoming more plausible as it is approaching the initial SAM. In this circumstance, Russia use the matrix balancing method not just to balance a matrix but to integrate available and inconsistent statistical information as much as possible into a balanced matrix, i.e. data reconciliation.

For matrix balancing, the distance minimisation method is applied to the initial SAM except for the net lending cells, the values of which are replaced by those of the Central Bank of Russia flow of funds. Only the constraints that require the equality of the row and column totals of each account are imposed.

4.1.2.1 Difficulty in analysis caused by statistical discrepancies

Negative net saving by the non-financial corporation sector is one of the characteristics of the Russian investment–saving balance. Net saving is defined as:

	the sum of current inflows of the sector
Minus	the sum of the sector's outflow
Equals	net savings

The negative net saving, therefore, means that the sector has a current deficit. Consequently, the Russian non-financial corporation sector has to finance the current deficit of 72,3 trillion roubles (Cell 5,14) in addition to its investment.

Row 14 shows how the non-financial corporation sector raises funds to finance its current deficit and capital expenditure, while column 14 shows how the sector uses the funds raised. Capital consumption (Cell 14,10) finances a dominant part (76,3% = 357,0 million roubles of a total of 467,6 million roubles) of the demand for funds. The capital transfer (Cell 14,10) follows on 12,1%. The large amount of the capital transfer, free capital financing, is unusual.

The rest of the demand for funds was financed by net borrowing (Cell 14,19). The largest item of the demand for funds is fixed investment (Cell 18,14). Its amount is about two-thirds of the capital consumption (271,6 million roubles of a total of 399,6 million roubles). Russian non-financial corporations consume their capital stock. This may be more or less true, because the SAM has large statistical discrepancies.

Row D, which is defined as the subtraction of the row total from the column total of each account, identifies the discrepancies. The unadjusted goods account has a positive discrepancy, summing up the discrepancies of the unadjusted accounts for saving and ROW finances. Gathering discrepancies into the saving and of the good accounts is a convention of the SNA. The causes of the discrepancies do not necessarily exist in those accounts. When the discrepancies are included, net lending by the household sector increases by one-third and net lending by the other sectors changes from negative to positive or in the opposite direction. These uncertainties on the saving side cause difficulties in evaluating the investment activity, which is a key to Russian economic growth (Hare, 1997). This is the only model Russia used to analyse their SAM.

4.1.3 Comparisons with the South African SAM

4.1.3.1 Differences

- Russia used institutional sectors to compile their SAM, while the South African SAM's main focus was on households; their consumption expenditure was broken into four population and 12 expenditure groups.
- The Russian SAM consists of 23 accounts divided into five groups: institutional sectors, production factors, investment, savings and the ROW, whereas the South African SAM consists of four population groups, 12 expenditure groups, four skill levels, 11 occupational groups, 27 products and 27 industries.
- The Russians analysed their SAM using a distance minimisation matrix balancing method.

4.1.3.2 Similarities

- The Russian and the South African SAMs were compiled according to the 1993 SNA.
- Both SAMs could be used to understand the contribution of household expenditure to the economy of the country by bringing supply and demand together in a circular process.

4.2 Construction of a SAM for Tanzania: 2000

The information used for the construction of the Tanzanian SAM for the 2000 reference year included the results of the 2000 household budget survey (HBS) and the 2000 labour force survey (LFS). Other information included balance of payments, national accounts statistics, internal taxes (income taxes and VAT), exports, imports and related taxes (imports duty, excise duty, VAT) and the input–output table of 1992. The Tanzanian SAM for the 2000 reference year was constructed according to the 1968 SNA.

4.2.1 Main data sources

The main data sources for the 2000 SAM were the micro SAM (as described below), the 2000 labour force survey and the household budget survey.

4.2.1.1 Micro SAM

The Tanzanian SAM distinguishes between activities (entities that carry out production) and commodities (representing markets for goods and non-factor services). There are 43 productive activities and 43 commodities. Although the SAM distinguishes between producers and commodities, the input–output table does not account for differences between supply and use of the 43 production sectors in the SAM. Of the 43 sectors, 21 are in agriculture. The remaining are split between mining (1), manufacturing (13), the rest of the secondary sector (2) and the tertiary sector (6). The same disaggregation applies to the commodities. In addition, there are three marketing-margin commodity accounts for exports, imports and domestic sales transaction costs (see Table 11).

Table 11: Micro SAM account descriptions: 2000

Group	Account	Description
Agricultural sectors activities	AMAIZE	Growing of maize
	APADDY	Growing of paddy
	ASORGH	Growing of sorghum or millet
	AWHEAT	Growing of wheat
	ABEANS	Growing of beans
	ACASSA	Growing of cassava
	ACEREA	Growing of other cereals
	AOILSE	Growing of oil seeds
	AROOTS	Growing of other roots and tubers
	ACOTTO	Growing of cotton
	ACOFFE	Growing of coffee
	ATOBAC	Growing of tobacco
	ATEAGR	Growing of tea
	ACASHE	Growing of cashew nuts
	ASISAL	Growing of sisal fiber
	ASUGAR	Growing of fruit and vegetables
	AOCROP	Growing of other crops
	ALIVES	Operation of poultry and livestock
	AFISHI	Fishing and fish farms
	AHUFOR	Hunting and forestry
Non-agricultural sectors (activities)	AMININ	Mining and quarrying
	AMEATD	Processing of meat and diary products
	AGRAIN	Grain milling
	APFOOD	Processed food
	ABEVER	Beverages and tobacco products
	ACLOTH	Textile and leather products
	AWOODP	Wood paper printing
	ACHEMI	Manufacture of basic industrial chemicals
	AFERTI	Manufacture of fertilizers and pesticides
	APETRO	Petroleum refineries
	ARUPLA	Rubber, plastic, and other manufacturing
	AGLASS	Glass and cement
	AMETAL	Iron, steel and metal products
	AEQUIP	Manufacture all equipment
	AUTILI	Utilities
	ACONST	Construction
	ATRADE	Wholesale and retail trade
	AHOTEL	Hotels and restaurants
	ATRANS	Transport and communication
	AESTAT	Real estate
	AADMIN	Public administration, health and education
	APRIVS	Business and other services

Table11: Micro SAM account descriptions for the year 2000 (continued)

Group	Account	Description
Agricultural sectors commodities	CMAIZE	Maize
	CPADDY	Paddy
	CSORGH	Sorghum or millets
	CWHEAT	Wheat
	CBEANS	Beans
	CCASSA	Cassava
	CCEREA	Other cereals
	COILSE	Oil seeds
	CROOTS	Other roots and tubes
	CCOTTO	Cotton
	CCOFFE	Coffee
	CTOBAC	Tobacco
	CTEAGR	Tea
	CCASHE	Cashew nuts
	CSISAL	Sisal fiber
	CSUGAR	Fruits and vegetables
	COCROP	Other crops
	CLIVES	Poultry and livestock
	CFISHI	Fish
	CHUFOR	Hunting and forestry
Non-agricultural commodities in manufacturing	CMININ	Mining and quarrying
	CMEATD	Meat and diary products
	CGRAIN	Grain milling
	CPFOOD	Processed food
	CBEVER	Beverages and tobacco products
	CCLOTH	Textile and leather products
	CWOODP	Wood paper printing
	CCHEMI	Manufacture of basic & industrial chemicals
	CFERTI	Manufacture of fertilizers and pesticides
	CPETRO	Petroleum refineries
	CRULPLA	Rubber plastic and other manufacturing
	CGLASS	Glass and cement
	CMETAL	Iron steel and metal products
	CEQUIP	Manufacture all equipment
	CUTILI	Utilities
	CCONST	Construction
	CTRADE	Wholesale and retail
	CHOTEL	Hotels and restaurants
	CTRANS	Transport and communication
Non-agricultural commodities in non-manufacturing	CESTATE	Real estate
	CADMIN	Public administration health and education
	CPRIVS	Business and other service activities
Marketing margins	CTDTP-E	Export transactions costs
	CTDTP-D	Domestic sales transaction costs
	CTDTP-M	Import transaction costs
Labour	FSUB	Subsistence labour
	LCHILD	Child labour
	LNONF	Female labour (no formal education)
	LNFPF	Female labour incomplete primary school
	LNFSF	Female labour incomplete secondary school
	LSECF	Female labour (secondary/higher education)
	LNONM	Male labour (no formal education)
	LNFPM	Male labour incomplete primary school
	LNFSM	Male labour incomplete secondary school
	LNFSM	Male labour (secondary/ higher education)
Capital	CAPAG	Agriculture capital
	CAPNAG	Non-agricultural capital
	LAND	Agricultural land

Table 11: Micro SAM account descriptions for the year 2000 (concluded)

Group	Account	Description
Households	HRBBFPL	Rural (below poverty line)
	HRFBPL	Rural between food & basic needs poverty line
	HRNOED	Rural non-poor with no education
	HRNFPS	Rural non-poor incomplete prim school
	HRNFSS	Rural non-poor incomplete sec school
	HRSECP	Rural non-poor complete sec school
	HUBFPL	Urban below poverty line
	HUFBPL	Urban between food & basic needs poverty
	HUNOED	Urban non-poor with no education
	HUNFPS	Urban non-poor incomplete prim school
	HUNFSS	Urban non-poor incomplete sec school
	HUSECP	Urban non-poor complete sec school
Taxes	DIRTAX	Direct taxes on domestic institutions
	IMPTAX	Import tariffs
	EXPTAX	Export taxes
	ACTTAX	Value added or activity taxes
	INDTAX	Indirect or sales taxes
	OTHTAX	Other taxes
Other	GOV	Government
Institutional	ROW	Rest of the world
Accounts	S-I	Savings and investment

Source: National Bureau of Statistics of Tanzania

4.2.1.2 Labour force survey

In the Tanzanian SAM, labour was disaggregated according to gender and educational levels. The exception to this disaggregation was the child labour category, which included all working children between the ages of 10 and 14 years. Adult workers were divided into male and female labour categories, and then disaggregated further according to highest level of education. The education categories chosen included no formal education (including adult education), incomplete primary school, incomplete secondary school, and completed secondary school or higher education.

Children are an important source of labour in Tanzania. Child labour accounts for 8,6% (see Table 12) of the total workforce, although they only contribute 0,3% to the gross domestic product (GDP) at factor cost or total value-added. Within both male and female adult labour, the largest category is workers who did not complete secondary school. Male workers held a relatively larger proportion of the jobs that required higher levels of education than female workers.

Table 12: Labour force by labour category: 2000

Age and gender category	Education category	Number of workers	Share of total workers (%)
Subsistence labour		5 937 131	36,2
Child labour (ages 10 to 14)		1 403 358	8,6
Female non-subsistence labour	No formal education	1 527 131	9,3
	Incomplete primary school	672 474	4,1
	Incomplete secondary school	2 344 897	14,3
	Secondary or higher education	143 315	0,9
	Total adult females in non-subsistence labour	4 687 817	28,6
Male non-subsistence labour	No formal education	788 193	4,8
	Incomplete primary school	928 912	5,7
	Incomplete secondary school	2 407 857	14,7
	Secondary or higher education	249 685	1,5
	Total adult males in non-subsistence labour	4 374 646	26,7
All labour categories		**16 402 952**	**100,0**

Source: National Bureau of Statistics of Tanzania

The SAM of Tanzania separates the labour force from households. Households were initially divided into those in rural areas and those in urban areas. There are two poverty lines (a poverty line in Tanzania is defined as the level of income required by households to meet the basic needs, particularly food) in Tanzania. The first poverty line covers sufficient food, and the second covers food and other basic needs. The remaining disaggregation was based on the income level of the household. The remaining households that do not fall into either of these categories (approximately 60% of the population) are divided according to the highest educational level.

4.2.1.3 Household budget survey

The Tanzanian total population for the year 2000 was 31,3 million people, of whom 80,3% lived in rural areas (rural areas are defined as places where a group of people are less wealthy and have a lower educational level than those in the urban areas) as illustrated in Table 13. Of the rural population, about 2,6% had completed secondary education, compared to 18,8% of the urban population.

Table 13: Population within educational category: 2000

Rural/urban	Educational category	Number of people	Share of total population (%)
Rural	Below food poverty line	5 080 859	16,2
	Between food and basic needs poverty lines	4 605 455	14,7
	Non-poor with no education	3 512 349	11,2
	Non-poor incomplete primary school	3 499 736	11,2
	Non-poor incomplete secondary school	7 842 113	24,9
	Non-poor complete secondary school	661 535	2,1
	Total rural	25 202 047	80,3
Urban	Below food poverty line	674 816	2,2
	Between food and basic needs poverty lines	712 486	2,3
	Non-poor with no education	422 993	1,4
	Non-poor incomplete primary school	689 084	2,2
	Non-poor incomplete secondary school	2 462 953	7,9
	Non-poor complete secondary school	1 146 635	3,7
	Total urban	6 108 967	19,7
All households	**Total population**	**31 311 014**	**100**

Source: National Bureau of Statistics of Tanzania

Table 14 shows how the income earned by each income source is distributed across households. For the sake of convenience, those households that lie above food and the basic needs poverty lines have been aggregated. However in the final SAM, these households are further divided into categories based on the educational qualification of the household heads.

Table 14: Distribution of income sources across households: 2000 (percentages)

Income source	Rural			Urban			
	[9]BFL	BFBL	AFBL	BFL	BFBL	AFBL	All
Subsistence factor income	9,1	13,1	68,0	0,3	0,4	9,1	**100,0**
Child labor	5,3	5,4	52,4	0,5	4,9	31,5	**100,0**
Female (no formal education)	12,0	11,6	57,5	2,6	2,4	13,9	**100,0**
Female [10](NFP)	7,0	7,3	56,2	1,6	2,5	25,4	**100,0**
Female (NFS)	2,1	3,4	48,9	1,2	2,2	42,2	**100,0**
Female (sec+)	0,0	0,7	18,2	0,6	1,8	78,7	**100,0**
Male (no formal education)	13,6	21,3	52,0	1,5	1,2	10,4	**100,0**
Male (NFP)	8,8	9,2	54,5	1,8	2,4	23,3	**100,0**
Male (NFS)	2,9	4,2	54,2	1,0	1,6	36,1	**100,0**
Male (sec+)	0,7	0,9	31,5	0,3	0,9	65,7	**100,0**
Agricultural capital	12,4	15,4	65,2	0,9	0,5	5,6	**100,0**
Land	12,3	15,3	64,7	1,1	0,6	6,0	**100,0**
Non-agricultural capital	0,6	1,6	48,3	2,5	6,3	40,7	**100,0**
Government	7,0	7,0	64,9	1,0	0,8	19,3	**100,0**
Rest of world	00,0	0,0	45,7	0,0	0,0	54,3	**100,0**
Total household income	**5,3**	**7,3**	**55,3**	**1,2**	**2,4**	**28,5**	**100,0**

Source: National Bureau of Statistics of Tanzania

Table 15: Household income by income source: 2000 (percentages)

Income source	Rural			Urban			
	BFL	BFBL	AFBL	BFL	BFBL	AFBL	All
Subsistence factor income	45,4	47,2	32,9	5,9	4,5	8,6	**26,5**
Child labor	0,3	0,2	0,3	0,1	0,6	0,4	**0,3**
Female (no formal education)	2,0	1,4	1,1	1,9	0,9	1,1	**0,9**
Female (NFP)	1,4	1,0	1,2	1,4	1,1	1,7	**1,0**
Female (NFS)	2,7	3,1	3,9	6,7	6,0	7,0	**6,8**
Female (sec+)	0,0	0,2	1,6	1,1	1,5	5,1	**2,1**
Male (no formal education)	2,7	3,0	1,3	1,3	0,5	1,2	**1,0**
Male (NFP)	5,6	4,2	4,0	5,1	3,4	5,9	**3,4**
Male (NFS)	4,8	5,0	5,1	7,4	5,6	6,2	**8,8**
Male (sec+)	0,7	0,7	8,3	1,5	2,1	11,3	**5,6**
Agricultural capital	20,9	18,7	10,3	6,9	1,9	2,0	**8,9**
Land	9,0	8,1	4,4	3,4	1,0	0,9	**3,9**
Non-agricultural capital[11]	2,9	6,0	21,3	56,3	70,5	43,1	**27,2**
Government	1,6	1,2	1,5	1,0	0,4	0,9	**1,2**
Rest of the world	0,0	0,0	2,8	0,0	0,0	4,6	**2,4**
Total household income	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

Source: National Bureau of Statistics of Tanzania

The rural households below the food poverty line earned 45,4% of their total income from subsistence factor income (income received from farming for own use) compared to the urban

[9] BFL: below food poverty line, BFBL: between food and basic needs poverty line, ABL: above basic needs poverty line, AFBL: above food basic needs poverty line

[10] NFP: incomplete primary school, NFS: incomplete secondary school, and Sec+: complete secondary or higher school

[11] Non-agricultural capital refers to manufacturing, construction, financial intermediaries or anything outside agriculture

households below the food poverty line (5,9% of the total income). Given their lower dependence on subsistence factor income, urban households are more dependent on non-agricultural capital income. The urban households below the food and basic needs poverty line earned 70,5% of their total income from non-agricultural capital income, compared to 6,0% of the rural households below the food and basic need poverty line. Females with no formal education earned 0,9% of the total household income compared to 1,0% males with no formal education. Males who completed secondary school earned 5,6% of the total household income compared to females who completed secondary school (2,1%). Rural households were also more dependent on transfers from government as a household income source than urban households.

Table 16 shows how total household consumption spending is distributed across broad commodity categories. On average 64,8% of all household consumption spending is on agricultural and food products. Rural households spend more on food and agriculture than urban households according to the Tanzanian SAM. Amongst poorer households, those below the food poverty line depend more on agriculture and food than those households above food and basic needs poverty lines. The higher income urban households (above food and basic poverty line) spend 17,9% of their incomes on other services.

Table 16: Household consumption spending by broad commodity category: 2000 (percentages)

Commodity category	Rural			Urban			
	BFL	BFBL	AFBL	BFL	BFBL	AFBL	All
Agriculture and food	70,7	73,1	67,0	63,9	68,4	57,0	**64,8**
Other manufactured goods	16,2	14,2	17,2	21,2	15,2	17,9	**17,1**
Utilities	0,5	0,6	0,6	1,2	0,9	1,3	**0,9**
Real estate	8,0	8,5	8,1	8,3	8,4	8,4	**8,5**
Other services	4,2	4,1	6,5	5,5	7,3	15,4	**8,7**
All commodities	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: National Bureau of Statistics of Tanzania

4.2.1.4 Government, saving, investment and the rest of the world

Government income is generated through its tax revenues. The most important of these revenues are indirect and direct taxes (see Table 17), which contribute 45,1% and 25,5% respectively to the total government revenue. Import taxes are another important revenue sources. Government expenditure was dominated by consumption spending, and saved 20% of its income in 2000.

Table 17: Government income and expenditure: 2000

Income	Value (Tsh Bil[12])	Share (%)	Expenditure	Value (Tsh Bil)	Share (%)
Enterprise dividends	3	0,4	Consumption spending	434	70,0
Direct taxes	158	25,5	Transfers to households	62	10,0
Import taxes	96	15,5	Savings	124	20,0
Export taxes	2	0,3			
Value added taxes	71	11,4			
Indirect taxes	280	45,1			
Other taxes	11	1,7			
Total	**620**	**100**		**620**	**100**

Source: National Bureau of Statistics of Tanzania

[12]Tsh Bil: billion Tanzania shillings

Total savings in Tanzania are heavily dependent on the inflow of foreign savings (foreign income). Total savings received from abroad amounted to over 70% of total savings available for investment (see Table 18). The remaining savings came from households (17,2%) and the government (11,9%). All savings are directed towards gross fixed capital formation, which represents both public and private investments in the economy.

Table 18: Savings and investment: 2000

Savings	Value (Tsh Bill)	Share (%)	Investment	Value (Tsh Bil)	Share (%)
Households	180	17,2	Fixed capital formation	1044	100,0
Government	124	11,9			
Foreign	740	70,9			
Total	**1044**	**100**		**1044**	**100**

Source: National Bureau of Statistics of Tanzania

The final account in the Tanzania SAM is the current account. The value of imports far exceeds the value of exports. This large trade deficit is made possible by the inflow of foreign capital into the country. While some of this is foreign borrowing, much of it is in the form of foreign aid (grants). As such, while the deficit is a substantial share of total receipts, it could at least in part be interpreted as dependent on foreign growth.

Table 19: Tanzanian current account: 2000

Receipts	Value (Tsh Bil)	Share (%)	Payments	Value (Tsh Bil)	Share
Exports	749	46,4	Imports	1565	97,0
Household remittance	125	7,8	Factor remittances	49	3,0
Deficit					
Total	**1614**	**100**	**Total**	**1614**	**100**

Source: National Bureau of Statistics of Tanzania

4.2.2 Analysis

A cross-entropy approach to SAM estimation was used to balance the unbalanced SAM. A SAM is balanced by running a cross-entropy code in general algebraic modeling system (GAMS). This code has been tested on various SAMs from 1998 to 2001 and has found solutions for each of those years without requiring any adjustment to it. It is therefore expected that, in the case of Tanzania, the SAM construction and updating process for subsequent years will be easily achieved as well. This was the only model Tanzania used to balance their SAM.

The SAM was defined as a matrix T of monetary flows Ti,j (a payment from account j to account i), representing receipts and expenditures of all economic agents. Following the convention of double-entry bookkeeping, total receipts and total expenditure of a particular agent i have to be equal, i.e. respective row and column sums are balanced:

$$Yi = \sum_j Ti,j = \sum_j Tj,i$$

Dividing every cell entry of the flow matrix T by its respective column total generates a matrix A of column coefficient:

$$Ai,j = \frac{Ti,j}{Yj} \quad \text{with } \sum_i Aij = 1$$

In matrix notation it follows that:

$$Y = Ay$$

The cross-entropy approach allows the incorporation of errors in variables, inequality constraints, and prior knowledge about any part of the SAM. These features of the cross-entropy estimation technique allow considerable flexibility in incorporating specific information and implementing limits to which the estimation results are restricted.

4.2.3 Comparisons with the South African SAM

4.2.3.1 Differences

- The Tanzanian SAM for the year 2000 was compiled according to the 1968 SNA, while the 1998 SAM for South Africa was compiled according to the 1993 SNA.
- The Tanzanian population was divided into six household groups, while the South African population was divided into four population groups.
- The Tanzanian household groups were further divided into rural and urban areas, while the South African used rural and urban areas as the external matrix.
- The Tanzanian SAM used three data sources to compile the 2000 SAM; i.e. the labour force survey, household budget survey and micro SAM. The South African SAM on the other hand used four data sources, population census, supply and use tables, income and expenditure survey and integrated economic accounts.
- The Tanzanian SAM consists of six household groups, four labour categories, four educational levels, 43 products and 43 industries, and rural and urban areas. The South African SAM consists of four population groups, 12 expenditure groups, 27 products and 27 industries, 11 occupational groups and four skill levels.
- The Tanzania SAM used a cross-entropy approach to balance their SAM while South Africa has not used any modeling to balance or test their own SAM.

4.2.3.2 Similarities

- Both SAMs show expenditure patterns of poor households, in relation to the structure of the economy of each country. They also used urban and rural areas.

4.3 Construction of a SAM for Zambia: 1995

A 1995 SAM for Zambia (ZAMSAM) was constructed according to the 1968 SNA and consists of row and column accounts that represent the different activities, commodities, agents and institutions of an economy at a chosen level of a disaggregation. Each cell of the matrix represents a payment from a column account to a row account.

The Zambian SAM is divided into three steps. Firstly, a highly aggregated SAM (macro SAM or national accounting matrix) is constructed. It represents the macroeconomic framework of the Zambian economy in 1995. Secondly, the macro SAM (NAM) is disaggregated into a micro one. Its sub-matrices are constructed from various data sources with macro SAM entries serving as control totals for the adjustment of the raw data. Due to data insufficiencies, the first micro SAM (the proto SAM) obtained from raw data is still highly unbalanced. Thus, after some prior adjustment to facilitate the solution process, a cross-entropy approach is applied in a third step, with the proto SAM providing the prior adjustment for the parameter estimation and macro SAM entries serving as constraints.

4.3.1 Main data sources

The Zambian micro SAM differentiates between accounts for 28 activities, 27 commodities, four labour categories plus value-added (VA) capital and land, four households, the government, the rest of the world (ROW), and the saving/investment account. To facilitate the analysis of the linkage effects, the activities are further separated into mining and quarrying, three labour-intensive light-manufacturing divisions, three manufacturing divisions, one construction and seven services sectors. Light-manufacturing divisions include food and beverages, textiles and garments, and wood, paper and furniture. These are the sectors that are directly linked to agricultural outputs as inputs into their own production processes. In addition, the fertilizer and basic chemicals industry and the capital goods industry are separated from other manufacturing subsectors.

The micro SAM incorporates consumption of own-farm production and separates marketing on sales of domestic goods, exports and imports. In addition, the maize commodity is produced by two different technologies (and thus activities), i.e. the commercial maize technology and small-scale and emergent maize technology.

In the micro SAM the activity and commodity account of the macro SAM is disaggregated into 28 activities and 27 commodities. For maize, the micro SAM distinguishes between two activities producing the same commodity. Three additional 'commodity' accounts capture different marketing margins for exports, imports and domestic goods.

The Zambian micro SAM has an agricultural focus, with 14 out of 28 activities belonging to agriculture (including forestry and fisheries). Zambia's agricultural activities include small/emergent maize and commercial maize, crop activities, drought-tolerant staples, export crop activities (coffee, cotton, groundnuts, horticulture, sugar and tobacco), wheat, other crops and livestock.

Other accounts of the micro SAM are 27 commodity plus marketing margin accounts, seven labour accounts, two value-added capital, one land accounts, four household accounts, the government, the ROW and the saving/investment account. Taxes are collected and transferred to the government by four separate tax accounts. The disaggregation of labour into seven categories follow the distribution of academic qualifications (none, primary, secondary and post-secondary education) in priority survey I (PS I), priority survey II (PS II) and the living conditions monitoring survey (LCMS). The disaggregation of households follows the socio-economic group categories in the 1993/94 household budget survey, with non-metropolitan households broken down into urban and rural households (metropolitan high income, metropolitan low income, non-metropolitan urban and non-metropolitan rural households). The other institutional accounts of the micro SAM follow the account structure of the macro SAM.

Table 20: Accounts of the Zam SAM: 1995

Account type	Acc No	Acc code	Description
Agricultural activities	1	ASMA	Maize, small and emergent
	2	ALMA	Maize, commercial
	3	ASGT	Drought-tolerant staples
	4	AGNT	Groundnuts
	5	ASUG	Sugar
	6	ACOT	Cotton
	7	ATOB	Tobacco
	8	ACOF	Coffee
	9	AWHE	Wheat
	10	AHCR	Horticulture crops
	11	AOCR	Other crops
	12	ALIV	Livestock products
	13	AFIS	Fisheries
	14	AFOY	Forestry
Non-agricultural activities	15	AMIN	Metal mining
	16	AFBT	Food, beverages and tobacco
	17	ATAG	Textiles and garments
	18	AWAF	Wood, furniture and paper
	19	AFER	Fertilizer, pesticides and basic chemicals
	20	AOMA	Other manufacturing
	21	AEAW	Energy
	22	ACAG	Capital
	23	ACON	Construction
	24	ATSV	Trade and transportation services
	25	ATOU	Tourism
	26	ASER	Other marketing services
	27	AFIN	Finance
	28	APUB	Public non-market services
Commodities	29	CMAI	Commodities
	30-54	CSTA	Disaggregation as activities except for maize, two different activities, ASMA and ALMA, produce the same commodities
	55	CPUB	Maize, CMAI
	56	CMME	Export marketing margins
	57	CMMI	Import marketing margins
	58	CMMD	Domestic marketing margins
Factors of production	59	LNONE	Unskilled labour
	60	LPRIM	Labour with primary education
	61	LSECO	Labour with secondary education
	62	LPOST	Labour with post secondary education and degree
	63	KAP	Capital
	64	LAND	Agricultural land
Households	66	HHMH	Household metropolitan high income
	67	HHML	Household metropolitan low income
	68	HHNU	Household non-metropolitan urban
	69	HHNR	Household non-metropolitan rural
Other institutions tax account	70	ENT	Firms/Enterprises
	71	GOVR	Government recurrent
	72	DIRTX	Direct taxes
	73	VATAX	Value added tax
	74	INDTX	Indirect taxes
	75	TARIFFS	Tariffs (import taxes)
	76	WORLD	Rest of the world
	77	KACCOUN	

Source: Central Statistics Office of Zambia

The values for private cash consumption are extracted from the consumer price index weights of the 1993/94 household budget survey. This survey distinguishes between high and low income metropolitan households and non-metropolitan households. Labour value-added is distributed to households according to the shares derived from the 1996 living conditions monitoring survey. The raw data is taken from the distribution of the population aged 12 years and older not currently attending school by the highest level of education and stratum. The educational levels are the same as in the 1993 priority survey. The stratum is divided into four types of rural households (small-scale farmers, medium-scale farmers, large-scale farmers and non-agricultural households) and three types of urban households (high, medium and low cost households).

In the micro SAM it is assumed that only metropolitan high-income households pay individual income taxes. The macro SAM figure for individual income tax is therefore allocated to the household metropolitan high income (HHMH). It amounts to ZK[13] million 134 153.

4.3.2 National accounting matrix

The Zambian macro SAM for the year 1995 comprises 24 non-zero entries. The gross output level (total cost of production) of the initial macro SAM balances at ZK 5 775 876 and the total absorption (including total marketing margin and exports) at ZK7 802 980. These numbers include an initial trade deficit of ZK145 894 million, which amounts to 13,5% of total export earnings.

The construction of a macro SAM started from national accounts data. This data was re-compiled in the form of income–expenditure balance sheets and is presented in the table below. Unfortunately, Zambian national accounts give little information on government income and expenditure or private and public savings.

Table 21: Zambian national income statistics balance sheets: 1995 (K'mil)

GDP	**Income**	**GDP**	**Expenditure**
Compensation of employees	936 205	Government final consumption	464 049
Gross operating surplus	1 703 009	Private final consumption	2 202 250
		Gross fixed capital formation	373 104
Net indirect taxes	359 108	Increase in stocks	104 813
		Exports of goods and services	1 082 341
		Less: Imports of goods and services	-1 228 235
Total (GDP m.p.)	**2 998 322**	**Total (GDP m.p.)**	**2 998 322**
National disposal income	**Income**	**National disposal income**	**Expenditure**
Compensation of employees	936 205	Government final consumption	464 049
Gross operating surplus	1 703 009	Private final consumption	2 202 250
Net indirect taxes	359 108	Savings	
Compensation of employees from ROW (net)	n/a[14]		
Property and entrepreneurial income from ROW (net)	-237 723		
Current transfer from ROW (net)	-17 400		
Total	**2 743 199**	**Total**	**2 743 199**
Gross savings	76 900	GFCF (investments)	373 104
Current account deficit	401 017	Increase in stocks	104 813
Total	**477 917**	**Total**	**477 917**

[13] ZK: Zambia kwacha
[14] n/a: not applicable

Table 21: Zambian national income statistics balance sheets: 1995 (K'mil) (concluded)

Rest of the world	Income	Rest of the world	Expenditure
Imports of goods and services	1 228 235	Exports of goods and services	1 082 341
Compensation of employees to ROW	n/a	Compensation of employees from ROW	n/a
Property and entrepreneurial income to ROW (net)	237 723		
Other current transfer to ROW (net)			
Surplus on current account to ROW (net)	17 400		
	-401 017		
Total	**1 082 341**	**Total**	**1 082 341**

Source: Central Statistics Office of Zambia

4.3.3 Analysis

Accounts in the SAM state the entries in a matrix by rows and columns. Rows represent incomes and columns represent expenditure. Typically, these accounts comprise production, goods and services, factors of production, institutions and the rest of the world accounts. Production accounts are compiled using data from national accounts and input–output tables.

Three types of SAM accounts were taken as endogenously determined: production, factors and institutions. Other accounts, consisting of the government, the capital and the rest of the world accounts, were considered exogenous. The matrix of multiplier is decomposed into four additive components:

- Initial injection
- Net contribution of transfer multiplier effect as a result of direct transfer with endogenous accounts
- Net contribution of open loop effects capturing the interactions among and between the three endogenous accounts
- Net contribution of circular closed-loop effects ensuring that the circular flow of income is completed among endogenous accounts.

In order to carry out the multiplier analysis in the SAM framework, certain conditions need to be held. Firstly, there was excess capacity, which would allow prices to remain constant. Secondly, the expenditure propensities of endogenous account also remain constant. Thirdly, the production technology and resource endowment are given. Under these three assumptions SAMs can be used to estimate the effects of exogenous changes and injection, such as increases or decreases in demand for specific products on the whole economic system.

4.3.3.1 The accounts of Zambian SAM

The structure of the SAM for Zambia follows the "traditional" composition. The SAM constructed for 1995 has a total of 33 accounts, 13 of which were considered as exogenous and 20 as endogenous.

The endogenous accounts were as follows:

- Eleven sectors of production
- Three categories of labour
- Three types of household accounts
- Two capital
- A private sector account.

Exogenous accounts were:
- Nine sectors of production
- The government
- The rest of the world accounts.

It is possible to extend the multiplier analysis from the traditional input–output multipliers (production multipliers) to include the social sectors (SAM multipliers).

In the case of the SAM for Zambia, some specific issues must be taken into consideration. Firstly, the SAM is not based on a coherent data from input–output tables. This means that additional consistency checks are needed. Secondly, the SAM is based on a project where the statistical authorities of Zambia participated in the compilation process but later withdrew from the project. Thirdly, the SAM has a rather small number of accounts therefore has limitations to the level of analysis.

4.3.3.2 Balancing the SAM using the cross-entropy approach

A cross-entropy approach was applied to balance the SAM. This approach minimises the entropy distances between prior coefficients from the proto SAM and the new micro SAM. The new SAM must satisfy the condition that all corresponding row and column totals balance. Furthermore, all column coefficients must be smaller than one and must add up to one by column. Other constraints can be imposed, which knowledge about certain parts of the SAM. In the Zambian case, various macro SAM entries are imposed as constraints. They ensure that the balanced micro SAM largely reflects the structure of the 1995 national accounts. Zambia used multiplier and cross-entropy approaches to analyse their SAM.

4.3.4 Comparisons with the South African SAM

4.3.4.1 Differences

- The Zambian SAM was compiled according to the 1968 SNA, while the South African was compiled according to the 1993 SNA.
- The Zambian SAM underwent three stages: highly aggregated SAM, national accounting matrix and the cross-entropy approach, whereas the South African is divided into an aggregated SAM (national accounting matrix) and a disaggregated SAM (full SAM).
- The Zambian population is divided into four household groups, while the South African population is divided into four population groups.
- The Zambian SAM consists of four household groups, four labour categories, four educational levels, four rural areas and three urban areas, 28 products and 27 industries. The South African SAM consists of four population groups, four skill levels, 27 products, 27 industries, four institutional sectors, 11 occupational groups, and 12 expenditure groups.
- The major data sources used for Zambia SAM are the micro SAM (supply and use tables), the household budget survey, socio-economic groups and the living condition monitoring survey, whereas the South African major data sources used were the population census, supply and use tables, income and expenditure survey and integrated economic accounts.
- The Zambians also used cross-entropy approaches to analyse their SAM while the South Africans did not analyse their SAM.

4.3.4.2 Similarities

- Both countries constructed national accounting matrix.
- Both countries used rural and urban areas and supply and use tables by product and industries.

4.4 Construction of a SAM for Ghana: 1993

The 1993 SAM for Ghana was constructed by the Ghana Statistical Services (Powell and Round, 1997). This was the first stage of a substantive methodological revision of the Ghana national accounts, compiled in accordance with the recommendations of the 1993 SNA, involving a re-estimation and rebasing of all past estimates.

4.4.1 Main data sources

The SAM involved the compilation of supply and use tables, as well as detailed and extensive household survey information obtained from a 1992/93 Ghana living standards survey (GLSS). The compilation, in fact, involved the development of two SAMs. The first, called the mini SAM (comprising 62 accounts), is a representation of the Ghana SNA (the supply and use tables and integrated economic accounts) in matrix format. The creation of the second SAM, the 'full SAM' (comprising 120 accounts) involved a further disaggregation of factors (factors which are referred to as generation of income accounts in the SNA terminology) and household accounts. The modelling experiments conducted here are based on a third variant, which is referred to as a 'consolidated SAM' (comprising 40 accounts).

The consolidated SAM has six principal blocks of accounts together with some significant disaggregation in four of the blocks. It is a variant of the two existing versions of the Ghanaian SAM, the full and mini SAMs. In accordance with the 1993 SNA guidelines, at the compilation stage of the base versions (mini SAM) of the SAM, the institutions current accounts were subdivided into three separate accounts: the primary income distribution, the secondary income distribution and the use of income. One major difference between the base SAM and the consolidated SAM is that the three sets of current accounts for institutions have been combined into a single set.

The production activity accounts have three sectors and twelve activities. The factor accounts (which are referred to as generation of income accounts in the 1993 SNA) include nine accounts and cover three broad categories: compensation of employees, operating surplus and mixed income, plus taxes on production and imports less subsidies on production and imports. Compensation of employees and mixed income are further distinguished by gender and educational level of the employee or own account worker. Educational level is further disaggregated into four groups: primary school, secondary school, training college and tertiary qualification. Operating surplus is identified as a return to the capital employed in corporate or quasi-corporate enterprises and is aggregated in the consolidated SAM into a single account.

The institutional current accounts (the distribution and use of income accounts) are subdivided into broad institutional sectors according to standard international statistical conventions. These comprise households, corporate enterprises (both financial and non-financial), government, and non-profit institutions serving households (private schools, clinic,

etc). The household sector is further disaggregated into Accra urban, other-urban and rural household categories, with further subdivisions according to the six occupational statuses (farming, trading, clerical, construction, professional and managerial) of the household head and region (in rural areas only) and four skill levels (unskilled, lower skilled, middle skilled and higher skilled) (also in rural areas only).

In the full SAM the household sector was disaggregated into 14 household groups based on gender, educational level and occupational group, so that characteristics of households in each group are relatively homogenous. Therefore, the pattern of consumption and income distribution in Ghana is likely to be adequately captured in respect of these broad socioeconomic groups. However, due to lack of information in the available household survey data, some consolidation and further assumption had to be made to the basic framework in arriving at the consolidated SAM.

The mini SAM was expanded to construct the full SAM; not all the transactions relative to the household accounts have been broken down into corresponding transactions for the different household groups. In other words, although the full SAM should show all the transactions for each household group, some of them were only recorded at an aggregate level. The net saving is the balancing item carried forward from the use of income account and capital transfer. Capital transfers payable are recorded with a negative sign.

The information on taxes on production provided in the original 'full SAM' was too aggregative for the purpose of the redistributive modelling experiments. Hence, by drawing on extra information, some assumptions separate tax revenue accounts were generated for domestic taxes, import duties and export taxes. Another major adjustment to the SAM was to eliminate the seemingly negative savings, which appeared in some household accounts and for the household sector as a whole.

4.4.2 Ghana poverty profile

The poverty profile confirmed that poverty was more endemic and severe in rural Ghana than in urban areas. A greater proportion of the poor derived their income from agriculture than the non-poor. Their major conclusion was that a policy of raising producer prices of key agricultural commodities would be a consistent poverty reduction strategy.

An analysis of determinants of average per capita expenditure showed that the poor do not benefit as much from education as the non-poor do. This is because the poor tend not to go beyond primary or middle school level, beyond which education contributes to improvements in household welfare.

It is common practice to begin a poverty analysis by identifying an indicator of individual welfare. This is usually a monetary indicator such as consumption expenditure or total income. The second step is to define (single or multiple) poverty lines and the third step is a summary of poverty measure to be identified. Ghana poverty line is based on the wealth measure on per capita expenditure (cash and imputed). The poverty line is set initially at a percentage of mean expenditure, and the poverty measure is based on the headcount index. Per capita expenditure has often been argued to be a better measure of permanent income. The choice of the poverty line, though initially arbitrary, becomes an absolute benchmark in the subsequent dominance holds.

Per capita cash expenditure is derived from the GLSS for the period 1992/93. For Ghana as a whole, the disparities between household groups are quite substantial. For example, while only 7,0% of the population belong to households in the 'urban skilled' category, but account for 21,8% of the total household consumption. On the other hand 17,8% of the population live to 'Savannah farm' households, but account for only 3,3% of the total household consumption. The comparisons across urban and rural households are also as a result of the figures. Whereas 66,8% of the population lived in rural Ghana, they incurred only 41,2% of the total consumption expenditure.

Two poverty lines are derived and used for each household group. The higher poverty lines are set at 129 199 cedis (two-thirds of the mean per capita expenditure in 1993), while the lower (hard core) poverty lines are set at 64 599 cedis (one-third of the mean per capita expenditure). Poverty in Ghana is substantially a rural phenomenon. On the basis of the high-level poverty line, 93,9% of the poor live in rural areas; this rises to 99,6% if one restricts attention to a low-level (hard core) poverty line. Also, poverty incidence is substantially higher in forest farm, forest non-agricultural, coastal and savannah farm household groups. The incidence is correspondingly negligible in the urban skilled, Accra skilled and coastal non-agricultural households.

4.4.3 Analysis

The role of the Agriculture Project of the United Nations Food and Agriculture Organisation was to describe the distribution of poverty across various household groups in Ghana between 1991 and 1999, using consumption expenditure estimates from the GLSS data. The growth linkages model (SAM-based model) is then used to analyse the effects of agricultural growth on poverty reduction in Ghana.

Poverty levels have declined since 1991, with the most significant declines occurring among export crop farmers and formal private sector workers. Food crop farmers and savanna zones, the poorest groups in the country, recorded the lowest levels of improvements in their poverty levels. Poverty reduction among these groups was limited by depth and increases in inequality over the period of estimation.

The growth linkages model employed in this analysis is based on the four-sector semi input–output model of Delgado *et al* (1998). The sector includes farm tradables, farm non-tradables, non-farm tradables and non-farm non-tradables. The four-sector structure makes it possible to examine the effects of supply shifters in both farm and non-farm sectors on rural growth. The key issues of model application are assumptions about the price elasticity of supply of non-tradables, the classification of commodities into tradable or non-tradable, and farm or non-farm and estimation of marginal budget shares of commodity groups for different population sub-groups.

Following Delgado *et al* (1998), goods are classified into farm and non-farm sectors, rather than food/non-food or rural/urban sectors because farmers tend to engage in both farm and non-farm activities, and farm households are also non-farm households. All raw farm produce including livestock, milk, eggs, cereals, legumes, roots and tubers and plantains, fruits and vegetables are classified as farm commodities. Processed food items on the other hand are classified as non-farm because the value addition activities are post-harvest activities. All services and unpackaged prepared foods are classified as non-tradables. Household expenditure patterns are analysed on the basis of the average budget shares (ABS), which

measure the percentage of total household expenditure allocated to a commodity group, and marginal budget shares (MBS), which measure the percentage of additional income allocated to a commodity group.

ABS are estimated as: $S_i = E^{Ei} + b_i \; ^{ai}{}_E + c_i \log E + \Sigma_{ii} (\mu_{ij} \; ^{Z}{}_{j\,E} + \lambda_{ij} Z_i)$

Where: ^{Ei} is expenditure on the i^{th} commodity and E is a total consumption expenditure

Z_i is a household characteristics that may affect the level and slope of the Engel functions,

$^{a}{}_i$, b_i, μ_{ij} and λ_{ij} are constants.

MBS were estimated from the modified working-leser model of Hazell and Roell, 1983, Delgado *et al*, 1998, where the expenditure share equation is estimated with an intercept.

$MBSi = {}_{\partial E} \; ^{\partial E}{}_i = b_{i+} c_{i\,(1+} \log E) + \Sigma_{\,i} \lambda_{ij} Z_i$

Estimating growth multipliers include household consumption expenditures on farm tradables and non-farm tradables, household savings, intermediate input demands for farm and non-farm non-tradables.

The multiplier for the non-farm sector is higher than that in the farm sector. Therefore a growth stimulus is more likely to generate a larger impact through the non-farm sector than the farm sector. Secondly, the multipliers from the farm and non-farm sectors are the largest among the lowest income groups and smallest for the highest income group. Thirdly decomposition of each multiplier reveals the higher contribution of farm sector to overall growth multipliers than the non-farm sector. The larger contribution of the additional demand in the farm sector to the total multiplier is a derivation from the results of other studies, but indicates a role for the farm sector to meet the additional expenditure requirements generated from growth.

Although investment in the non-farm sector generates a larger multiplier than the farm sector, there is a strong positive relation between growth in the farm sector and overall national growth. Furthermore, this growth is particularly strong among the poorest through their higher consumption responses for farm non-tradables. Expenditure on farm non-tradables generates large share of the consumption multiplier component of growth. The model assumption of perfectly elastic supply of non-tradables implies that income increases among the poorest groups will tend to mop up surplus or underutilised resources for the production of farm non-tradables. Ghana used both poverty and multiplier analysis to analyse their SAM.

4.4.4 Comparisons with the South African SAM

4.4.4.1 Differences

- The Ghanaian population is divided into twelve household groups and the South African into four.
- The Ghanaian SAM consists of a mini-SAM (which represents SU-tables and integrated economic accounts) and a full SAM which comprises 120 accounts which involve a further disaggregation of factors and households accounts. The South African SAM consists of a national accounting matrix and a full SAM, which involve a further disaggregation of factors.

- The Ghanaian SAM consists of 12 household groups, six occupational groups four educational and skill levels, 12 products and 12 industries, five institutional sectors, rural and urban areas for the South African (Table 5).
- The Ghanaian further does an analysis on poverty using Ghana living standard survey for the 1992/93 and multiplier analysis to analyse their SAM.

4.4.4.2 Similarities

- Both countries compiled their SAMs according to the 1993 SNA.
- Both used supply and use tables and an integrated economic account as their data source.

4.5 Construction of a SAM for Zimbabwe: 1991

The Central Statistics Office (CSO) of Zimbabwe constructed a Zimbabwean SAM for the reference year 1991 according to the 1968 SNA. Each account of a Zimbabwean SAM was represented by a row and column of the table. By convention each cell of the matrix represents expenditure by the column account and an income to the row account. The underlying principle of double-entry accounting requires that total revenue (row total) must equal the total expenditure (column total) for each account in a SAM.

The year 1991 was chosen as the base year for the Zimbabwe SAM in order to accommodate the policy concerns of the macroeconomic reform and regional integration in Southern Africa (MERRISA) project on the impact of Economic Structural Adjustment Programme. Moreover, the years 1992 and 1995 were characterised by severe drought, which would have created an abnormal structural picture of the Zimbabwean economy, unsuitable as a benchmark for policy analysis.

4.5.1 Main data sources

The main data sources for the Zimbabwean SAM were the census of industrial production, a household income and expenditure survey, production accounts of agriculture, surveys amongst small-scale farmers and information from input–output tables for the year 1980.

4.5.1.1 Census of industrial production

The snapshot picture that is distilled from the 1991 SAM by Baustista and Thomas (1999) shows a number of characteristics of the Zimbabwean economy. In the first column of Table 22, the distribution of gross output is shown, while the next column shows the distribution of net output (GDP or value added) amongst activities. Columns 3 and 4 show the distribution of exports, imports and services. The penultimate column shows the fraction (as percentages) of total output of each sector that is exported, while the last column gives an indication of the import intensity.

Row 1 indicates that maize produces 1,1% of the total sectoral gross value of production, while its contribution to GDP is around 1,5% and exports about 1%. The fifth column suggests that about 22% of the maize production is exported. In the second row, wheat-producing activities are less important in Zimbabwe and part of their demand is imported. Other important exporters in Zimbabwe are mining, other manufacturing and private services.

4.5.1.2 Household income and expenditure survey

One of the main focus areas of a SAM is the distribution of income. The agricultural bias of the Zimbabwean economy is reflected in the distribution of household income. Large-scale commercial farming households earned about 35% of the total household income of Zimbabwe, while households that generate income from highly skilled urban-based labour account for about 48%. Small-scale farming households earn about 7%, commercial farm workers about 10%.

Table 22: The structure of the Zimbabwean economy: 1991 (percentages)

	Activities	Output	GDP	Exports	Imports	Exports share of gross output	Imports share of gross output
1	Maize	1,10	1,54	1,04		22,27	
2	Wheat	0,26	0,44		0,21		11,80
3	Other grain	0,20	0,26		0,14		30,34
4	Horticulture	0,61	0,64	0,23	0,06	7,24	2,09
5	Coffee	0,24	0,28	1,18		72, 19	
6	Tea	0,18	.0,21	0,65		52,88	
7	Groundnuts	0,23	0,30	0,13		28,74	
8	Cotton	0,79	0,98	2,35		43,13	
9	Sugar	0,54	0,63	1,45		38,96	
10	Tobacco	5,49	6,60	34,52	0,19	91,70	0,58
11	Other crops	0,59	0,71				
12	Cattle	1,72	1,37				
13	Other livestock	1,39	1,01	0,35		4,51	
14	Fisheries	0,12	0,08				
15	Forestry	0,16	0,25				
16	Mining	4,16	4,51	12,58	1,25	44,06	4,73
17	Grain milling	0,92	0,57				
18	Other food processing	7,74	6,87	2,52	1,97	4,75	4,05
19	Textiles	3,71	2,99	1,71	3,69	6,70	14,13
20	Other light manufacturing	6,34	5,96	2,05	5,29	4,71	12,14
21	Fertilizers	0,98	0,49	0,13	4,02	1,97	40,49`
22	Other manufacturing	12,95	10,28	16,53	77,61	18,61	49,85
23	Electricity and water	2,20	2,66				
24	Construction	6,57	3,09				
25	Trade and transport	17,04	16,73				
26	Public services	10,03	14,06				
27	Private services	13,74	16,53	22,59	5,60	23,98	6,33

Source: Central Statistics Office of Zimbabwe

4.5.2 National accounting matrix

The disaggregation of a Zimbabwean macro SAM resulted from GDP broken down into nine factors of production (various labour and capital accounts) and 36 production activities (such as agriculture, mining and manufacturing) household income broken down into five household classes (along the characteristics of the main breadwinners such as commercial farmers, small-scale farmers, urban high income earners, urban low income earners and large-scale farmers), and 27 commodities (maize, sugar, textiles etc).

The revised set of national accounts (CSO 1997 and 1998) was used as the principal data source to construct the Zimbabwean macro SAM. A few entries were based from other data sources, marketing margin rates which were derived from the 1980 I-O table (CSO 1988), and the total home consumption was estimated from the production account of agriculture, forestry and fishing for communal lands (CSO 1996a) and inter-household transfers (their shares of total income) were estimated from income consumption and expenditure survey (CSO 1994).

Table 23: Zimbabwean NAM: 1991 (macro SAM)

	Activities	Commodities	Factors	Enterprise	Household	Government	Capital	ROW	Total
Activities		Sales			Home consumption				**Total domestic product**
Commodities	Intermediate inputs	Marketing margins			Private consumption	Government consumption	Investment expenditure	Exports	**Total marketing supply**
Factors	Value added								**Total factor income**
Enterprise			Capital income			Transfers			**Total enterprise income**
Households			Labour income	Retained earnings	Inter household transfer	Transfer		Remittance	**Total household income**
Government	Indirect taxes	Import tariffs		Corporate taxes	Income tax			Foreign grants	**Total government income**
Capital				Corporate saving	Household saving	Government saving		Foreign saving	**Total saving**
ROW		Imports	Factor income paid to ROW	Enterprise income paid to ROW		Government income paid to ROW			**Total foreign exchange outlays**
Total	**Total cost of production**	**Total absorption**	**Total value added**	**Total household expenditure**	**Total government expenditure**	**Total investment**	**Total investment**	**Total exchange earnings**	

Source: Central Statistics Office of Zimbabwe

The structure of a macro SAM can be describe as follows:

- Production activities purchase intermediate inputs from the commodities account as well as the services of primary factors.
- The output is either retained by producers for home consumption or sold on the market.
- Factors of production distribute income to enterprises, households and the rest of the world.
- Retained earnings from enterprises (capital income net of corporate taxes and saving) are distributed to households and the ROW.
- Households and enterprises receive factor payments and income transfer from other households, government and the ROW.

The aggregated income flows form part of the macro SAM that shows in more detail the economic linkages among producers, consumers and markets in the economy. NAM/ macro SAM embodies the following principles:

- Any purchase, expenditure or flow of money from any account is a sale, income or flow of money to one or more other accounts. For example, the income generated by factors of production (labour, land and capital) is distributed entirely to the household.
- In each account, total income equals total expenditure. For example, the total income generated by each activity from the sales of output and the value of home consumption must equal the total expenditure on inputs, factors of production and domestic indirect taxes.

Table 24: Zimbabwean national accounts balance sheet: 1991 (Z$ million)

GDP	**Income**	**GDP**	**Expenditure**
GDP f.c	26 284	Government consumption	4 775
Indirect taxes	3 339	Private consumption	20 163
		Gross capital formation	5 658
		Exports	7 075
		Less imports	(8 048)
Total (GDP m.p)	**29 623**	**Total (GDP m.p)**	**29 623**
GDP	**Income**	**GDP**	**Expenditure**
Wage and salaries	11 239	Final consumption	24 938
Rent	529	Gross saving	4 099
Gross operating surplus		Net factor income paid abroad	979
(less imputed banking charges)	14 516		
indirect taxes			
net current transfer from abroad	3 339		
	393		
Total (GNP)	**30 016**	**Total (GNP)**	**30 016**
Capital account	**Income**	**Capital account**	**Expenditure**
Domestic saving	4 099	Gross capital formation	5 658
Foreign saving	1 559		
Total	**5 658**	**Total**	**5 658**
ROW	**Income**	**ROW**	**Expenditure**
Imports	8 048	Exports	7 075
Net factor income	979	Net current transfer	393
		Surplus	1 559
Total	**9 027**	**Total**	**9 027**

Source: Central Statistics Office of Zimbabwe

In view of these principles, the macro SAM entries are derived from aggregated national accounts. The balance sheet in Table 24 shows the correspondence between gross domestic income and expenditure items in the national accounts. Entries such as the GDP at factor cost, final consumption by households and government, gross capital formation, exports and import, and foreign savings are reported in the NAM as they appear in the balance sheet.

Entries requiring some level of disaggregation are derived from other tables in the national accounts such as the central and local government budget tables. This process ensures balance and consistency among the different accounts.

4.5.3 Analysis

The Zimbabwean government adopted an Economic Structural Adjustment Programme and the Zimbabwean Programme for Economic and Social Transformation in an effort to stabilise the macro economy, promote economic growth and improve equity after decades of disappointing economic performance.

Zimbabwe's agricultural sector is extremely dualistic, consisting of a densely populated (mostly communal) smallholding sector and a modern, large-scale commercial (LSC) sector. The LSC sector occupies about one-third of the country's total land area and has a disproportionately large share of the high-potential agricultural land. LSC farms are highly merchandised and show very high crop yields in the small proportion of arable area actually cultivated. By contrast, lower yields characterise the smallholdings farms in which a much higher proportion of the farm is cropped.

The 1991 Zimbabwean SAM constructed according to the 1968 SNA has an agricultural focus (15 of the 27 sectors are agricultural) and incorporates the important distinction between smallholdings and LSC sector in the representation of production technologies and in household classification. Conventional multiplier analysis using the Zimbabwean SAM confirms the hypothesis that exogenous income increases produce stronger linkage effects in lower-income households and agricultural production (relative to nonagricultural production). Within the agriculture sector, larger GDP multipliers (income effects) are associated with smallholdings farms relative to LSC farms, suggesting that productivity increases in Zimbabwean's smallholder agriculture do not depend on a tradeoff between income growth and equity.

The 1991 Zimbabwean SAM has a total of 36 accounts, 17 of which were considered exogenous and 19 endogenous. The endogenous accounts in the SAM were as follows:

- twelve sectors of production
- five household accounts
- two capital accounts.

Exogenous accounts were as follows:

- fifteen sectors of production
- the government
- the rest of the world accounts.

Income and equity implications for alternative growth paths emphasising various agricultural sub-sectors are quantitatively examined based on the calculated SAM multipliers for the relevant activity and commodity accounts. The smallholder road to development, focusing on smallholder production, is associated with the largest GDP multiplier, indicating that each Zimbabwean dollar of additional value-added generated in smallholder farms leads to an increase of Z$1,23 in income elsewhere in the domestic economy (in 1991 prices). The multiplier for light manufacturing, a potentially important source of needed employment

generation in Zimbabwean, is calculated at 1,44, which is lower than any of the agricultural multiplier, with the exception of non-traditional export crop production.

Agricultural growth emphasing smallholder production appears to have the most favourable equity impact. Smallholder households understandably receive the largest income increment. The low-income urban household group also benefits greatly, presumably related to more labour-intensive nature of smallholder household demand.

Zimbabwe also used a computable general equilibrium (CGE) model that allows for relative price effects arising from changes in sectoral supply conditions. It is built around the structure of the benchmark SAM, and has some distinctive features that represent a significant departure from earlier work on Zimbabwe, including an explicit focus on agriculture, emphasis on income distribution among various rural and urban household groups, and a detailed specification of factor markets.

One important result of the CGE model simulations shows that trade policy reform alone – dismantling import and foreign exchange controls and reducing import taxes to a low uniform rate – increases GDP, agricultural production, and aggregate disposable household income. In addition, foreign trade expands markedly (by about a quarter of the base year value). These aggregate effects are even larger when trade liberalisation is accompanied by price decontrol in the maize market. Zimbabwe used multiplier analysis and the CGE model to analyse their SAM.

4.5.4 Comparisons with the South African SAM

4.5.4.1 Differences

- The Zimbabwean SAM was compiled according to the 1968 SNA, while the South African according to the 1993 SNA.
- The Zimbabwean SAM focus more on trade and agricultural policy issues and other concerns are more relevant to industrial policy. The South African SAM on the other hand focuses mainly on household groups.
- The major data sources for the Zimbabwean SAM were the census of industrial production, a household income and expenditure survey, production accounts of agriculture, surveys amongst small-scale farmers and input–output tables whereas the major data sources for the South African were population census, supply and use tables, income and expenditure survey and integrated economic accounts.
- The Zimbabwean SAM consists of five household groups, two skill levels, 36 products and 27 industries, and rural and urban areas (for SA see Table 4).
- The Zimbabweans used multiplier analysis and computable general equilibrium model to analysis their SAM.

4.5.4.2 Similarities

- Both the Zimbabwean and the South African SAMs were divided into national accounting matrix and a full SAM.
- Both SAMs used supply and use tables as one of the major data sources and rural and urban areas as the external matrix.

4.6 Construction of a SAM for Botswana: 1985/86

The Central Statistics Office of Botswana compiled a SAM for Botswana for the reference year 1985/86 according to the 1968 SNA. It was the fifth series of SAMs constructed for Botswana. The other SAMs were constructed for 1974/75, 1976/77, 1979/80 and 1983/84 and were compiled according to the 1968 SNA. The primary objective of Botswana to compile SAMs on a regular basis was to provide an up-to-dated input–output tables and associated tables for a macro economic model for Botswana (MEMBOT).

4.6.1 Main data sources

The main data sources for the construction of the 1985/86 SAM were the household income and expenditure survey, 53 commodities, 34 productive activities, institutions on the capital account and financial assets. Households were broken down into seven groups.

4.6.1.1 Factor income

Fifteen sets of factor income were identified. The first ten relate to the labour force. In addition, five different categories of skills were identified: professional and technical, administrative and managerial, clerical, skilled manual and unskilled. The first four were further disaggregated into citizen and non-citizen.

4.6.1.2 Institutions

The Botswana SAM comprised four institutions, namely households, corporations, government and the ROW. Households were disaggregated into seven components to identify those groups of households which had different patterns of income and expenditure. These household groups include those dependent on wages, urban households dependent on self-employment income, urban households dependent on transfer, rural households dependent on wages, rural household dependent on self-employment income, rural households dependent on transfer and non-citizen households. Households were also categorised according to the type of assets that they held and in particular the number of cattle owned.

Table 25 shows a cross-classification of income by household categories. Citizens' household income accounts were over 70% of income and rose to 90%. Non-citizen households earned over 96% of the wage income. All households received some income from each source of income, wages, self-employment income and transfers. This was followed by institutions and the ROW. Migrant workers abroad fell into this category.

Corporations were split between non-financial and financial institutions. For non-financial institutions a distinction was made between parastatals and other mining organisations. For financial institutions the Bank of Botswana was shown separately. There were five categories of corporations and non-financial institutions, namely mines, non-financial institutions - parastatals, non-financial institutions - other, financial institutions, and financial institutions - other.

Table 25: Household income by type: 1985/86

	Citizen urban households				Citizen-rural households				All citizens		
	Wage	**Self-employed**	**Transfer**	**Total**	**Wage**	**Self-employed**	**Transfer**	**Total**	**All citizens**	**Non-citizens**	**Total**
Income (P million)[15]											
Wage income	19,0	0,4	0,3	**19,8**	10,4	0,8	0,9	**12,2**	32,0	11,5	**43,5**
Self-employed	0,7	1,8	0,2	**2,7**	1,5	9,4	2,0	**13,0**	15,7	0,2	**15,9**
Transfer	1,5	0,1	1,4	**3,0**	1,7	2,4	7,2	**11,4**	14,4	0,2	**14,6**
Total	**21,2**	**2,3**	**1,9**	**25,5**	**13,6**	**12,6**	**10,1**	**36,4**	**62,1**	**11,9**	**74,0**
Percentage by income category											
Wage income	89,6	17,4	15,8	**77,7**	76,5	6,3	8,9	**33,3**	51,5	96,6	**58,8**
Self-employed	3,	78,2	10,5	**10,6**	11,0	74,6	19,8	**35,5**	25,3	1,7	**21,5**
Transfer	7,1	4,3	73,7	**11,8**	12,5	19,0	71,3	**31,1**	23,2	1,7	**19,7**
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Percentage by household type											
Citizens	34,2	3,7	3,1	**41,0**	21,9	20,3	16,3	**58,8**	100,0		
Total	**34,2**	**3,7**	**3,1**	**41,0**	**21,9**	**20,3**	**16,3**	**58,8**	**100,0**		

Source: Central Statistics Office of Botswana

[15] P million: million Pula

4.6.1.3 Commodities and productive activities

Thirty-four productive activities and 53 commodities were distinguished. The number of commodities exceeded productive activities largely because of the number of important commodities that were imported.

4.6.1.4 Comparison of the 1983/84 and 1985/86 SAMs

The 1983/84 SAM differed from the SAM for 1985/86 in two respects: presentation and size and pattern of the data entries. For presentation the 1985/86 SAM includes more disaggregation than 1983/84. Under factors, taxes and subsidies are shown separately and an entry is shown for the informal sector rather than for self-employment. Under the current accounts for institutions, households are disaggregated into seven groups instead of two, financial enterprises are separated from non-financial enterprises and within those the Bank of Botswana is shown separately.

The section on redistributive transactions was completely new in the 1985/86 SAM and replaces the net redistribution shown in the 1983/84. The number of commodities distinguished increased from 36 to 53 and the number of productive activities from 23 to 34.

As far as changes in the pattern and size of data entries are concerned, Table 26 shows household consumption by commodity for the two SAMs at approximately the level of commodity detailed in the 1983/84 SAM and the percentage distribution by commodity. The difference between these distributions was quite remarkable, given that the 1985/86 data was based on the household income and expenditure survey whereas the data for 1983/84 SAM was determined only in the context of a SAM. The household expenditure (food, drink and tobacco) accounted for 58% in the 1983/84 SAM and 55% in the 1985/86 SAM. Other goods accounted for 25% in each year and services 17% in the 1985/86 SAM and 20% in the 1983/84 SAM.

Table 26: Comparison of household consumption by commodity: 1985/86

1983/84 SAM				1985/86 SAM			
Commodity	**Code**	**Pmn[16]**	**%**	**%**	**Pmn**	**Code**	**Commodity**
Cattle	22	-	-	-	-	C1	Cattle
Other livestock	23	0,9	0,2	-	-	C2	Other livestock
Fruits, vegetables and nuts	24	12,7	2,3	3,1	23,5	C3	Fruit, vegetables and nuts
Cereals	25	35,0	6,4	4,0	30,2	C4	Cereals
Other agricultural products	26	19,0	3,5	4,1	30,8	C5	Other agricultural produce
Mining	27-29	-	-	-	-	C6-8	Mining
Sand, gravel, etc.	30	-	-	-	-	C9	Sand and gravel
Cement	31	-	-	-	-	C10	Cement
Meat, edible offals	32	56,9	10,4	9,3	69,6	C11	Meat and product
Dairy products	33	42,0	7,7	4,1	30,9	C12	Dairy product
Oil and fat	34	8,8	1,6	0,6	4,8	C13	Oil and fat
Flour	35	38,4	7,0	6,2	46,3	C14	Flour
Prepared foodstuff	36	51,1	9,4	8,5	63,7	C15	Prepared foodstuff
Beer and soft drink	37	51,1	9,4	8,5	63,7	C16	Beer & soft drink
Other beverages, spirits and vinegar	38	12,9	2,4	11,7	87,5	C17	Other beverages
Tobacco	39	12,8	2,3	2,2	16,4	C18	Tobacco
Textiles and artiles, footwear	40	69,7	12,8	5,4	40,2	C19-20	Textiles & footwear
Hides and skins	41	-	-	-	-	C21	Hides & skins
Petroleum fuels and product	42	5,0	0,9	3,2	23,9	C22	Petroleum
Other commodities	43	62,6	11,5	16,8	126,1	C23-33	Other commodities
Water	44	2,7	0,5	0,7	4,9	C34	Water
Electricity	45	3,2	0,6	0,9	7,1	C35	Electricity
Construction	46	-	-	-	-	C36	Construction
Trading margin	47	-	-	-	-	C37	Wholesaler & retail margin
Rail transport	48-49	1,4	0,3	0,3	2,2	C39	Rail transport
Air transport	50-51	3,4	0,6	0,4	2,7	C41	Air transport
Roads transport	52-53	4,7	0,9	0,9	6,4	C40	Road transport
Education services	54	16,3	3,0	3,5	26,2	C49	Education
Health service:	55	3,6	0,7	1,1	8,4	C50	Health:
Private subsidised	56	4,4	0,8	-	-	C51	Private subsidised
Hotels, restaurants and bars	57	6,4	1,2	0,4	2,9	C38	Hotels & restaurants
Rents, ownership of dwellings	58	26,4	4,8	6,3	47,4	C45-46	Rent & ownership of dwellings
Other service	59	18,3	3,4	5,2	39,1	C42-44 47-48 52-53	Other services
Total		**545,1**	**100,0**	**100,0**	**750,0**		**Total**

Source: Central Statistics Office of Botswana

Table 27 shows the proportion of imports including import duty to total supply for the two matrices at the same degree of commodity detail as above in order to compare how the degree of dependence on imports has changed over the two-year period. It also shows the distribution of total imports by type of commodity in two years. The distribution of other items is also very similar over the two-year period, the most notable difference being in services. However, this was likely to reflect the somewhat different treatment of services rather than a real change in the pattern of imports. When the proportions of total supply provided by imports were

[16]Pmn: million Pula

examined, it was seen that there was a little significant change. Where the proportions do change by more than a little, it was almost always associated with commodities where total supply was small in absolute terms.

4.6.1.5 System used by Botswana

The measure of activity within an economy is conventionally measured by accounting for the production of goods and services. Goods and services may be used in the production of other goods and services or may satisfy the consumers demand. Some goods and services were not used in the production of other goods and services during the 1985/86 period but in the subsequent period. These products were called capital formation. Goods and services that were used to produce other goods and services were called intermediate consumption, while those that satisfied the consumers' needs were called final consumption.

Thus:

	Intermediate consumption
Plus	final consumption
Plus	capital formation
Equal	production

The above equation stems from consideration of what happens to the goods and services once they are produced. The value of intermediate consumption represents a major cost of production.

Economic transactions can be perceived from both the purchaser and seller's points of view. This characteristics leads to double entry bookkeeping and this principle was also used in the national accounts. As categories of transactions change over time, there were two types of tables, one showing incomings and the other outgoings. The entries along the rows of the matrix show income and the entries down the columns show the expenditure. For example, an entry in the row for yarn and for textiles in the column shows the amount of yarn purchased by the textile industry as input into the textile-weaving process.

The first set of rows and columns deals with the primary generation of income. To that end, income in the form of wages and salaries and operating surplus is paid by industries. Wages and salaries are paid to individuals and the operating surplus remains within the firm where it was generated.

Table 27: Comparisons of imports in the Botswana SAMs 1983/84 and 1985/86 as a proportion of supply

1983/84 SAM						1985/86 SAM					
		Imports		Supply	Import/	Imports		Supply	Import/		
Commodity	**Code**	**(P mil)**	**(%)**	**(P mil)**	**Supply%**	**(P mil)**	**(%)**	**(P mil)**	**Supply %**	**Code**	**Commodity**
Cattle	22	0,8	0,1	43,5	1,8	0,8	0,1	56,8	1,4	C1	Cattle
Other livestock	23	0,5	0,1	6,2	8,1	0,8	0,1	2,2	36,4	C2	Other livestock
Fruits, vegetables and nuts	24	8,5	1,1	13,3	63,9	10,5	0,9	29,7	35,4	C3	Fruit, vegetables and nuts
Cereals	25	24,1	3,2	37,1	65,0	32,6	2,9	69,7	46,8	C4	Cereals
Other agricultural products	26	12,7	1,7	30,5	41,6	3,7	0,3	32,3	11,5	C5	Other agricultural produce
Mining	27-29	2,6	0,3	624,4	0,4	4,3	0,4	1257,2	0,3	C6-8	Mining
Sand, gravel, etc.	30	9,5	1,3	12,6	75,4	11,4	1,0	14,5	78,7	C9	Sand and gravel
Cement	31	0,6	0,1	4,2	14,3	2,6	0,2	7,2	36,1	C10	Cement
Meat, edible offals	32	0,6	0,1	124,0	0,5	1,6	0,1	176,5	0,9	C11	Meat & products
Dairy products	33	13,6	1,8	44,8	30,4	13,4	1,2	34,1	39,3	C12	Dairy products
Oil and fat	34	6,7	0,9	11,2	59,8	17,1	1,5	23,7	72,1	C13	Oil and fat
Flour	35	25,9	3,4	38,2	67,8	17,6	1,6	48,3	86,5	C14	Flour
Prepared foodstuff	36	35,2	4,7	66,7	52,8	62,2	5,6	94,3	66,0	C15	Prepared food
Beer and soft drink	37	0,8	0,1	25,8	3,1	4,4	0,4	98,5	4,5	C16	Beer & soft drink
Other beverages, spirits and vinegar	38	5,2	0,7	27,3	19,0	5,3	0,5	16,6	31,9	C17	Other beverages
Tobacco	39	8,7	1,2	12,8	68,0	11,5	1,0	16,8	68,4	C18	Tobacco
Textiles and artiles, footwear	40	70,3	9,3	132,3	53,1	98,4	8,8	161,4	61,0	C19-20	Textiles & footwear
Hides and skins	41	0,5	0,1	10,0	5,0	3,2	0,3	13,2	24,1	C21	Hides & skins
Petroleum fuels and products	42	70,5	9,3	94,9	74,3	100,6	9,0	147,9	68,0	C22	Petroleum
Other manufacture	43	385,4	51,0	575,1	67,0	579,4	52,1	875,7	67,6	C23-33	Other manufacture
Water	44	-	-	16,6	-			26,1	-	C34	Water
Electricity	45	5,3	0,7	60,6	8,7	9,6	0,9	72,7	13,2	C35	Electricity
Construction	46	23,2	3,1	213,0	10,9	6,0	0,5	283,9	2,1	C36	Construction
Trading margin	47	-	-	168,2	-	-	-	207,5	-	C37	Wholesaler & retail margin
Rail transport	48-49	-	-	52,9	-	23,6	2,1	82,5	28,6	C39	Rail transport
Air transport	50-51	15,0	2,0	28,2	53,2	20,0	1,8	34,6	57,8	C41	Air transport
Road transport	52-53	0,3	0,0	31,5	1,0	-	-	67,9	-	C40	Road transport
Education	54	3,5	0,5	80,2	4,4	-	-	193,6	-	C49	Education
Health service	55	0,3	0,0	3,6	8.3	-	-	8,4	-	C50	Health eervice
Private subsidised	56	-	-	30,5	-	-	-	53,6	-	C51	Private subsidised
Hotels, restaurants and bars	57	10,3	1,4	40,4	25,5	-	-	43,7	-	C38	Hotels & restaurants
Rents, ownership of dwellings	58	5,0	0,7	54,1	9,2	-	-	74,9	-	C45-46	Rent & ownership of dwellings
Other service	59	10,4	1,4	469,4	2,2	72,1	6,5	628,2	11,5	C42-	Other services (C42-44, 47-48, 52-53)
Total		**756,0**	**100,0**	**3184,1**	**23,7**	**1112,7**	**100,0**	**4936,2**	**22,5**		**Total**

Source: Central Statistics Office of Botswana

4.6.2 Comparisons with the South African SAM

4.6.2.1 Differences

- The Botswana SAM was compiled according to the 1968 SNA, while the South African SAM according to the 1993 SNA.
- The Botswana population was divided into seven household groups, while the South African population was divided into four population groups.
- The major data source for Botswana SAM were input–output tables, capital assets and household income and expenditure survey.
- Botswana compiled SAM on a regular basis in order to provide an up-to-date input–output tables.
- The Botswana SAM for the year 1984/85 consists of seven household groups, five occupational groups, 34 products and 53 industries, five institutional sectors and rural and urban areas.
- In the Botswana SAM, as it was not the case in South Africa, households are categorised according to the types of assets they held and in particular the number of cattle they owned. The South African SAM on the other hand categorised households consumption expenditure according to four population and twelve expenditure groups.

4.6.2.2 Similarities

- Like the South African SAM, the Botswana SAM also focused on households.
- Both SAMs used income and expenditure as one of the data sources.

4.7 Construction of a SAM for Vietnam: 2000

Successful economic diversification depends on the income potential of alternative production activities for households, which in turn depends ultimately on the downstream linkages of these activities to the rest of the regional, national and global economy. Some activities may be profitable in some areas, where linkages are well articulated. For this reason, elucidating linkages can do much to improve the quality of diversification decision and increase the ultimate returns to factors allocated to diversified activities.

One of the most widely used tools for analysing economic linkages is the social accounting matrix, a double entry bookkeeping device that details a bilateral transaction across a region, nation or global economy, at any level of detail for which data are available. Vietnam is fortunate to have a recent SAM (2000), which was estimated at an exceptionally detailed level according to the 1993 SNA. They use SAM and other data to produce several new datasets, including macro SAMs for each of their fourteen provinces in the Northern Uplands, a regional SAM with disaggregation comparable to the national table, and a two-region table which clearly delineates direct and indirect income-expenditure linkages within and between the two regions and with respect to the rest of the world.

Income diversification effects can occur through backward production, forward production and consumption linkages. Backward production linkages refer to the effect of income diversification on the demand for inputs into the production activity, particularly locally produced inputs. For example, the growth of a fishery industry may result in additional demand for locally produced fish food, fingerlings, pond construction services, and so on. Forward production linkages refer to the effect of income diversification on downstream

users. For example, the same fishery industry development may lead to new fish-drying enterprises, generating income for employees and owners.

Consumption linkages refer to the impact of diversification on household income and, indirectly, on demand for other goods. For example, households whose income has been increased by aquaculture may increase their purchases of meat, fruits and vegetables, with indirect effects on producers of these commodities.

4.7.1 Main data sources

The main data sources for the Northern Uplands Vietnam NAM were General Statistics Office (GSO) and the 1998 Vietnam living standards survey (VLSS). GSO has supplied the macro accounting information available for each of the fourteen provinces in the Northern Uplands. This information is essential, but insufficient to calibrate the NAM for the region and make it consistent with the economy-wide Vietnam NAM.

The VLSS is a detailed household survey for which there are several thousand representative households in the Northern Uplands. From those datasets, Vietnam had extracted information on income sources, expenditure patterns and savings behaviour in a manner consistent with the detailed (97 commodity) final demand accounts of the national SAM. Table 28 shows data obtained from the GSO for construction of North Uplands SAM.

Table 28: Data for construction of North Uplands SAM: 2000

Type of data	Details and source
Marketed production	The gross output number as defined in GSO (2001) pages 90-94 for the year 2000
Intermediate consumption	The intermediate consumption number as defined in GSO (2001) page 94 for the year 2000
Private (household) final consumption	The private consumption number as defined in GSO (2001) page 104 for the year 2000
State (government) final consumption	The state consumption number as defined in GSO (2001) page 134 for the year 2000
Investment/ Gross capital formation	The investment number as defined in GSO (2001) page 104 for the year 2000 (i.e. gross fixed capital formation and change sin inventories)
Net commodity resource flow	This net flow calculated as residual from a supply/use balance table for each province
Value added	The value added number as defined in GSO (2001) pages 90-94 for the year 2000
Compensation of employees	The compensation of employees number as defined in GSO (2001) page 121-127 for the year 2000
Consumption of fixed capital	The compensation of fixed capital number as defined in GSO (2001) pages 121-127 for the year 2000
Operating surplus	The operating surplus number as defined in GSO (2001) pages 121 for the year 2000
Production taxes	The production tax number as defined in GSO (2001) pages 121-128 for the year 2000
State savings	The state savings calculated as revenue minus expenditure
State expenditure by its various components	Figure representing the various categories of state expenditure, including transfers such as social security payments and other current transfers to households, enterprises and central government for the year 2000
State revenue by its various components	State revenue by its various components disaggregated by standard categories

Source: General Statistics Office of Vietnam

Since the data obtained from GSO and elsewhere was disaggregated by province, the NAM was estimated for each of the fourteen provinces in the Northern Uplands.

Table 29 presents a variety of disaggregated economic statistics extracted from 38 sectors of aggregate regional SAM.

Table 29: Structure of marketed supply, demand and value added: 2000

Primary	**[17]X**	**S**	**EV**	**EW**	**EV/S**	**EW/S**	**C**	**I**
Rice	3,30	3,76	1,12	1,11	0,05	0,02	8,95	1,98
Raw rubber	0,19	0,02	1,02	0,91	6,65	1,99	0,00	0,00
Coffee bean	0,47	0,00	2,80	2,35	162,20	45,51	0,00	0,00
Sugarcane	0,37	0,38	0,00	0,00	0,00	0,00	0,10	0,00
Other crops	1,61	1,69	1,02	1,88	0,10	0,06	1,99	0,07
Pigs	1,26	1,37	0,74	0,73	0,09	0,03	4,41	0,28
Poultry	0,32	0,36	0,15	0,15	0,07	0,02	0,41	0,12
Other livestock	0,18	0,18	0,04	0,42	0,03	0,12	0,41	0,12
Irrigation services	0,07	0,08	0,00	0,00	0,00	0,00	0,00	0,00
Other agricultural services	0,11	0,13	0,00	0,00	0,00	0,00	0,00	0,00
Forestry	0,67	0,80	0,09	0,80	0,02	0,01	0,79	0,01
Fishery	1,55	1,77	0,46	0,46	0,04	0,01	1,00	0,01
Energy	6,19	7,11	1,79	1,97	0,04	0,01	1,03	23,30
Mining	1,13	1,32	0,23	0,23	0,03	0,01	0,00	0,00
All primary industry	17,36	18,98	9,45	10,28	0,08	0,03	19,61	25,79
Processed meat	0,13	0,11	0,19	0,19	0,27	0,09	0,10	0,02
Dairy	0,15	0,15	0,13	0,13	0,14	0,04	0,09	0,02
Fruits and vegetables	0,34	0,34	0,34	0,34	0,16	0,05	1,08	0,0
Sugar	0,62	0,71	0,17	0,16	0,04	0,01	0,13	2,07
Coffee beverages	0,05	0,02	0,18	0,15	1,16	0,33	0,03	0,00
Other beverage and tobacco	10,08	11,90	1,37	1,52	0,02	0,01	41,13	0,43
Seafood	1,76	0,35	9,66	4,91	4,34	0,73	0,40	0,00
Animal feed	0,39	0,48	0,00	0,00	0,00	0,00	0,00	0,02
Other production food	0,99	1,09	0,51	0,50	0,07	0,02	2,32	0,17
Building materials	11,01	5,21	50,18	3,98	1,52	0,04	2,92	0,94
Industrial chemicals	2,89	3,30	0,93	0,92	0,04	0,01	2,42	0,85
Agricultural chemicals	0,63	0,73	0,19	0,19	0,04	0,1	0,00	0,05
Technical manufacturing	0,33	0,40	0,00	0,00	0,00	0,00	0,18	0,66
Vehicles	0,76	0,96	0,00	0,00	0,00	0,00	0,86	0,69
Machinery	3,58	4,30	0,14	0,14	0,01	0,00	1,13	10,53
Metal products	2,51	3,03	0,05	0,05	0,00	0,00	0,23	0,40
Textile and apparel	7,94	5,07	13,89	44,80	0,43	0,46	4,27	0,82
Other industry	1,68	1,73	1,22	1,98	0,11	0,06	2,27	0,49
All industry	45,86	39,87	79,16	59,96	0,21	0,05	59,58	18,24

[17] X: total sectoral output, S: regional supply to the regional market-internal or domestic supply, EV: exports to the Rest of Vietnam (ROV), EW: exports to the ROW, EV/S: ratio of ROV exports to domestic supply, EW/S: ratio of ROW exports to domestic supply, C: final household consumption and I stands for investment

Table 29: Structure of marketed supply, demand and value added: 2000 (concluded)

Primary	[18]X	S	EV	EW	EV/S	EW/S	C	I
Utilities	1,50	1,81	0,00	0,00	0,00	0,00	1,16	0,00
Construction	5,65	6,84	0,00	0,00	0,00	0,00	0,00	23,21
Commercial trade	11,96	14,47	0,00	0,00	0,00	0,00	13,56	32,47
Transport services	1,75	1,55	2,69	2,66	0,27	0,09	0,63	0,27
Other private services	9,93	9,48	7,53	25,67	0,13	0,14	5,47	0,01
Public services	6,00	7,00	1,17	1,42	0,03	0,01	0,00	0,00
All services	36,78	41,15	11,39	29,76	0,04	0,04	20,81	55,97

Source: General Statistics Office of Vietnam

4.7.1.1 Supply

In column 1 of Table 29, for example, shares of economy-wide marketed gross output are given for all sectors and aggregates representing primary, industry and service activities. The high level of subsistence agriculture in the Northern Uplands means that agriculture was a relatively small share of marketed output and GDP.

There were many indications that Northern Uplands' agricultural potential, and especially its marketable component, could be expanded significantly and sustainably. This would be done in ways that respond to more attractive output prices and greater value-added. The composition of crops would be shifted towards higher value varieties. More domestic food processing capacity could also be developed, independently or in foreign partnership, and preferably located in rural regions where the income gains would be most significant.

The second column gives sectoral shares of domestic supply. The difference between these and the gross output shares are better understood by reference to columns 3 and 4, which give the corresponding export shares, and measure of supply-side trade dependence for each sector.

In manufacturing, even a cursory review of column 3 indicates that Northern Uplands has not yet captured the export potential of dynamic growth sectors in Vietnam. These sectors not only give leverage to external demand for domestic employment and capacity development, but also accelerate modernisation and confer many growth externalities on the domestic economy.

4.7.1.2 Demand

Demand patterns for the Northern Uplands are captured in column 7 of Table 29, and reflect characteristics typical of economies at the early stages of development. Average incomes are quite low, and private consumption is concentrated on raw and processed food products. The marketable household budget was concentrated on secondary and tertiary expenditure. Urban households had increased demand for durables, but on a national basis Vietnamese households have very limited means for discretionary consumption.

[18] X: total sectoral output, S: regional supply to the regional market-internal or domestic supply, EV: exports to the Rest of Vietnam (ROV), EW: exports to the ROW, EV/S: ratio of ROV exports to domestic supply, EW/S: ratio of ROW exports to domestic supply, C: final household consumption and I stands for investment

4.7.1.3 Value added

The sectoral information in column 9 of Table 29 leads to the regional income determination, detailing value-added shares for labour, capital and land across activities. Vietnamese services are characterised by relatively simple distribution activities and have neither the technological sophistication nor the skill-intensity of advanced economic professional services. Northern Uplands have three state transitions, accompanied by significant rural–urban demographic change, namely:

- The present stage, where agriculture and petty commerce dominate value added
- Industrialisation and significant new urbanisation, driven by exports and technology transfer
- Modernisation, with higher domestic incomes and a large, diversified internal market with a dominant, modern service sector.

The allocation of labour to agriculture in the Northern Uplands was not rewarded by marketable production. Labour value added instead was concentrated in commercial intermediation, trade and transport, as well as wage-oriented light industry.

4.7.2 National accounting matrix

The National Accounting Matrix (NAM) for 14 Vietnam provinces in the Northern Uplands was developed according to the 1993 SNA and for the 2000 reference year. The NAM is essentially a double entry representative of the usual macroeconomic accounting identities. It is used to ensure that the more detailed activity, commodity factor and other institutional accounts in the disaggregated SAM are consistent with the existing macroeconomic information. Table 30 depicts a generic macro SAM in terms of the standard macro accounting identities.

With the macro accounts, intermediate goods are included explicitly, and production is decomposed in the activity and commodity accounts. While there is a little more detail in Table 30, it continues to represent a double entry accounting version of the traditional macro accounts. Relying on the data supplied by the General Statistics Office (GSO, 2002) and the Vietnamese macro SAM developed by Tarp *et al* (2002), 14 regional macro SAMs for northern Vietnam were developed.

The NAM for Vietnam has nine rows and nine columns. Corresponding rows and columns share the same level. For example, row three and column three are both labelled ‘factors’. In the macro SAM, entries are in the form of macroeconomic aggregates. In social accounting matrix, rows track receipts, while columns track expenditure. Hence, row and column sums represent, respectively, total receipts and total payments by a given account or institution. In the tradition of double entry accounting, row sums must equal column sums.

Table 30: An open-economy macro SAM with a government sector: 2000

	Expenditure				
Receipts	**1**	**2**	**3**	**4**	**5**
1. Suppliers	-	C	G	I	E
2. Household	Y	-	-		-
3. Government	-	T	-	-	-
4. Capital account	-	S_h	S_g-		S_fSa
5. Rest of the world	M	-	-	-	-
Total supply		**Expenditure**	**Expenditure**	**Investment**	**ROW**

Source: General Statistics Office of Vietnam

Where:

S_h is private savings
T is tax payment
S_g is government savings
E is exports
S_f is foreign savings
M is imports
G is government
S_fSa is
I is investment
C is consumption
Y is income

Accounting identities

1. $Y + M = C + G + I + E$ (Gross national products)
2. $C + T + S_h = Y$ (Income)
3. $G + S_g = T$ (Government budget)
4. $I = S_h + S_g + S_f$ (Saving investment)
5. $E + S_f = M$ (Trade balance)

4.7.2.1 Estimation of the microeconomic SAM for the Northern Uplands

The microeconomic SAM for the Northern Uplands was estimated at the same level of disaggregation as the economy-wide 2000 Vietnam SAM estimated by Tarp et al (2002). The Northern Uplands SAM includes the following factors:

- Ninety-seven activity/ commodity categories
- Twelve occupational categories of labour
- Capital as a factor of production
- Land as a factor of production
- Natural resources as a factor of production
- Eight types of households
- Types of enterprises
- Provincial and central government accounts
- A variety of fiscal instruments
- Consolidated capital account
- Trade flows with respect to the rest of Vietnam and ROW.

To estimate the SAM for the Northern Uplands, four types of basic data were used:
- The regional macroeconomic SAMs
- Detailed microeconomic survey data from the 1997/98 VLSS, a nationally representative household survey with direct sampling in the Northern Uplands
- The national SAM for 2000.

The basic estimation procedure consisted of a combination of direct survey and non-survey methods. In particular, all direct survey data were combined in the same layout as the national microeconomic SAM, and used as controls to reconcile imputed compositional values for the remaining accounts.

4.7.3 Comparisons with the South African SAM

4.7.3.1 Differences

- The Vietnamese compiled their SAM for 14 provinces, while the South African SAM is a national one.
- The major data sources for the Vietnamese SAM were Vietnam the living standards survey, general statistics office, the provincial and central government accounts.
- The Vietnamese population were divided into eight household groups and the South African into four population groups.
- The Vietnamese SAM consists of eight household groups, 12 occupational groups, 38 products and 38 industries and 14 provinces.

4.7.3.2 Similarities

- Like South Africa, Vietnam compiled their SAM according to the 1993 SNA.
- Both SAMs compiled an aggregated national accounting matrix
- Both SAMs disaggregated households according to their expenditure patterns.
- Both used supply and use tables with products and industries.

4.8 Construction of a village SAM for Ethiopia: 2000

Constructing a village SAM requires a very thorough knowledge of the functioning of the village economy, markets and institutions that govern the distribution of factor income across households. It is often very difficult to construct village SAMs based on standard household surveys that gather data on farm budgets and consumption mainly because such data often do not contain information on the origin and destination of transaction the revenue and expenditures. The village SAM for Ethiopia was constructed for a village in Ada-Liben district, a south-eastern Shewa region of Ethiopia. It was constructed for the year 2000 according to the 1968 SNA.

4.8.1 Main data sources

The data for the Ethiopian village SAM came from a detailed household survey in 1994 for the production year 1993/94. A stratified sample of 120 farms, classified into four groups based on their oxen ownership, was subjected to a detailed questionnaire. Since land is cultivated using a pair of oxen, ownership of oxen locally is regarded as an important

indicator of wealth. The four groups of 30 households each in the village SAM represented households with no ox, one, two and more than two oxen.

The SAM framework includes a matrix of double account where rows represent income and columns represent expenditure. As a comprehensive and consistent accounting method, the SAM framework requires balancing of incomes and expenditures in all entries. The level of disaggregation in a village SAM depends on the analyst's preference, the objectives of the research and the availability of data. Entries under production activities could be disaggregated to include all village farm and off-farm activities as well as household chores (cooking, fetching water and firewood, childcare, etc). In addition to the production activities, a separate commodities account can be included representing the major household consumption categories and the domestic product market.

A farm household-modelling framework and consumption include the value of subsistence production as well as family labour time consumed as leisure. The factor of production includes labour, traction power (tractor, oxen, etc), land, fertilizer, fodder, farmyard manure and so forth. The capital accounts include investments and savings by households. Village institution sets the production, consumption, access to resources, and exchange relationship. Government and local administrative structures may also be part of the institutions account. Depending on the level of market development in the village, the rest of the world account includes exchange with the rest of the village, other markets in the country and international markets.

The basic characteristics of the four groups of farm households are given in Table 31. The samples were randomly selected from a stratified group of all household-farms in the village. A questionnaire specially designed to suit a village SAM was used to capture the transaction on the income and expenditure of households. The origin and destination of all such transactions were registered market-by-market as within village (nearby local market) and distant markets. All transactions at the distant markets involved the significant transactions costs in terms of the time and transportation costs to and from such regional markets.

There are local markets for village output and factors within the village. Since land is non-tradable in Ethiopia, short-term rental markets existed. These markets often lacked legality but are commonly used by farmers to ease short-term supply and demand constraints for farmland. The demand for land is often larger than the available supply, but the short-term nature of such contracts and lack of formality serve as a check on land rental prices.

Labour may also be hired within the village, but the shallowness and markets seasonality of village production activities introduce uncertainty and variation in wages. Except during the few peak seasons, labour demand does not seem to clear supply within the village. Some labour may however be also transacted outside of the village, but that involves transaction costs. Some household members may migrate for short periods and search for temporary employment in other areas outside the village. Some households, especially those who lack sufficient land and oxen may also engage in petty trade and other off-farm activities. Because of shallow local markets and high transaction costs related to migration outside the village, the shadow value of family was assumed to be lower than the wage rate within the village.

Table 31: Basic characteristics of surveyed households in Ada-Liben district: 1993/94

	Households with one, two and more oxen	Groups	
Oxen	**Household**	**Ox**	**Oxen**
Sample size	30,00	30,00	30,00
Proportion in the village	0,12	0,11	0,4
Family size (person)	3,4	4,83	5,2
Consumer (normalised units)	2,98	4,23	4,55
Workers (normalised units)	1,81	2,61	2,86
Education of household heads (years)	1,6	1,07	1,08
Estimated nominal discount rate (%)	120,00	84,00	69,00
Operated farmland (kert)	2,59	6,72	8,57
- Teff	1,72	4,31	5,77
- Cereals	0,36	1,03	0,97
- Pulses	0,51	1,38	1,83
- Livestock	0,31	2,46	4,46
- Livestock	0,31	2,46	4,46
Annual net household income	1951,00	2813,00	3086,00
- Crop production	931,00	2420,00	2876,00
- Livestock production	80,00	164,00	83,00
- Employment and business	410	98	127
- Land rental income	530,00	107,00	0,00
- Oxen rental income	0,00	24,00	0,00
- Oxen rental income	0,00	24,00	0,00
Marketed surplus	490,00	1035,00	1328,00

Source: A social and environmental accounting analysis

The total value of crop and livestock production activities includes the value of by-products generated by these activities (crop residues used as fodder and dung used as fuel wood in the village). Crop production takes place on two types of farmland: well-drained upland soils on the hills and poorly drained vertic, lowland soil on the foothills. Soil degradation due to erosion and nutrient mining is a major problem on shallow red soils on the uplands where intensive production takes place without proper land management practices.

Change in the value of the soil stock is included in the SAM under the capital accounts. These changes reflect the level of soil degradation that results from annual production activities valued in terms of lost agricultural production. The user cost of erosion on the two types of land is computed in terms of the perpetual discounted productivity loss due to soil erosion. This was estimated from a damaged function due to the erosion for each type of crop produced under the two types of land. Since annual rates of soil formation are very low, the soil stock can be a concern as non-renewable in the short-term and eroded soil is practically lost once and for all therefore appropriate to estimate the perpetual economic benefits lost by not having soil on the farm. The user costs are estimated based on the farmer's real rates of a discount.

4.8.2 Analysis

The village SAM was used to examine the intersectoral linkages in the village economy in terms of the multipliers that would be generated from flow of resources into each endogenous elements of the SAM. The derived multipliers were also used to run some policy experiments on the effect of exogenous policies on the village economy.

Table 32 shows five groups of endogenous and four groups of exogenous accounts. The A matrices represent the coefficients of endogenous accounts. The F matrix represents exogenous injections in terms of increased demand village output and a reduction in transaction costs. The exogenous injections produced corresponding leakages in terms of increased government revenues and payments to parts of the country in terms of transaction costs and increased imports. This is represented by vectors in the rows of the exogenous accounts. Ethiopia used multiplier analysis to analyse their village SAM.

Table 32: Elements of the Ethiopian village SAM

		Expenditure								
		Endogenous accounts					**Exogenous accounts**			
Receipts	**Endogenous accounts**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
	Production activities		A_{12}					F_{17}		F_{19}
	Commodities					A_{25}				
	Factors	A_{31}							F_{18}	
	Capital					A_{45}				
	Institutions (household)			A_{53}	A_{54}	A_{55}	F_{56}			F_{59}
	Exogenous account									
	Government					$\lfloor_{65}$		$\lfloor_{67}$		
	Rest of village		$\lfloor_{72}$	$\lfloor_{73}$						
	Transaction costs	$\lfloor_{81}$								
	Rest of Ethiopia	$\lfloor_{91}$	$\lfloor_{92}$	$\lfloor_{93}$			$\lfloor_{96}$		$\lfloor_{98}$	
	Total	$_1Y$	$_2Y$	$_3Y$	$_4Y$	$_5Y$	$_6Y$	$_7Y$	$_8Y$	$_9Y$

Source: A social and environmental accounting analysis

Where:

A_{12} is production of commodities for home consumption

A_{31} is payments to factors of production

A_{25} is expenditure patterns of household groups

A_{54} is change in stock by household group

A_{52} is investment on the natural resource stock per household

A_{55} is household transfer within village

A_{56} is transfer from government to household

F_{17} and F_{17} are products sold within village and exported out of the village

F_{18} is transfer from household

$_1Y - _9Y$ are income linkages within village SAM

$\lfloor_{(72,\ 73,\ 81,\ 91,\ 92,\ 93,\ 96\ \text{and}\ 98)}$ are expenditure linkages within Village SAM

Through income and expenditure linkages within the SAM, changes in exogenous accounts given in the F sub-matrices will determine the level of income in endogenous accounts.

In order to derive the SAM multipliers for policy analysis, the endogenous part of the SAM accounts was converted into the corresponding matrix of average expenditure propensities.

The SAM coefficient matrix, a sub-matrix of endogenous shares, was defined by dividing each element in a given column of endogenous accounts by the sum total at that column.

For endogenous accounts, the total income Y can therefore be computed as:

$$Y = CY + F$$

Where

F is the matrix consisting of the sub-matrices for exogenous accounts, and

CY is the coefficient matrix of endogenous accounts.

This implies that the row totals of the endogenous accounts can be obtained by multiplying the average expenditure propensities for each row by the corresponding column sum and adding exogenous income F.

When the multiplier matrix is derived from average expenditure propensities, the endogenous accounts, as opposed to marginal expenditure propensities, is commonly referred to as the accounting multiplier matrix. However, using average expenditure shares implies unitary expenditure elasticities, and hence the computed average expenditure propensities are constant over any incremental exogenous injection.

Transaction costs and the performance of rural markets determine the degrees to which rural markets and communities are linked and integrated with markets in other parts of the country and the rest of the world. When inter-household production and expenditure linkages within villages/communities are not very strong, micro-economy wide model will not be very useful. Transaction costs and differentiation among households determine the level of market development and trade within villages. Accordingly, two major cases where village economy-wide modelling will not be appropriate.

Firstly, in subsistence rural economy where all households are self-sufficient and markets are not used, all prices are endogenous to the households. In this case, idiosyncratic prices will encourage self-sufficiency rather than trade so that all goods and services are non-tradables. Households supply their own inputs and consume their own output. Inter-household income linkages within the village are therefore non-existent or underdeveloped.

Secondly, in a well-developed open village economy, which is very well integrated and connected with other outside markets (local, regional, etc), interaction within the village economy is less important. All prices are determined outside local markets. In such a village, households often specialise according to the comparative advantages and trade with outside markets at exogenously determined prices. Hence, all goods or services are village tradables and households are price takers, exogenous change on the supply or demand for village tradables will not influence local price and production.

On the other hand, economic linkages within the village economy are highest when all goods and services are village non-tradables, which is when trade takes place only within the village but not with outside markets. This may be the case with an isolated village with high transaction costs, but high differentiation among households encourages trade within the village. As in many developing countries, a typical village in Ethiopia is often partially integrated to outside markets and trade occurs both within the village and with markets in the rest of the world.

In this case, differences in household specific transaction costs will make some prices to be endogenous to households while others are exogenous hence some goods and services are household non-tradables (non-traded within the village), others are village non-tradables (traded only within the village) others village tradables (traded with markets outside the villages). Some products and factors are bought and sold outside the village, while rental markets for factors like land and oxen only exist within the village, and households may be self-sufficient in some factors like labour. In this case, village-wide equilibrium effects and income linkages within the villages are expected to be relevant for policy analysis. For South Africa, one might have to do this study for rural areas, i.e. rural breakdown of income or expenditure patterns as compared to that of urban.

4.8.3 Comparisons with the South African SAM

4.8.3.1 Differences

- The Ethiopian village SAM was compiled according to the 1968 SNA, while the South African was compiled according to the 1993 SNA.
- The Ethiopians compiled a village SAM, which mainly focused on farms and ownership of oxen. The South African compiled a national SAM which focused mainly on households.
- The Ethiopian population was divided into four household groups and the South African into four population groups.
- The main data sources for the Ethiopian village SAM were a stratified sample of 120 farms and a household survey, while the SA SAM's major data sources were population census, income and expenditure survey, supply and use tables and integrated economic accounts.
- The Ethiopian village SAM consists of four household groups, 120 farms and the villages.
- The Ethiopian used multiplier analysis to analyse their village SAM.

5. Conclusion

A Social Accounting Matrix represents the link between two, often distinct, fields of statistics, namely economic and social statistics. The integration of these fields enables a wider range of policy issues to be monitored and analysed. For example, the level and composition of employment (unemployment) is an important social concern. A SAM provides additional information on the level of employment via a subdivision of compensation of employees by skills. Additionally, the savings ratio is a key economic indicator. A SAM will therefore provide information on the contributors to national saving and their predominant source of income. A SAM also provides a useful tool for analysing the informal economy, for example, household sector.

5.1 Methodologies used in industrialised countries

5.1.1 United Kingdom

The United Kingdom (UK) has a long history of producing SAM and several SAMs have been produced by academics. An official SAM was produced by the Office for the National Statistics in 1996 for the reference year 1993. The 1993 SAM was compiled according to the recommendations of the 1993 SNA. The UK SAM is a labour-oriented one in that labour input is broken down by gender and educational level, and households are broken down according to the main source of income.

5.1.2 Netherlands

The 1994 SAM was constructed according to the 1993 SNA. This was the revised SAM for the year 1993. The main focus of the 1994 SAM was on households and the labour market positions. Households were divided into five groups, namely single persons without children, single persons with children, couples without children, couples with children and pensioners. The labour market position was further divided into five groups: employed persons, persons receiving an unemployment insurance benefit, persons receiving unemployment assistance benefits, persons receiving disability benefits and other non-participants (including people in early retirement schemes, students and aged persons).

5.2 Methodologies used in developing countries

5.2.1 South Africa

The 1998 SAM was compiled according to the 1993 SNA. This was the second SAM Stats SA compiled; the first one was for the reference year 1988 and was constructed according to the 1968 SNA. The main focus of the 1998 SAM was to describe the role of the household sector relative to other sectors of the economy. This was achieved by detailing their final consumption expenditure according to four population groups and twelve expenditure groups. The low and middle expenditure groups spend the largest proportion of their final household consumption expenditure on food. The high expenditure groups spend less than half of their final consumption expenditure on manufacturing products, of which one-third was spent on manufactured food products.

5.2.2 Russia

The 1993 SAM was constructed according to the 1993 SNA. Russia constructed an aggregated SAM from their national accounts and flow of funds and eliminated the statistical discrepancies using a matrix balancing method. The elimination of the statistical discrepancies made it possible for Russia to apply matrix algebraic operations to the SAM. The main focus of the 1993 SAM was on the production factor, institutional sectors, investment and saving and the ROW. The Russian SAM includes the production factor which does not exist in the 1993 SNA, because Russia wants to propose another possible statistical picture on their economy.

5.2.3 Tanzania

The SAM constructed for Tanzania was for the year 1992 and followed by another ones 1998, 1999, 2000 and 2001. The Tanzanian SAMs (from 1992-2001) were constructed according to the 1968 SNA. The 2001 SAM is not yet published. Tanzania compiles SAMs on a regular basis in order to try to balance their SAMs using the cross-entropy approach. The main focus for the 2000 SAM was on the disaggregation of agricultural products, which comprise 21 of the 43 sectors, four types of households and four labour categories. Labour was disaggregated according to gender and educational level.

5.2.4 Zambia

The 1995 SAM was constructed according to the 1968 SNA. This is the only SAM constructed for Zambia. It was divided into three steps: a highly disaggregated SAM (NAM), micro SAM and the cross-entropy approach. The cross-entropy approach was used to balance the micro SAM and generate the final estimated SAM. The main focus of this SAM was on agricultural products, which comprise 14 out of 28 products, six household groups and four labour categories. Households were disaggregated according to urban and rural.

5.2.5 Ghana

The 1993 SAM was constructed according to the recommendations of the 1993 SNA. It was divided into a mini SAM and a full SAM. The mini SAM is the representation of the supply and use tables and integrated economic accounts, while the full SAM involved a further disaggregation of the factor accounts and household groups – which were broken down into 12 groups based on gender, educational level and occupational category. The household groups were further disaggregated into rural (poor) and the urban (non-poor). The poor derived more of their income from the agricultural sector than the non-poor, and had lower educational levels than the non-poor.

5.2.6 Zimbabwe

Zimbabwe's 1991 SAM was constructed according to the 1968 SNA. This is the only SAM constructed for Zimbabwe. The main focus of the 1991 SAM was on trade and agricultural policy issues and distribution of income. The agricultural bias of the Zimbabwean economy is reflected in the distribution of household income. Large-scale commercial farming households earn about 35% of the total household income in Zimbabwe, while households that generated income from highly skilled urban-based labour account for about 48%. Small-scale farming

households earn about 7%, commercial farm workers about 1% and lowly skilled urban workers about 10% of commercial farming.

5.2.7 Botswana

The 1985/86 SAM was constructed according to the 1968 SNA. This was the fifth SAM constructed for Botswana. The very first SAM constructed for Botswana was for the reference year 1974/75 and was compiled according to the 1968 SNA, followed by SAMs for 1976/77, 1979/80 and 1983/84. The primary objective for Botswana to compile SAMs on a regular basis was to provide up-to-date input–output tables and associated tables for the macro economic model for Botswana (MEMBOT). The main focus of the 1985/86 SAM was on households, which had different patterns of income and expenditure. Households were broken down into seven groups and categorised according to the type of assets that they possessed particularly the number of cattle owned.

5.2.8 Vietnam

Vietnam constructed the 2000 SAM for 14 provinces. This SAM was constructed according to the 1993 SNA. It consists of eight household groups, 12 occupational categories, and 97 commodities and activities. Household groups were further disaggregated according to income source, expenditure pattern and saving behaviour. The 97 commodities and activities were aggregated to 38 sectors, of which 18 were from the agricultural sector.

5.2.9 Ethiopia

The 2000 village SAM was constructed according to the 1968 SNA. The first village SAM constructed by Ethiopia was for the reference year 1988 and was also constructed according to the 1968 SNA. The main focus of the 2000 village SAM was on farms, four household groups and the rental of oxen. Land is non-tradable in Ethiopia (no household owns farms), so the short-term rental market exists. Apart from land, oxen for traction can also be obtained within the village on a rental basis. Households who rent land are more specialised than those who rent oxen.

5.3 Comparisons between the 1998 South African SAM and other countries

Table 33 compares the different SAMs described in this report.

Table 33: Comparisons between the South African SAM and other countries

South Africa	Tanzania	Russia	United Kingdom	Zambia	Ghana	Zimbabwe	Botswana	Vietnam	Netherlands	Ethiopia
Compiled according to 1993 SNA	Compiled according to 1968 SNA	Compiled according to 1993 SNA	Compiled according to 1993 SNA	Compiled according to 1968 SNA	Compiled according to 1993 SNA	Compiled according to 1968 SNA	Compiled according to 1968 SNA	Compiled according to 1993 SNA	Compiled according to 1968 SNA	Compiled according to 1968 SNA
Four population groups	Six household groups		Four household groups	Four household group	Twelve household groups	Five household groups	Seven household groups	Eight household groups	Five household groups	Four household groups
Eleven occupational & 12 percentile groups	Four labour categories		Three income levels	Four labour categories	Six occupational groups		Five occupational groups	Twelve occupational groups	Five labour markets	
Four skill levels	Four educational levels		Three educational levels	Four educational levels	Four educational & Four skill level	Two skill levels			Seven educational levels and gender	
Twenty-seven products & 27 industries	Forty-three products & 43 industries			Twenty-eight products & 27 industries	Twelve products & 12 industries	Thirty-six products & 27 industries	Thirty-four products & 53 industries	Thirty-eight products & 38 industries	Six industries	Hundred and twenty farms
Integrated economic accounts		Production factors, investment, savings & ROW	Integrated economic accounts		Integrated economic accounts	Production accounts of agriculture				
Four institutional sectors		Five institutional sectors	Four institutional sectors		Five institutional sectors		Five institutional sectors		Four institutional sectors	

Table 33: Comparisons between the South African SAM and other countries (continued)

South Africa	Tanzania	Russia	United Kingdom	Zambia	Ghana	Zimbabwe	Botswana	Vietnam	Netherlands	Ethiopia
NPISHs published with household groups			NPISHs published with household groups		NPISHs published separately				NPISHs published with household groups	
Rural & urban areas	Rural & urban areas			Rural & urban areas	Rural & urban areas	Rural & urban areas	Rural & urban areas	Fourteen provinces		Village SAM
Twenty-seven products & 27 industries	Forty-three products & 43 industries			Twenty-eight products & 27 industries	Twelve products & 12 industries	Thirty-six products & 27 industries	Thirty-four products & 53 industries	Thirty-eight products & 38 industries	Six industries	Hundred and twenty farms
Integrated economic accounts		Production factors, investment, savings & ROW	Integrated economic accounts		Integrated economic accounts	Production accounts of agriculture				
Four institutional sectors		Five institutional sectors	Four institutional sectors		Five institutional sectors		Five institutional sectors		Four institutional sectors	
NPISHs published with household groups			NPISHs published with household groups		NPISHs published separately				NPISHs published with household groups	
Rural & urban areas	Rural & urban areas			Rural & urban areas	Rural & urban areas	Rural & urban areas	Rural & urban areas	Fourteen provinces		Village SAM

Table 33: Comparisons between the South African SAM and other countries (concluded)

South Africa	Tanzania	Russia	United Kingdom	Zambia	Ghana	Zimbabwe	Botswana	Vietnam	Netherlands	Ethiopia
National Accounting Matrix			National accounting matrix	National accounting matrix		National accounting matrix		National accounting matrix	National accounting matrix	
Full SAM	Full SAM	Full SAM	Pilot SAM	Full SAM	Full SAM	Full SAM	Full SAM	Full SAM	Pilot SAM	Full SAM
	LFS		LFS	LFS					LFS	
Population census	HBS	Household income survey	HBS	HBS	GLSS	Census of industrial production		VLSS	HDS	Household survey
Income and expenditure survey			EFS	Income and expenditure survey		Income and expenditure survey	Income and expenditure survey		Socio-economic accounts	Farms budget and consumption survey
Supply and use tables	Supply and use tables		Supply and use tables	Supply and use tables	Supply and use tables	Supply and use tables			Cumulated production structure	
					Poor and non-poor					
			Labour account						Labour account	
	Cross-entropy approach	Matrix balancing methods		Cross-entropy approach	Multiplier analysis	CGE & multiplier analysis			MIMIC/ applied general equilibrium	Multiplier analysis

5.4 The most important characteristics used in other countries

Below are the most important characteristics used in other countries to construct their SAM. South Africa can use some of these characteristics to construct the SAM in the future.

According to our research we discovered that:

- Most countries compiled their SAMs according to the 1968 SNA (six countries out of eleven), while South Africa used the latest version (1993 SNA).
- Population groups were divided (broken down) into gender, educational level, labour market position, skills level, occupational group and household type.
- Examples of disaggregation used for the labour market are employed persons (including self-employed), persons receiving unemployment insurance benefits, person receiving disability benefits, pensioners, students, main source of income and expenditure.
- Examples of disaggregation used for the educational levels are no formal or basic education, completed primary school, completed secondary school and completed tertiary school.
- Examples of skill levels are the highly skilled, middle skilled, lowly skilled and unskilled. The highly skilled in the labour market are professionals, technicians and the senior managers.
- Examples of disaggregation of occupational groups are farming, trading, clerical, service workers, construction, technicians, professionals and managers.
- Examples of household types are single, couple, pensioners, student, rural and urban households, assets household owned.
- In Netherlands, lowly skilled employees are not persons with low education, but persons with lower positions in the labour market and unskilled are those with low education. The lowly skilled in the labour market are such people as craftsmen, agricultural workers, clerks, construction workers and cashiers.
- Most countries used total household income sources while South Africa used expenditure because people are more reluctant to provide information on their earnings than their expenditure. Vietnam also used both income and expenditure.
- In both the United Kingdom and South Africa, non-profit institutions serving households transactions are not published separately, but are combined with those of the household sector, because of the lack of data to accurately distinguish between the two sectors.
- In Ghana, non-profit institutions serving households transactions are published separately. Examples of these sectors are private schools, clinics, churches, etc.
- The Netherlands and the United Kingdom compiled their SAMs using labour accounts, and used labour force surveys as data sources. South Africa is currently busy with the feasibility study for compiling labour accounts with the SAM.
- Employment and unemployment data were also used to construct a SAM. Employed persons are all people with jobs. Statistics Netherlands defined employed persons as only those who work at least twelve hours per week or are willing to do so. Unemployed persons are people who voluntarily seek jobs. Employment is defined as both the employed and the self-employed engaged in some productive activity that falls within the productive boundary. Unemployment is defined as all jobless people who are actively looking for work and excludes all jobless people who are not actively looking for work.
- Botswana and Tanzania construct a SAM on a regular basis in order to update their data sources.
- Vietnam compiled a SAM for fourteen provinces.
- Ethiopia constructed a village SAM.

5.5 Recommendations

Based on the various experiences from other countries, it is evident that a SAM is an extremely valuable tool for analysing the household sector's role within the national accounts. Stats SA should endeavour to construct an updated SAM based on more recent data sources as soon as possible. This is however not possible, given the constraints within Stats SA as well as the limited international experiences with SAM based on SNA '93, to develop various economic models at this stage.

It is proposed that the next SAM should be constructed with the following characteristics:

- In the 1998 SAM (SA), the population was divided into four (population) groups. According to the research findings most countries populations were categorised according to gender, educational level, labour market position, skill level and household group. South Africa can also consider the same approach. Households can also be divided into rural and urban household groups.
- In the 1998 SAM, occupational levels (senior managers, professionals, technicians, service workers, craftsmen, labourers, cashiers etc) were divided into eleven groups. For the SAM in the near future South Africa can aggregate occupational groups into eight groups, while the skill levels (unskilled, lowly skilled, skilled and highly skilled) remain the same as in the 1998 SAM.
- In the 1998 SAM, percentiles were divided into 20 groups and aggregated into 12 groups. South Africa can further aggregate percentiles into eight groups.
- South Africa can disaggregate educational levels into four groups i.e. no schooling, primary school, secondary school and the tertiary school.
- In 1998 SAM, population groups were further divided into twelve expenditure groups (not income groups). Countries such as the UK, Zambia, Netherlands and Ghana used income source, while Vietnam used both income and expenditure groups. South Africa can continue using the expenditure groups because people are reluctant to give information about income.

Users of the SAM and other interested parties are welcome to submit their thoughts in this regard. Your contributions will form valuable inputs in the development and design of the next SAM.

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Table 34: Comparison of the 1968 SNA and the 1993 SNA

1968 SNA	1993 SNA
Economic agents	Institutional sector
Input–output tables	Supply and use tables
No emphasis on prices, incentives the role of market versus that of the state	Emphasis on price, incentive and the role of market versus that of the state were address
Recommends only one particular SAM	Range of SAMs corresponding to a range of purpose
SAM is a square matrix	SAM is a presentation of SNA in a matrix form
Factor income	Primary income
Direct taxes	Current taxes on income and wealth
Other indirect taxes and imports	Other taxes on production
Commodity taxes	Taxes on products
Indirect taxes	Taxes on production and imports
Change in stock	Change in inventory
Gross national product	Gross national income
Intermediate consumption	Gross fixed capital formation
Imputed bank services charges	Financial intermediation services indirectly measured (FISIM)
Macro SAM	National accounting matrix
Quintiles	Percentiles