A SOCIAL ACCOUNTING MATRIX FOR MADAGASCAR: METHODOLOGY AND RESULTS

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with

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ABBREVIATIONS

AIRD	Associates for International Resources and Development
BDE(DG)	Banque des Donées de l'Etat (Direction Générale)
CGE	Computable General Equilibrium Model
CUS	Centres Urbains Secondaires
EBM	Enquête sur les Budgets des Ménages
EEC	European Economic Community
FMG	Franc Malagasy
GCU	Grands Centres Urbains
IMF	International Monetary Fund
INSRE	Institut National de la Statistique et des Etudes Economiques
MPARA	Ministère de la Production Agricole et de la Reforme Agraire
SAM	Social Accounting Matrix
TEE	Tableau Economique d'Ensemble
TOF	Tableau d'Opérations Financières

FOREWORD

CFNPP monograph 9 detailed the evolution of Madagascar's economic crisis and the policy reform initiatives that were undertaken in response to growing budget and balance of payment deficits. The trends of macroeconomic policy and performance, and the response of markets and the microeconomy, were analyzed. In addition, monograph 9 elucidated the linkages between macro policy and household-level outcomes. However, it did not deal with the issue of the counterfactual: what would have occurred in the absence of macroeconomic adjustment?

Addressing this question demands construction of a simulation model. In the case of Madagascar, a computable general equilibrium model (CGE) will be developed to enable decision makers to better understand the macro- and household-level impact of alternative policy options. As an interim step in building the CGE, a social accounting matrix (SAM) has been developed, and is described and discussed in this working paper. Like all SAMs, it represents an internally consistent data set that enables an analysis of the relationships of production, factor payments, employment, and the distribution of incomes. The Madagascar SAM also makes an important contribution as it represents one of the very few attempts to construct a SAM for sub-Saharan Africa; another attempt is the SAM for Cameroon described in CFNPP working paper 4.

The research in Madagascar is part of a multi-country study being performed by CFNPP staff in sub-Saharan Africa to determine the effect of economic reforms on macro performance as well as household levels outcomes, particular attention being given to distributional implications. The research is being funded under a cooperative agreement with the Africa Bureau of the US Agency for International Development.

Ithaca, New York
March 1991

David E. Sahn
Deputy Director, CFNPP

1. AN INTRODUCTION TO SOCIAL ACCOUNTING MATRICES (SAMS)

A Social Accounting Matrix (SAM) is essentially a snapshot of an economy in a given year; it presents aggregates of national accounts in a matrix that explicitly includes income distribution (Decoster 1982; Hayden and Round 1982). By disaggregating national accounts data into constituent institutional parts, the SAM enables the examination of distributional issues in a manner that demonstrates the relationships among employment, income distribution and production.

While the use of social accounting dates from at least the eighteenth century with Francois Quesnay and his Tableau Économique, direct interest has only recently arisen with the development of economywide general equilibrium models as a means to analyze distributional and sectoral impacts of development policy. The SAM imposes tight bookkeeping constraints that are from the start of a modeling exercise and that ensure the data are consistent with the national income and input-output accounting (Taylor 1990).

THE STRUCTURE OF A SAM

The structure of a SAM depends on the analytical objective of the exercise and on data availability. The SAM can be either simple and highly aggregated or detailed and disaggregated, depending on the reasons for which the SAM is being built. It may be relevant to incorporate a wide range of institutions and socioeconomic categories, such as household types categorized by occupation of the head of household or location, by technological characteristics of production activities, or by qualitative differences among factors of production. However, the amount of disaggregation is ultimately constrained by data availability.

A SAM is a square matrix divided into submatrices or accounts. Rows represent receipts by accounts and columns represent payments by accounts.[1] Since all resources must be exhausted by uses, row sums equal column sums for each account. SAMs are based on the double-entry accounting principle that receipts by one account must equal expenditures

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[1] Some columns or rows may be split into subaccounts, reflecting, for example, two different technologies used to produce the same product. Thus, the SAM may not technically be a square matrix (i.e., it may not have the same number of columns and rows).

by another account, although there is the complication that each cell in the SAM shows the transaction only once-that is, the entry shows both the origin and destination of the particular transaction (Hayden and Round 1982).

Another characteristic of SAMs is that they often use dummy account submatrices that serve to map row accounts to column accounts even though there is no real transaction. Theoretically, these submatrices show that income or production is transferred from one set of accounts to another. An example is the mapping of factor income to households in the factor income submatrix.

The number of accounts depends, as mentioned above, on the objectives of the exercise and on data constraints. However, a number of basic accounts are common to all SAMs.[2]

First, production accounts depict the supply side of the economy: intermediate inputs and payments to factors of production are shown as expenditures of activities (productive sectors), and the values of the outputs are shown as receipts. In some SAMs, separate commodity accounts are included, for which (a) expenditures are the output of activities and (b) receipts are the sales of commodities for use as final demand or as intermediate inputs into production.

Second, factor accounts show the distribution of value added - that is, payments from activities accounts to factors of production, and the mapping from factor income columns to institution rows. Where data are available, capital, labor, and land may be disaggregated into more analytically useful classifications.

The third basic account describes the current account transactions of the main institutions that engage in economic activity: households, enterprises, financial institutions, and public sector institutions. Households are often disaggregated to a greater extent because household current expenditures are of major interest in analyzing distributional impacts of macroeconomic policies and performances.

Fourth, capital accounts of domestic institutions show the basic savings and investment flows within the economy and the means by which institutions, through changes in financial assets and liabilities, participate in the intermediation between savings and investment.

Fifth and finally, the foreign account includes all current and capital transactions between the domestic economy and the rest of the world.

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[2] What follows is a brief discussion of the basic SAM accounts. A more thorough examination is conducted below in the overview of the Madagascar SAM (Section 2).

DATA REQUIREMENTS FOR CONSTRUCTION OF A SAM

The basic data requirements for construction of a SAM are national accounts statistics, an input-output table, socioeconomic surveys of households and enterprises, labor force surveys, and financial surveys. Constructing SAMs for countries that use the French system of national accounts is facilitated by the statistics being presented in the form of a Tableau Économique d'Ensemble (TEE), or Comprehensive Economic Table. The TEE, being a latter-day version of Quesnay's Tableau Économique, is essentially a SAM without disaggregation into factor and institutional subcategories (such as types of labor or household).

APPLICATIONS OF SAMS TO AFRICA

There have been only a few widely disseminated applications of SAMs to sub-Saharan African countries. SAMs have been constructed for Botswana (Greenfield 1985, Hayden 1981), Swaziland (Webster 1985), Cameroon (Gauthier and Kyle 1990), Kenya (cited in Hayden and Round 1982), and Côte d'Ivoire (Michel and Noël 1984). The World Bank, in collaboration with the Government of Madagascar, constructed a regional SAM for greater Antananarivo (World Bank and Groupe Huit-Aura 1989). The Botswana SAM was used to analyze the macroeconomic impact of increases in government wages and salaries, the sectoral impact of foot and mouth disease, and the effects on poor households of the European Economic Community's proposed cut in beef prices during the second stage of the Lomé Agreement. The Swaziland SAM was used for ascertaining the macroeconomic effects of a proposed power station, the feasibility of an expansion of the sugar industry, and the implications of constraints on the government's ability to continue to hire qualified school leavers as a general employment policy. The original aggregated Cameroon SAM was constructed to run a Computable General Equilibrium model that assessed the macroeconomic effects of increased oil export revenues. The SAM for the Côte d'Ivoire was constructed as the data base for a CGE model designed for comparative static simulations. The World Bank and Huit-Aura SAM of Antananarivo was created to analyze exchanges between urban Antananarivo and its rural surroundings. Under the aegis of the Cornell Food and Nutrition Policy Program, SAMs are also being constructed for Zaire, Niger, and Tanzania. The construction of a SAM for Madagascar as part of a study titled "The Impact of Macroeconomic Policy Reform on the Poor: The Case of Madagascar will create the data base for a general equilibrium model, which through simulation exercises, will lead to a better understanding of the distributional impacts of policy reform.

PLAN OF THE PAPER

This working paper is a "travelogue" of the SAM's construction. It is perhaps also a road map for applications elsewhere. Section 2 presents

an overview of the Madagascar SAM and describes the rationale behind the structure chosen. In Section 3, the methodology used to estimate both the sizes of various household groups and the size of the labor force is described in detail. Section 4 describes production and income flows, which are based on Madagascar's National Accounts, and Section 5 outlines the methodology used for estimating expenditures of various household groups. Finally, Section 6 presents some major results of the SAM-building exercise and highlights the main data problems and uncertainties.

2. OVERVIEW OF THE MADAGASCAR SAM

The structure of the Madagascar SAM reflects the structure of the economy of Madagascar, a low-income island nation that had 9.6 million people (1984) and is located off the southeast coast of Africa. In addition, the structure of the SAM is partly determined by its ultimate use as a data base for a general equilibrium model.[3]

As shown in Figure 1, the current account includes 15 production subsectors (activities), which are in turn subdivided into different technologies for most subsectors. In most cases, two technologies, representing small- and large-scale production, are specified for a given production subsector. Thus the SAM contains a total of 27 separate activities (technologies) in the first 27 rows and columns of the matrix.

The primary sector accounted for 32 percent of GDP in 1984 and is a major focus of the Madagascar SAM. Five production subsectors (paddy, other food crops/forestry, export crops, industrial crops, and livestock/fish) with 10 technologies are specified (Table 1). Two subsectors (paddy production and rice milling) with five technologies are devoted to rice, which is the most important food staple (accounting for about half of national calorie consumption). Three of the five secondary subsectors receive the bulk of their inputs from agriculture (rice milling, other food processing, textiles). The tertiary sector (which accounted for 53 percent of GDP in 1984) includes construction, transport, marketing, other private services, and the government.

The intersection of the production activities rows and the commodities columns gives the mapping between the output of production activities and commodities. If every activity produced only one commodity (its characteristic commodity), this submatrix would be diagonal. However, in Madagascar's national accounts, the production activities are not defined as producing only one commodity; rather the accounts are derived from the production accounts of individual firms that produce several commodities. For example, a sugar refinery may grow its own raw sugar cane (an agricultural product) and produce refined sugar as well.

The intersection of the production activities columns and the commodities rows is the table of intermediate consumption giving commodity inputs into production activities (Appendix 3). Value added from each production activity is subdivided into returns to the various factors.

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[3] The proposed framework for the model is provided in Sarris (1990).

Figure 1 - Structure of the Madagascar SAM

	EXPENDITURES												
	CURRENT ACCOUNT							CAPITAL ACCOUNT					
				INSTITUTIONS				INSTITUTIONS					
												LIABILITIES	
RECEIPTS	ACTIVITIES 1..15 DOMESTIC	COMMODOTIES 1..15	FACTORS (L, K, LAND)	HOUSEHOLDS	ENTERPRISES	PUBLIC ADMIN	REST OF THE WORLD	HOUSEHOLDS	ENTERPRISES	PUBLIC ADMIN	REST OF THE WORLD	FINANCIAL	INSTRUMENTS	TOTAL
CURRENT ACCOUNT PRODUCTION ACTIVITIES DOMESTIC 1..15		Domestic supply of commodities												Total output
COMMODITIES 1..15	Intermediate consumption	(Marketing Margins)		Household consumption		Government Consumption	Exports		Investment					Total demand
FACTORS LABOR CAPITAL LAND	Distribution of value added among factors of production													Factor revenues
INSTITUTIONS HOUSEHOLDS ENTERPRISES			Factor income	Transfers			Current transfers from ROW							Income of dom. institutions after transfers
PUBLIC ADMINISTRATION	Indirect taxes	Indirect taxes		Direct taxes and transfers										Govt. revenues
REST OF THE WORLD (imports)		Imports		Current transfers to rest of the world										ROW receipts
CAPITAL ACCOUNT INSTITUTIONS HOUSEHOLDS ENTERPRISES BANKS CENTRAL COMMERCIAL GOVERNMENT				Savings				Capital transfers to domestic institutions			Capital transfers from the rest of the world	Change in liabilities		Aggregate savings
REST OF THE WORLD							Foreign savings	Capital transfers to ROW						Foreign savings
ASSETS FINANCIAL INSTRUMENTS								Change in assets						Total change in assets
TOTAL	Total costs	Absorption	Factor Income	Uses of Incomes			ROW Expenditures	Aggregate Investment				Total change in liabilities		TOTAL

Table 1 - Subsectors in Madagascar SAM

Subsectors	Gross Value Added	Sectoral Gross Value Added as a Percent of Total GVA
Primary sector	568,709	35.8
1 Paddy	119,036	7.5
1a Small farm irrigated	44,227	
1b Large farm irrigated	58,947	
1c Upland	15,862	
2 Other food crops	197,855	12.5
3 Export crops	37,573	2.4
3a Small farms	27,283	
3b Large farms	10,290	
4 Industrial crops	11,680	0.7
4a Small farms	8,030	
4b Large farms	3,650	
5 Livestock and forestry	202,565	12.8
5a Informal sector	189,548	
5b Formal sector	13,017	
6 Mining, energy, and water	31,969	2.0
7 Rice milling	3,807	0.2
7a Informal sector	0	
7b Formal sector	3,807	
8 Other food processing	59,944	3.8
8a Informal sector	12,118	
8b Formal sector	47,826	
9 Textiles	24,545	1.5
9a Informal sector	4,391	
9b Formal sector	20,154	
10 Other industry	44,447	2.8
10a Informal sector	10,664	
10b Formal sector	33,783	
11 Construction	42,752	2.7
11a Informal sector	5,339	
11b Formal sector	37,413	
12 Transportation and communications	160,758	10.1
12a Informal sector	130,818	
12b Formal sector	29,940	
13 Commerce	331,933	20.9
13a Informal sector	219,161	
13b Formal sector	112,772	
14 Services, private	188,787	11.9
15 Public administration	130,301	8.2
Total	1,587,954	100.0

Source: Tableau Entrées-Sorties, Madagascar National Accounts (1984).

Nine factors are defined in the SAM: highly skilled, skilled, and unskilled labor; formal and informal capital; land of smallholders in three separate agroecological zones (Plateau, East Coast, and West and South); and other land (Table 2). Returns to the farmer's own capital and to farm management are included in returns to land.

All flows in the SAM are expressed in terms of purchaser's prices – that is, marketing and transport costs and indirect taxes are included as part of the value of a commodity. Marketing margins (indirect taxes on commodities) are shown in the intersection of the commerce (government) row and the commodities columns.

Eleven institutions are specified in the SAM: besides eight types of households, the other institutions are formal nonfinancial enterprises (Sociétés et Quasi-Sociétés Non-Financières), financial enterprises, and the government (Table 3). Household types are defined so as to focus on the lower-income groups and to be consistent with definitions in the household budget surveys previously conducted in Madagascar. Three urban household groups are specified: households headed by a highly skilled, skilled, or unskilled person. In rural areas, there are five types of households: small farm households in the Plateau, East Coast, or West and South regions; the nonfarm rural poor; and the rural rich (including large farmers).

Household receipts include factor incomes (the intersection of the factor columns with the households rows), transfers from other institutions (including other households), and transfers from abroad. Household current expenditures include consumption, indirect taxes paid on consumer goods, direct taxes, and transfers to other institutions (including interest payments and land rent). The difference of total household revenues less expenditures is household savings (shown in the capital account). Accounts for formal nonfinancial enterprises and financial enterprises are similar. Returns to capital comprise the incomes of these institutions; expenditures consist of investment and savings, while final consumption by these institutions is zero.

Government receipts are the indirect taxes paid on intermediate consumption, taxes on production, export and import taxes, and direct taxes. Government expenditures on current account are government consumption of the output of the public administration sector and transfers to other institutions (including interest payments to abroad); the residual enters as government savings in the capital account.

In the table, the row called Rest of World (ROW) under current account shows receipts of the rest of the world from Madagascar's imports of goods and services (at the intersection of the row with the commodities columns) and current transfers to abroad from domestic (Malagasy) institutions (at the intersection of the row with the institutions and

Table 2 - Factors of Production in Madagascar SAM

SAM Row Number	Factor
	Labor
16	Highly skilled
17	Skilled
18	Unskilled
	Capital
19	Formal sector
20	Informal sector
	Land
21	Plateau
22	East Coast
23	West and South
24	Large farm

Source: Madagascar SAM.

Table 3 - Institutional Classifications in the Madagascar SAM

Households	Classification
Urban	
25	Urban 1 - Highly skilled
26	Urban 2 - Skilled
27	Urban 3 - Unskilled
Rural	
28	Farming - Plateau
29	Farming - East Coast
30	Farming - West and South
31	Rural rich
32	Rural nonagricultural
33	Private, nonprofit institutions
34	Formal sector enterprise
35	Financial institution
36	Public administration

Source: Madagascar SAM.

columns). ROW column under current account shows the expenditures of the rest of the world on Malagasy exports (at the intersection of the column with the commodities rows) and current transfers from abroad to domestic institutions (at the intersection of the column with the institutions rows). ROW foreign savings (which appear as positive numbers in the SAM when Madagascar runs a current account deficit) are shown at the intersection of ROW current account expenditures and ROW capital account receipts.

In the capital account (Table 4), only five domestic institutions are specified: all households, formal nonfinancial enterprises, the Central Bank, commercial banks (including insurance companies and all other financial institutions), and the government. Receipts include savings, capital transfers from other institutions, and changes in financial liabilities (e.g., households increase their receipts of capital by borrowing from commercial banks). Expenditures include investment in real goods and services, indirect taxes paid on investment, capital transfers to other institutions, and changes in financial assets. Four financial assets (domestic currency, deposits in the banks or other financial institutions, loans of various types [including bonds], and official foreign assets) are defined in the SAM. An additional row is included for accounting discrepancies as shown in Madagascar's Tableau des Operations Financières.

Similarly, receipts on the capital account for the ROW are foreign savings (the negative of Madagascar's balance on current account), capital transfers to the ROW from Malagasy institutions, and changes in liabilities of the ROW arising from transactions with Malagasy institutions. Expenditures by the ROW are transfers by the ROW to Malagasy institutions and changes in assets of the ROW.

Table 4 - Capital Account Institutions and Assets

Row Number	Description
Institutions	
38	Households (including nonprofit institutions)
39	Formal enterprises
40	Banks
40a	Central Bank
40b	National banks (including insurance companies)
41	Public administration
42	Rest of world
Assets	
43	Money
44	Deposits
44a	Deposits in Central Bank
44b	Deposits in national banks
44c	Other deposits (including time deposits and bonds)
45	Loans
45a	Loans by the Central Bank
45b	Loans by the national banks
45c	Loans in foreign currency (by the rest of the world)
45d	Other loans (including stocks and other equity)
46	Official reserves
47	Accounting discrepancies

Source: Madagascar SAM

3. HOUSEHOLD GROUPS

Estimating the size of household groups defined in the previous section is a crucial step in constructing the SAM; the size of various household groups is the basic link between data on micro-level household budgets, which are available on a per capita basis, and data on consumption and income, which are derived as residuals in the national accounts or food balance sheets. In this section, the methodology used to derive estimates of the size of the household groups is discussed in some detail, including a discussion of the choice of population figures and the breakdown of households by major occupation, by agroecological region, and (for farm households) by size of farm.

POPULATION ESTIMATES

Madagascar's last population census was conducted in 1975, but population estimates for more recent years have been calculated by the Ministry of Plan on the basis of a small survey and data on the age structure of the population in 1975 (Disaine and Randrianadraina 1988). According to these estimates (used in the construction of the SAM), only 13.9 percent of Madagascar's total population of 9.6 million people lived in the seven large urban centers in 1984, while the secondary urban centers accounted for another 5.1 percent of the population. The remaining 80.9 percent (7.8 million people) lived in rural areas.

The above rural population figures are 10.5 percent below the estimates of the rural population from the 1984/85 agricultural census, but the Ministère de la Production Agricole et de la Reforme Agraire survey was not designed as a population census (MPARA 1988). The MPARA estimates for the year 1985 imply a very high average growth rate of the rural population (3.16 percent per year from 1975 to 1985); the implicit average growth rate in the plan's estimates for 1975 to 1984 is 2.25 percent per year.

URBAN HOUSEHOLD GROUPS

The breakdown of urban households into subgroups was estimated using the distribution of occupations of the head of household from the 1978 and the 1980 household budget surveys of large urban centers during 1978 (INSRE 1978, 1979) and the 1980 household budget surveys of secondary

urban centers and rural areas (DGBDE 1987a).[4] The survey data was also used to estimate the average number of persons per household for each household type. Type II urban households, consisting of households headed by office workers, factory and manual laborers, and private traders not employing others, form the largest of the urban household groups: 200,000 households or 67 percent of all urban households (Table 5).

BREAKDOWN OF FARM HOUSEHOLDS BY GEOGRAPHICAL REGION

More than half of all households in Madagascar are headed by small farmers (those cultivating less than 1.5 hectares of land). In defining household groups for the SAM, it is desirable to have groups that are as homogeneous as possible in terms of their resource endowment and expenditure patterns. On the other hand, data requirements increase exponentially as the number of households groups increase. Thus a balance must be struck between homogeneity of household groups and the number of groups. A third consideration is that most data are readily available at the faritany level, but data on the fivondranana level are less abundant.[5]

For the Madagascar SAM, small farm households are broken down into three groups, corresponding roughly to the agroecological regions defined by the Ministry of Agriculture (Table 6 and in Appendix 4). Zone 1, Plateau, corresponds to a large extent with regions V and VI, covering the high plateau and western slope; it includes the faritany of Antananarivo and the western parts of Toamasina and Fianarantsoa faritanies. Zone 2, East Coast, corresponds closely with agroecological Regions I and II, covering most of the east and north coastal regions where export crops are widely grown; it includes all of the faritany of Antsiranana and the eastern parts of Toamasina and Fianarantsoa. Zone 3, West and South (Mahajanga and Toliary faritanies), corresponds roughly with regions III and IV, covering the less densely populated southern and western parts of the country. This latter zone includes several fivondranana that are included in other agroecological regions: Taolagnara (ex-Fort Dauphin) in region II; Betroka in region VI; Kandreho, Maevatanana, and Tsaratanana in region VI; and Bealanana, Befandriana, and Mandritsara in region V.

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[4] The shares of households in each socioprofessional category was calculated from regressions using data from the published tables. Inactive heads of households were assigned proportionately to each household group.

[5] Fivondronanas, formerly subprefectures, are the administrative units that compose the six faritanies of Madagascar.

Table 5 - Definitions of Urban Household Groups

SAM Category Occupation of Head of Household		Percent Households (region[a])	Number Households[b]	Percent Households (SAM category)	Population	Percent Population (SAM category)
Urban I						
Upper/mid-level staff	GCU	9.8	23,794	69.1	149,929	71.2
Upper/mid-level staff	CUS	5.9	5,478	15.9	34,524	16.4
Inactive[c]	GCU	1.6	4,002	11.6	20,358	9.7
Inactive[c]	CUS	1.2	1,136	3.3	5,909	2.8
Total			34,410	100.0	210,719	100.0
Urban II						
Office workers	GCU	18.8	45,737	22.9	278,620	24.9
Office workers	CUS	16.1	14,950	7.5	96,174	8.6
Manual laborers	GCU	24.1	58,678	29.4	347,621	31.0
Manual laborers	CUS	20.3	18,850	9.4	92,722	8.3
Traders	GCU	10.0	24,337	12.2	134,250	12.0
Traders	CUS	7.4	6,871	3.4	30,578	2.7
Inactive[c]	GCU	8.9	21,655	10.9	103,261	9.2
Inactive[c]	CUS	9.1	8,435	4.2	37,564	3.4
Total			199,513	100.0	1,120,791	100.0
Urban III						
Artisans	GCU	6.1	14,842	23.1	64,341	22.1
Artisans	CUS	6.5	6,036	9.4	31,072	10.7
Informal services	GCU	11.5	28,068	43.8	133,259	45.7
Informal serivces	CUS	6.0	5,571	8.7	26,140	9.0
Inactive[c]	GCU	3.0	7,217	11.3	26,830	9.2
Inactive[c]	CUS	2.6	2,407	3.8	9,792	3.4
Total			64,142	100.0	291,434	100.0

Source: Madagascar SAM.

Note: An estimated 6.3 percent of households in large urban centers and 24.9 percent of households in secondary urban centers are farm households.

[a] Percentage of households in each region calculated from INSRE EBM survey data.
[b] Average household size calculated from INSRE EBM surveys.
[c] Inactive households and population split proportionally among households.

Table 6 - Definitions of Geographical Regions

Agroecological Region	Faritany
ZONE A (East)	
Extreme North	1.1 Antsiranana
North East	1.2 Antsiranana
East Septentrional	2.1 Toamasina
Center East	2.2 Toamasina/Fianarantsoa
South East[a]	2.3 Fianarantsoa
Subtotal	
ZONE B (Central)	
Lac Alaotra	5.2 Toamasina
Central Plateau	5.3 Antananarivo
Meridianal Plateau	5.4 Antananarivo/Fianarantsoa
Horombe[b]	6.1 Fianarantsoa
Mid-West	6.2 Antananarivo
Tampoketsa[c]	6.3 Antananarivo
Subtotal B	
ZONE C (West and South)	
West Meridianal	4.1 Mahajanga
Center West	4.2 Mahajanga
North West	4.3 Mahajanga
Septentrional Plateau	5.1 Mahajanga
Tampoketsa[a]	6.3 Mahajanga
Extreme South	3.1 Toliary
South West	3.2 Toliary
Horombe[b]	6.1 Toliary
South East[c]	2.3 Toliary

Source: Madagascar SAM.

[a] Fivondronana Taolanaro (faritany Toliary) is included in Zone C; the remainder of the South East region (in faritany Fianarantsoa) is included in Zone A.

[b] Fivondronana Betroka (faritany Toliary) is included in Zone C; the remainder of Horombe region (in faritany Fianarantsoa) is included in Zone B.

[c] Fivondranana Fenarivobe and Ankazobe (faritany Antananarivo) are included in Zone B; the remainder of Tampoketsa region (in faritany Mahajanga) is included in Zone C.

POPULATION BY AGROECOLOGICAL ZONES

To divide the rural population according to agroecological zone, the percentage distribution of population given in the Banque des Données de l'Etat population estimates by fivondronana was used (Table 7). In the SAM, farmers who are residents of large cities and small urban centers are grouped together with farmers living in rural areas. The number of these farmers was derived from the percentage distribution of farm households (households for which agriculture was the major source of income) from the 1978 survey of large urban centers (INSRE 1978, 1979) and the 1980 survey of large secondary urban centers (DGBDE 1987a).

Of course, marketing opportunities are much different for urban and semiurban farmers, and their consumption baskets may differ from those of rural farmers as well. Table 8 presents data from the 1982/83 MPARA survey for farm households in the city of Antananarivo and farmers in the Plateau Centre region's rural areas.

Rural households consumed much less rice, although their consumption out of own production was almost twice that of the urban farm households. Greater access to subsidized rice in urban areas likely accounts for much of the difference between per capita consumption levels. However, a range of market accessibility is found in the rural areas also. Since there are relatively few urban farm households (2.6 percent of the total number of households), it was decided to group these households with other small farmers rather than keep urban farmers as a separate group in the SAM.

FARM HOUSEHOLDS ACCORDING TO FARM SIZE

For the SAM, it was necessary to divide the farm population not only by agroecological zone, but also by farm size. The 1984 to 1985 MPARA agricultural census defined a farm household as any household involved in agricultural production, no matter how small the plot size or how few the number of livestock. For the SAM, households with less than 0.25 hectare of cultivated area (7.2 percent of farmers by the agricultural census definition, but farmers who own only 0.8 percent of area cultivated) were considered as nonfarm households. If one uses this definition, the number of farm households recorded in the 1984 to 1985 agricultural census is 1,353,808, only 0.8 percent greater than the number of farm households derived from using the distribution of household types from household budget surveys. The set of farm households was then subdivided into small and large farm households, defining the latter group as households with farms greater than 1.5 hectares and as all households operating modern farms. Small farms (excluding those under 0.25 hectare) account for about 75 percent of all farms in each of the three regions of the country, but only about one-half of the total area cultivated (Table 9).

Table 7 - Population by SAM Agroecological Zone

Zone	Large Urban Centers	Small Urban Centers	Rural	Total
Plateau	959.5	147.5	3,170.2	4,277.2
Antananarivo	854.5	63.7	2,035.2	2,953.4
Toamasina I	0.0	37.5	306.9	344.3
Fianarantsoa I	105.0	46.4	828.1	979.5
East Coast	193.9	234.3	2,625.2	3,053.4
Antsiranana	74.1	93.7	572.4	740.2
Toamasina II	119.8	40.1	946.2	1,106.2
Fianarantsoa II	0.0	100.4	1,106.6	1,207.0
West and South	186.4	111.4	1,979.4	2,277.2
Mahajanga	110.8	42.2	854.8	1,007.8
Toliary	75.6	69.2	1,124.6	1,269.4
Total	1,339.8	493.2	7,774.8	9,607.8

Source: Madagascar SAM.

Table 8 - Characteristics of Farm Households in Urban and Rural Areas

	Urban	Rural
Average household size (individuals)	5.36	7.41
Average household expenditure (1,000 FMG)	316.10	427.00
Per capita expenditure (1,000 FMG)	59.10	58.00
Average household rice consumption (kgs.)	937.00	1052.00
Per capita rice consumption (kgs.)	175.00	142.00
Average household auto-consumption (kgs.)	346.00 (37%)	842.00 (80%)
Per capita auto-consumption (kgs.)	64.00	114.00

Source: AIRD (1984).

Table 9 - Regional Distribution of Farms

	Plateau	East Coast	West & South	Total
Number of farms < 0.25 hectare	40,961	15,305	49,361	105,627
Average size	0.14	0.15	0.14	0.14
Total area (percent)	0.9	0.4	1.4	0.8
Number of small farms[a]	368,038	384,475	259,171	1,011,684
Average size	0.78	0.90	0.87	0.85
Total area (percent)	45.1	54.8	46.1	48.9
Number of large modern farms	124,033	122,992	95,099	342,124
Average size	2.77	2.29	2.71	2.58
Total area (percent)	54.0	44.8	52.6	50.3
Number of farms total	533,031	522,773	403,631	1,459,435
Average size	1.20	1.20	1.21	1.20
Total area (percent)	100.0	100.0	100.0	100.0
Small farms/all farms (percent)[b]	74.8	75.8	73.2	74.7

[a] Small farms are traditional farms between 0.25 and 1.5 hectares.

[b] Excluding farms less than 0.25 hectare.

ESTIMATES OF THE SIZE OF HOUSEHOLD GROUPS IN THE 1984 SAM

Table 10 presents estimates of the size of household groups for the 1984 SAM on the basis of the above methodology – 83.7 percent of the households are classified as "rural," including urban farm households (2.1 percent of households nationally); 73.6 percent of households are farm households, with small farm households (mostly in the Plateau and East Coast regions) accounting for over half of all households (55.0 percent). Apart from the rural rich (large farm households together with other rural rich households) with 23.7 percent, all other groups in the SAM are relatively small, each representing between 2 percent and 9 percent of the total number of households in Madagascar.

LABOR FORCE AND ALLOCATION OF LABOR ACROSS HOUSEHOLDS

Estimates of the size of the total labor force by skill category and the distribution of labor in each type of household are based largely on population census data (Tables 11 and 12). The number of households and the total population of each household group are derived from the 1978 and 1980 household budget surveys (INSRE 1978, 1979; DGBDE 1987a). The number of children younger than 10 years old is calculated as 31.4 percent of the population of each household type, on the basis age structure for the population as a whole (Disaine and Randrianadraina 1988). Likewise, the active labor force is estimated using the same participation rate for labor (39.2 percent) in each household type.[6] Given the total labor force, the percentage of workers in each labor category in urban areas is estimated using data on types of employment by sector of activity from the 1975 population census (INSRE n.d.).[7] For rural areas, it is assumed that all workers, apart from the household heads of the rural rich households, are unskilled labor.

The distribution of the labor force in each urban household type was estimated assuming that, in each type of household, the head of the household has a skill level greater than or equal to the other household members. Thus, there are no highly skilled members in households of type II or III (households headed by medium-skilled, unskilled, or inactive workers). Likewise, there are no medium-skilled members in households of

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[6] The labor force participation rate is taken from the 1975 population census (INSRE n.d.), but no later survey estimates are available. Most of the economically inactive population in 1975 were school-aged children or adult women, however, and it is likely that the structure of labor force participation continued through 1984.

[7] As calculated from INSRE (n.d.), 9.0 percent of the labor force in 1975 held positions requiring highly skilled labor, 53.4 and 37.6 percent of the labor force that year held positions requiring medium-skilled labor and unskilled labor, respectively.

Table 10 - Size of Household Groups, 1984

	Percent Households	Number Households	Population/ Household	Population 1984
Seven largest cities	13.4	243,633	5.50	1,339,800
Secondary urban centers	5.1	92,856	5.31	493,200
Rural	81.6	1,487,651	5.23	7,774,800
Total	100.0	1,824,140	5.27	9,607,800
Rural SAM[a]	83.7	1,526,075	5.23	7,984,856
Plateau	34.5	630,138	5.23	3,297,059
East Coast	28.0	511,110	5.23	2,674,270
West and South	21.1	384,828	5.23	2,013,527
Urban SAM	16.3	298,065	5.44	1,622,944
Farmers	73.6	1,343,094	5.23	7,028,556
All small farmers	55.0	1,003,677	5.23	5,252,353
Small farmers - Plateau	20.0	365,125	5.23	1,910,740
Small farmers - East Coast	20.9	381,432	5.23	1,996,076
Small farmers - West and South	14.1	257,120	5.23	1,345,536
Large farmers	18.6	339,416	5.23	1,776,203
Other rural rich	5.1	92,234	5.23	482,038
Nonfarm rural poor	5.0	90,747	5.23	474,263
Plateau	2.1	37,471	5.23	195,830
East Coast	1.7	30,393	5.23	158,839
West and South	1.3	22,883	5.23	119,594
Nonfarm urban	16.3	298,065	5.44	1,622,944
Urban1[b]	1.9	34,410	6.12	210,719
Urban2[c]	10.9	199,513	5.62	1,120,791
Urban3[d]	3.5	64,142	4.54	291,434
Total	100.0	1,824,140	5.27	9,607,800

Source: Madagascar SAM.
[a]Rural SAM households includes urban farmers.
[b]Urban1: Mid- and upper-level staff.
[c]Urban2: Salaried employees, workers, and merchants.
[d]Urban3: Small informal services and artisans.

Table 11 - Urban Labor Matrix, 1984

	Head of Household			Other Household Members			Total	Total	
	Labor I	Labor II	Labor III	Labor I	Labor II	Labor III	Inactive	<10 Years	Total
Household/urban/I	29,272	–	15,048	10,650	1641	87,904	66,205	210,719	
Household/urban/II	–	138,215	31,208	–	114,098	17582	467,550	352,137	1,120,791
Household/urban/III	–	–	54,517	–	–	23,777	121575	91,565	291,434
Agricultural households	–	–	38,424	–	–	18,009	87627	65,997	210,056
Total	**29,272**	**138,215**	**124,149**	**15,048**	**124,748**	**61,009**	**764655**	**575,904**	**1,833,000**

Source: Madagascar SAM.

Table 12 - Rural Labor Matrix, 1984

	Head of Household			Other Household Members			Total	Total	
	Labor I	Labor II	Labor III	Labor I	Labor II	Labor III	Inactive	<10 Years	Total
Small farmers/Plateau			365,125			155,320	789,966	600,329	1,910,740
Small farmers/East Coast			381,432			162,257	825,247	627,140	1,996,076
Small farmers/West and South		257,120			109,376	556,291	422,750	1,345,536	
Large farmers			339,416			144,384	734,343	558,059	1,776,203
Other rural rich		92,234				39,062	199,291	151,450	482,038
Nonfarm rural poor			60,994			25,832	131,789	100,152	318,767
Inactive						12,601	94,040	48,855	155,496
Total		92,234	1,404,087			648,832	3,330,968	2,508,735	7,984,856

Source: Madagascar SAM.

type III (households headed by unskilled or inactive workers). Finally, it was assumed that the ratio of the number of medium-skilled, nonhousehold head members to the number of unskilled, nonhousehold head members was the same in urban households types I and II.

SUMMARY

The above estimates of the sizes and labor structure of the various household groups should be taken only as approximations. The distribution of farm households according to farm size and agroecological zone is probably quite accurate since it is based on the large MPARA agricultural census of 1984/85. The division of the urban and nonfarm rural population into household groups is more suspect, however, since this relies on the observed distribution from household budget surveys. Moreover, the data on average size of households is derived from the aforementioned household budget surveys rather than from population census figures. Finally, the estimates of labor force by household rely on labor force data from the 1975 population census, and no survey data exist on the composition of the labor force in each type of household. In spite of these reservations, however, the above estimates appear to be reasonable and are consistent with the available data; thus they provide an appropriate starting point for the construction of the 1984 SAM.

4. PRODUCTION AND INCOME FLOWS

This section covers details of the construction of all accounts in the Madagascar SAM except for the consumption accounts, which are covered in Section 5. Special attention is given to the disaggregation of the agricultural sector from the national accounts aggregates to the four SAM subsectors.

PRODUCTION ACTIVITIES

Madagascar's 1984 national accounts subdivided production into 32 subsectors, following the French system of national accounts (INSEE 1987). For the SAM, which was designed as the data base for an analytical model of the Malagasy economy, a higher level of aggregation was sufficient for the secondary and tertiary sectors. The 17 subsectors of the secondary sector were aggregated into 5 industrial subsectors, and the 12 subsectors in the tertiary sector were aggregated to 5 subsectors in the SAM (see Table 1). Agriculture, which was a single subsector in the national accounts, was disaggregated into four subsectors (paddy, other food crops, export crops, and industrial crops). In addition, to clearly identify rice flows in the SAM, the food processing subsector was disaggregated into rice milling and other food processing.[8]

Disaggregation of Agriculture

The disaggregation of agriculture into four subsectors was based on the supply-demand balances (équilibres réssources-emplois) of each agricultural product constructed for Madagascar's national accounts. The mapping between the four agricultural subsectors of the SAM and the commodities included in the national accounts is shown in Table 13, along with data on the value of production of the various commodities. Paddy production dominates Malagasy agriculture, accounting for 42.5 percent of the value of production at producer prices. Cassava (12.9 percent) and

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[8] In the national accounts, all paddy destined for final consumption as rice (including rice consumption out of own production) is treated as an intermediate input into the food processing industry.

Table 13 - Value of Agricultural Production by SAM Sector

	Production (mn FMG)	Percent Value Subsector	Percent Value Agriculture
Paddy	168,207	100.0	42.5
Other food crops	170,365	100.0	43.0
Cassava	51,177	30.0	12.9
Potato	15,547	9.1	3.9
Sweet potatoes, taro	15,115	8.9	3.8
Dry beans	8,906	5.2	2.2
Maize, Sorghum	7,957	4.7	2.0
Vegetables	11,297	6.6	2.9
Fruits	57,172	33.6	14.4
Bananas	13,919	8.2	3.5
Citrus	7,693	4.5	1.9
Pineapples	9,025	5.3	2.3
Other	3,194	1.9	0.8
Export crops	43,460	100.0	11.0
Coffee	26,862	61.8	6.8
Vanilla	9,575	22.0	2.4
Cloves	2,726	6.3	0.7
Clove oil	2,268	5.2	0.6
Cocoa	353	0.8	0.1
Pepper	729	1.7	0.2
Cinammon	141	0.3	0.0
Hot peppers	158	0.4	0.0
Ylang ylang oil	80	0.2	0.0
Lima beans (dry)	568	1.3	0.1
Industrial crops	14,177	100.0	3.6
Groundnuts	2,520	17.8	0.6
Seed cotton	5,241	37.0	1.3
Coconut	1,445	10.2	0.4
Castor beans	10	0.1	0.0
Soybeans	149	1.1	0.0
Sugarcane (smallholder)	4,027	28.4	1.0
Tobacco	785	5.5	0.2

Source: Madagascar 1984 National Accounts.

coffee (6.8 percent) rank second and third, respectively, in value of agricultural production. The value of coffee is greatly understated, however, because the producer price of coffee was 75 percent below the border price in 1984 (Dorosh, Bernier, and Sarris 1990). Clove and vanilla producer prices were both 86 percent below border prices in 1984, as well.

There are a number of anomalies in the supply-demand balances for agricultural products in the national accounts, as well. Post-harvest crop losses are ignored in the national accounts for all crops except rice. For rice, the net production implies losses of 21 percent of the gross production figure published by MPARA.[9] These losses are much higher than those usually assumed for rice in supply-demand balances.[10]

National accounts supply-demand balances for the major export crops also differ from other sources. Consumption of coffee, calculated as a residual and equal to 25.6 percent of production, appears to be somewhat overstated. The production figure for clove buds in the national accounts (equal to exports of clove buds - 6,269 tons) is considerably less than the MPARA production figure (18,000 tons).[11] For the export crops, consumption is used as a balancing item for coffee equal to 20,845 tons or 25.6 percent of production. Some clove buds implicitly go into the production of clove oil (production of clove oil is 1,783 tons); yet the combined value of clove oil and clove buds (2,994 million FMG) in the national accounts is still much less than the MPARA production figure valued at the official price (7,830 million FMG). Finally, the vanilla production figure used in the national accounts (1,509 tons of dry vanilla) is apparently based on a production of 9,575 tons of green vanilla valued at 1,000 FMG per kg. The implicit conversion factor of 6.345 of green vanilla to dried vanilla is much higher than the figure of 4.6 used in World Bank (1984).[12]

Building a SAM requires judgment as to where changes to official figures should be made. Given the high quality and overall consistency of the national accounts, the general policy adopted in constructing the Madagascar SAM was to strive to maintain consistency with the national accounts and thus to avoid making small adjustments. In this case, even

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[9] Rice losses are based on a survey by the Ministry of Agriculture (MPARA 1987a); the percentage loss figure is calculated using the published Ministry of Agriculture gross production figure (MPARA 1987b).

[10] For example, Hirsch (1986) uses a loss rate of 16 percent.

[11] MPARA (1987b), p. 41. On page 32 of the same document, a figure of 13,000 tons is given.

[12] Both figures for the production of green vanilla in MPARA (1987b) are considerably lower (5,405 and 6,900 tons).

though a change in the treatment of agricultural losses and export crop supply-demand balances would alter the outputs of the agriculture and commerce sectors, it was decided not to adjust these figures because (1) such a change would lead to confusion arising from differences between the SAM aggregates and those of the national accounts and (2) these changes would not be likely to affect significantly the results obtained from policy analysis using the SAM.

Production of agricultural commodities was split into agroecological zones according to information from the 1984 agricultural census (MPARA 1988d) or 1984 annual production figures (MPARA 1987b). For the major crops, production estimates were available by size of farm or technology used, as well as by region of the country (Table 14). The structure of rice production by farm size and technology (irrigated, tanety, or tavy) was derived from data from the agricultural census (MPARA 1988b,d). Data on the breakdown for large and small farms for export crops were taken from the World Bank (1984). For most other crops, area planted was first broken down by agroecological region and then divided according to the shares of small farms in total area cultivated in each agroecological region (see Table 9). For smallholder irrigated rice (1a) and all upland rice (1c), production costs were based on MPARA crop budgets in AIRD (1984). For large farm rice (1b), production costs are taken as a combination of the costs of rice production by formal enterprises (corporate farms)[13] plus production costs from MPARA crop budgets in AIRD (1984). Similarly, production costs for the major export crops and industrial crops were constructed using data from the World Bank (1983, 1984). Estimates of smallholder production costs were used directly for subsectors 3a and 4a. For large farms, production costs are a combination of the costs of large private farms and corporate farms. The residual between (1) the national accounts figures for the agriculture sector and (2) the total values of inputs and outputs for the paddy, export crop, and industrial crop SAM sectors was assigned to the other food crop sector in the SAM (sector 2).[14]

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[13] Production costs (input-output coefficients) on corporate farms are taken directly from the national accounts. Rice accounts for 92 percent of the agricultural production (88 percent of total production) of corporate farms in the national accounts. The same input-output coefficients for corporate farms are implicitly used in the SAM for production of other crops by corporate farms as well.

[14] Costs of production were also adjusted to include the costs of land preparation and manure inputs (specified in the national accounts utilization account for the output of the livestock sector).

Table 14 - Production by Agro-ecological Zone and Farm Size

	Area (ha)	Yield (MT/ha)	Production (MT)
Paddy	1,040,399	1.60	1,665,420
Small farm - irrigated	422,131	1.41	593,799
Plateau	178,313	1.52	270,386
East Coast	119,369	1.24	148,390
West and South	124,449	1.41	175,024
Large farm - irrigated	428,519	2.02	864,517
Small farm - nonirrigated	148,801	0.92	136,851
Plateau	11,163	1.06	11,839
East Coast	121,686	0.89	108,817
West and South	15,952	1.02	16,195
Large farm - nonirrigated	40,948	1.72	70,253
Export crops			
Coffee	223,100	0.36	81,400
Plateau, small	4,165	0.38	1,597
East Coast, small	179,421	0.32	57,844
West and South, small	7,852	0.34	2,678
Large farm	31,662	0.61	19,281
Cloves[a]	76,710	0.23	18,000
East Coast, small	46,026	0.20	9,000
Large farm	30,684	0.29	9,000
Vanilla	26,300	0.36	9,575
East Coast, small	21,040	0.31	6,419
Large farm	5,260	0.60	3,156
Industrial crops			
Cotton	23,595	1.43	33,813
Plateau, small	1,041	0.44	461
East Coast, small	10	1.30	13
West and South, small	12,257	1.07	13,151
Large farm	10,287	1.96	20,188
Sugarcane[b]	17,740	22.04	391,000
Plateau, small	1,926	22.04	42,453
East Coast, small	8,136	22.04	179,329
West and South, small	7,678	22.04	169,218
Groundnuts	33,110	0.95	31,500
Plateau, small	20,670	0.92	19,080
East Coast, small	1,090	0.88	955
West and South, small	7,703	1.00	7,716
Large farm	3,647	1.03	3,749

Sources: World Bank (1984), MPARA (1987), MPARA (1988).

[a] Clove production in the national accounts does not include cloves processed into oil.

[b] Sugarcane figures do not include production by sugar mills.

Rice Milling

In the national accounts, if paddy is milled by the farm household (hand-pounded), no value added is generated. In addition, if the paddy is milled by a rice miller, but the miller receives as payment the rice bran, there is no value added generated. Only in the case where the rice miller is paid in currency is the value added counted in the national accounts.

In the SAM, the first two methods of rice milling (by the household and by a miller who receives the rice bran as payment) are included in column 7a. No information exists on the amount of paddy milled in this way, but the amount of nonmarketed paddy (1,306,493 metric tons or 78.5 percent of net [after loss] production) was used as an approximation. Energy input costs (subsector 6) for the remainder of the paddy milled by rice millers were estimated as 5 percent of the value of the paddy on the basis of data in the industrial survey (DGBDE n.d.). Transport costs from farm gate to rice mill (equal to 2,516 million FMG or 8.3 percent of the farm gate value of the paddy) were taken from the national accounts worksheets.

OUTPUT MATRIX OF ACTIVITIES AND COMMODITIES

The production subsectors in the national accounts are based on production data of firms that in some cases produce commodities other than the characteristic commodities of the subsector. The largest elements in the output matrix that maps the output of activities into commodities are the diagonal elements that represent the characteristic commodity of each subsector (Table 15). Other commodities produced in significant amounts by several sectors include construction and marketing services (the outputs of subsectors 11 and 13, respectively). Subsectors 1 (paddy), 3 (export crops), and 4 (industrial crops) are defined so as to produce only their characteristic commodities. Joint products of the national accounts agricultural sector are assigned to SAM subsector 2 (other food crops). Similarly, subsector 7 (rice milling) produces only milled rice; all joint products of rice mills and other food industries are kept with subsector 8 (other food industries).

Disaggregation of the uses of agricultural products is straightforward. All intermediate consumption, except for paddy (an input to subsectors 1 for use as seed and subsector 7 to be milled for final consumption) and for cotton used by the textile industry (subsector 9), is an input to the food processing industries (subsector 8). There is no intermediate consumption of milled rice (the output of subsector 7).

BREAKDOWN OF VALUE ADDED BY FACTORS OF PRODUCTION

For the agricultural subsectors, it was not possible to use the division between wages and returns to capital given in the national accounts because the figure for wages does not include the value of own-family labor or the wages paid by individual farm enterprises. (Only wages paid by formal enterprises are included.) Instead, value added in agriculture was split between returns to land (which include returns to farmer management and capital) and wages using the percentages shown in Table 16.

For irrigated rice, a figure of 25 percent is chosen as an approximation of the typical rental payment (1/3 of the harvest) for irrigated land, adjusted downward because less of the value of rice production on lower quality irrigated land (that may not be rented out) can be attributed to returns to land. The share of returns to land of other crops are estimated using the above figure for irrigated rice as a benchmark. Rates of return to land, calculated using estimated values of the stock of land (which is based on assumed capital-output ratios), are also calculated as a check on the figures for returns to land and because these rates of return will enter the investment functions later included in the CGE model.[15,16] Value added in forestry (included in SAM

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[15] A direct estimation of the implicit wages paid for each crop was also attempted and was based on data on physical labor required (man days per hectare) and market wages. This method produced very low returns to land for irrigated paddy production as a result of overstated labor requirements and/or an overestimated wage rate. (For own-family labor, some shadow price of labor should be used instead of the market wage.)

[16] Distribution of value added in formal sector agriculture was more complicated. The value of rice production included in formal sector agriculture in the national accounts exceeded total value of large farm (greater than 1.5 hectares) rice production as derived from the agricultural census. For the SAM, formal sector rice production was defined as the production on modern farms (using the agricultural census definition, generally area greater than 10 hectares), equal to 11,368 hectares or 2.65 percent of large farm area planted to rice. Thus, 2.65 percent of nonwage value added or large farms is allocated to formal capital. For subsectors 2 and 3b, returns to formal sector capital are estimated as the shares of these subsectors in formal sector agricultural output (0.25 and 2.35 percent, respectively) times the total returns to formal sector capital in agriculture. Returns to formal capital for industrial crops (4b) estimated in the above fashion exceeded estimated returns to land for the sector; thus, returns to formal capital were estimated to be equal to total returns to land.

The above adjustments reduced total returns to capital in formal sector agriculture by 37,804 million FMG (as compared to the national accounts

subsector 2) is split 30 percent to large farms, 20 percent to small farms on the East Coast, and 50 percent to unskilled labor.

For the livestock and fishing subsector (subsector 5), data for the formal sector (incorporated enterprises) are directly from the national accounts. For the informal sector, fishing (with a value of production equal to 38.8 billion FMG, 15.5 percent of the output of subsector 5) was handled separately from the rest of the subsector, with 80 percent of the value added allocated to unskilled labor and the remaining 20 percent allocated to informal capital. Ten percent of the remainder of the value added in the informal sector was allocated to unskilled labor. The remaining value added was divided according to the distribution of cattle and pig production by farm size (Table 17), with the share of value added belonging to farms under 0.25 hectares allocated to informal capital.

For sectors 6-14, data from the 1984 industrial survey (DGBDE n.d.) were used to allocate wage payments by skill type in the formal sector. For the informal sector, population census data on employment by sector and type of job were used to estimate the shares of wages paid to medium-skilled and unskilled workers.

The shares of value added assigned to labor in the several informal services subsectors were estimated separately, since the national accounts data do not include the implicit wages of the owners of individual enterprises in the total wage bill. For subsectors 12 (transportation services) and 14 (other private services), 70 percent of the value added was allocated to labor. For subsector 13 (marketing services), 20 percent of the value added was allocated to labor. By definition, all returns to capital in the formal (informal) sector are assigned to formal (informal) capital.

For sector 15 (public administration), an estimate of the wage bill paid to central government employees insured under the national insurance program (CNAPS) was made using an estimate of the number of employees of each skill level and an average wage per employee type (equal to 80 percent of the average private sector wage by skill type.[17] The total wage bill thus calculated equals 51,142 million FMG, which is only 39 percent of the wage bill given by the Ministry of Finance and shown in the

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figure). Rents paid to formal enterprises were estimated as 30 percent of the value of production by farmers (equal to 25,140). These latter rents are included as transfers from large farmers to formal enterprises (these transfers include rents paid by small farmers, since small farmer total rents are shown as being paid to large farmers in the SAM). In total, returns to formal capital are reduced by 12,663 million FMG compared with the national accounts.

[17] The average wage per skill type in the private sector was calculated from the 1984 industrial census (DGBDE n.d.).

Table 15 - Output Matrix

Activities	Commodities														
	1C Padd	2C OFCr	3C ExpC	4C IndC	5C Live	6C Mine	7C Rice	8C Food	9C Text	10C Manf	11C Cons	12C Tran	13C Comm	14C Serv	15C PubA
1 Paddy	168,207	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2 Other food crops	0	233,774	0	0	981	46	0	1,003	0	0	454	0	1,183	612	0
3 Export crops	0	0	43,302	0	0	0	0	0	0	0	0	0	0	0	0
4 Industrial crops	0	0	0	14,177	0	0	0	0	0	0	0	0	0	0	0
5 Livestock/fish	0	60	0	0	249,082	0	0	140	0	0	70	18	45	18	0
6 Mines/energy/water	0	0	0	0	0	79,735	0	71	0	143	1,461	0	2,969	919	0
7 Rice milling	0	0	0	0	0	0	169,990	0	0	0	0	0	0	0	0
8 Food industries	0	1,905	0	0	0	0	0	299,062	0	896	2,837	689	4,270	1,318	0
9 Textile industries	0	556	0	0	0	0	0	0	73,095	111	118	0	333	59	0
10 Manufacturing industries	0	191	0	0	0	96	0	66	0	99,955	346	115	1,803	894	0
11 Construction	0	0	0	0	0	0	0	0	0	5,600	80,636	0	4,122	7,955	0
12 Transport/communication	0	78	0	0	0	0	0	0	0	190	398	252,760	250	727	0
13 Commerce	0	1,089	0	0	0	363	0	9,599	363	10,588	1,775	11,817	329,830	8,771	0
14 Services	0	0	0	0	0	0	0	42	0	63	55	189	1,484	272,346	0
15 Public administration	0	272	0	0	0	0	0	12,170	2	5,074	0	1,010	548	4,350	180,374

Source: Madagascar SAM

Table 16 - Returns to Land and Capital in Agriculture

		Production (Mn FMG)	Returns to Land (%)	Returns to Land (Mn FMG)	Capital-Output Ratio	Stock of Land and Capital (Mn FMG)	Rate of Return (%)
1a	Small Farm - Irrigated Paddy	59,974	0.25	14,994	1.5	89,961	16.7
1b	Large Farm - Irrigated Paddy	87,316	0.25	21,829	1.7	148,437	14.7
1c	Non-irrigated Paddy	20,918	0.15	3,138	1.5	31,377	10.0
2	Other Food crops	238,051	0.26	61,632	1.8	424,947	14.5
3a	Small Farm -Export Crops	30,448	0.27	8,218	2.0	60,896	13.5
3b	Large Farms - Export Crops	12,854	0.28	3,578	2.0	25,708	13.9
4a	Small Farms - Industrial Crops	9,612	0.20	1,922	1.5	14,418	13.3
4b	Large Farms - Industrial Crops	4,565	0.20	913	1.7	7,761	11.8

Source: Madgascar SAM.

national accounts. The remainder of the wage bill, 79,159 million FMG (assumed to have been paid to local government officials and the military), was allocated to labor skill types using the same average wage rates as above if we assume that 10 percent of the workers were highly skilled, then 60 percent of the workers were medium-skilled and the remainder, unskilled labor.

Table 17 - Distribution of Production of Livestock Sector

	Small Farm Plateau	Small Farm East Coast	Small Farm West&South	Large Farmers	Other	Total
Cattle[a]						
(mn FMG)	13,645	9,864	33,086	38,152	6,246	100,993
(percent)	13.5	9.8	32.8	37.8	6.2	100.0
Pigs[b]						
(mn FMG)	10,770	4,415	3,947	9,386	1,602	30,120
(percent)	35.8	14.7	13.1	31.2	5.3	100.0
Total						
(mn FMG)	24,415	14,279	37,033	47,538	7,847	131,113
(percent)	18.6	10.9	28.2	36.3	6.0	100.0

Source: MPARA (1988), Vol. V, Tables V.3, V.4, V.6, V.7.

[a] Cattle distribution is based on cattle ownership figures by size of farm in each faritany and cattle population by fivondronana.

[b] Pig distribution is based on pig ownership figures by size of farm for all of Madagascar and production figures by fivondronana.

FACTOR PAYMENTS TO INSTITUTIONS

Little empirical information exists on distribution of factor payments to households. In the SAM, the wage bill for each type of labor was allocated to households according to their share in the employed labor force of each type. For medium-skilled labor, the number of employed workers was calculated so that the ratio of the average wage rate of highly skilled workers to medium-skilled workers was the same as in the 1984 industrial census (4.32:1). Under this assumption, 37.1 percent of the employed medium-skilled workers were unable to find jobs that matched their skill qualifications. These workers were added to the supply of unskilled labor. These adjusted figures for employed labor of each skill type were used in the allocation of the wage bill (Table 18).

All returns to formal capital are assigned to formal sector enterprises; by definition, there is a direct one-to-one correspondence between returns to the four types of land (small farm Plateau, small farm East Coast, small farm West and South, and large farm) and rural farm households.

No direct information is available on the distribution of returns to capital belonging to individual enterprises in the informal sector. For small farm households, returns to informal capital were estimated as approximately 8 percent of their total revenues. These estimates were based on the share of incomes from trading activities of farm households in Antananarivo in 1988 (World Bank and Groupe Huit-Aura 1989). Fifteen percent of the returns to informal capital in the commerce subsector (13) were allocated to urban II households, which include private traders. Total returns to informal sector capital were allocated to other households so as to produce plausible results for household savings, given estimated levels of household consumption (discussed in Section 5).

The above example illustrates the usefulness of organizing data within a SAM framework to ensure consistency and to provide information on the magnitudes of flows for which there are few data. In this case, the levels of consumption expenditures were considered to be relatively reliable, and thus they provided a base from which other estimations (the allocation of informal sector capital flows) could be made.

INTERHOUSEHOLD TRANSFERS (LAND AND HOUSING RENTS)

Transfers between institutions in the SAM are based on the comprehensive economic table (TEE) of Madagascar's national accounts (Appendix 1), but disaggregation of the transfers by household type required additional assumptions. All transfers from households to other institutions included in the TEE (mostly direct taxes, social security

Table 18 - Total Labor/Household Matrix

	Number of Households	Total Labor I	Total Labor II	Total Labor III	Total Labor	Total Population
Household/Urban I	34,410 (0.02)	44,320 (1.00)	6,697 (0.03)	5,594 (0.00)	56,610 (0.02)	210,719 (0.02)
Household/Urban II	199,513 (0.11)		158,664 (0.71)	142,440 (0.06)	301,103 (0.12)	1,120,791 (0.12)
Household/Urban III	64,142 (0.04)			78,295 (0.03)	78,295 (0.03)	291,434 (0.03)
Small farms/Plateau	365,125 (0.20)			520,445 (0.22)	520,445 (0.20)	1,910,740 (0.20)
Small farms/East Coast	381,432 (0.21)			543,689 (0.24)	543,689 (0.21)	1,996,076 (0.21)
Small farm/West & South	257,120 (0.14)			366,496 (0.16)	366,496 (0.14)	1,345,536 (0.14)
Large farmers	339,416 (0.19)			483,800 (0.21)	483,800 (0.19)	1,776,203 (0.18)
Other rural rich	92,234 (0.05)		58,000 (0.26)	73,297 (0.03)	131,297 (0.05)	482,038 (0.05)
Nonfarm rural poor	90,747 (0.05)			99,426 (0.04)	99,426 (0.04)	474,263 (0.05)
Total households	**1,824,140** **(1.00)**	**44,320** **(1.00)**	**223,361** **(1.00)**	**2,313,482** **(1.00)**	**2,581,162** **(1.00)**	**9,607,800** **(1.00)**

Source: Madagascar SAM

deductions by the employer) are divided among the households in the SAM according to the household's share in the estimated formal sector's wage bill. Sixty-three percent of transfers from formal sector enterprises to households (largely dividends and social security payments) were allocated to the rural rich households on the basis of the estimated rural share in returns to formal sector capital.[18] The remaining transfers were split among urban household groups according to their formal sector wage shares. All interest payments and insurance indemnities paid by financial institutions were allocated to the urban rich households (urban I). All government transfers, including social security payments, were allocated to households according to their shares in formal sector wages.

The SAM also includes estimates of the values of land rents in agriculture on the basis of data from the 1985 agricultural census (MPARA 1988b). These data showed that 13 percent of cultivated land in Madagascar is not directly owned by the cultivator. In the SAM it is assumed that all this land is cultivated by small farmers and that the rental rate of one-third of the harvest (a rental rate common for rice fields) is paid to the rural rich households. Small farmers' rents are thus equal to 8.3 percent of the value added of their agricultural production.

GOVERNMENT ACCOUNTS

Government accounts are based on those from Madagascar's national accounts, mostly from the Tableau Économique d'Ensemble. Indirect taxes on domestic goods and imports are included as expenditures on intermediate inputs and final uses. Export taxes and receipts of the commodity stabilization fund are included as taxes on exports (i.e., taxes on the purchases of the rest of the world). Direct taxes are allocated to urban households in the same proportion as household wage receipts from the formal sector (which assumes that most direct taxes are paid out of the formal sector wage bill and that the tax rate is proportional to income).

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[18] Seventy percent of total returns to capital are in the formal service sector, and 100 percent of returns to capital are in the formal agricultural sector.

Likewise, social security payments (both actual and imputed) are allocated according to the household's share in wage receipts from the formal sector.[19]

Current expenditures of the public administration are mostly for the output of the public administration subsector (15). Also included are worker insurance payments to workers in the formal sector, transfers to formal enterprises or to financial institutions (insurance premiums and interest payments), and intergovernmental transfers. The government sector as a whole ran a current account surplus of 25,758 million FMG in 1984, equal to 7.9 percent of current account revenues, as shown in the intersection of the public administration current accounts column (expenditures) and the public administration capital accounts row (receipts).

REST OF WORLD

Trade data are taken from the national accounts figures, which are based on customs receipts. The territorial correction in the national accounts, which captures the discrepancy between (a) Central Bank foreign exchange receipts for imports and exports and (b) customs receipts, is included in the SAM as a payment of urban I households to the rest of world (ROW) current account.[20]

All current transfers from abroad to households (such as wage remittances) are allocated to the urban rich (urban I). These transfers, equal to 14,981 million FMG, accounted for 6.5 percent of gross incomes of the urban rich. Similarly, all current transfers to abroad from Malagasy households (3,738 million FMG) are also allocated to the urban rich. Current transfers from financial institutions, mainly interest payments, equalled 63,678 million FMG or 17 percent of total current account debits of Madagascar. Net foreign savings of the ROW (equal to Madagascar's current account deficit) was 113,536 million FMG in 1984, equal to 30 percent of current account debits.

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[19] Social security payments appear in three places both in the TEE and the SAM: (1) these payments are included as part of wages paid to labor in the formal sector (even though they are withheld from the employees' paychecks); (2) households then (implicitly) transfer social security payments to the public administration account; (3) payments out of the public administration's social security funds are made to households. The flows described in (1) and (2) are identical in magnitude. Flow (3) may be greater or less than the amount withheld from the employee's wage payments.

[20] In the national accounts, the territorial correction reduces total consumption of households by the discrepancy in exports (500) and increases consumption of households by the discrepancy in imports (15,600). The net figure is used for the SAM.

CAPITAL ACCOUNTS

The capital accounts in the SAM are based on the Comprehensive Economic Table (Tableau Économique d'Ensemble or TEE) and the Flow of Funds Table (Tableau des Opérations Financières or TOF). The correspondence between assets defined in the TOF and those in the SAM are given in Table 19.[21] Table 20 shows the capital accounts in the SAM (savings and investment are aggregated into a single column and row, respectively).

The major sources of funds for the central bank were the change in currency and bills (14.7 billion FMG), deposits in the Central Bank (46.7 billion FMG, mostly by the government) and foreign loans (92.5 billion FMG). Almost all of these funds were used for loans (102.4 billion FMG, mostly to the government) and to build up foreign exchange reserves (22.4 billion FMG).

Government savings (25.8 billion FMG) were insufficient to cover real investment (43.4 billion FMG) and capital transfers to public enterprises (58.2 billion FMG). Foreign grants and loans (totaling 52.8 billion FMG) and credit from the Central Bank (equal to 92.7 billion FMG) more than made up the shortfall, and government deposits in the Central Bank rose by 53.2 billion FMG.

Commercial banks (and insurance companies) supplemented positive savings (25.2 billion FMG) with an increase in demand deposits (21.3 billion FMG), time deposits (20.8 billion FMG), and other borrowing (6.5 billion FMG). Major uses of these funds were for loans (63.5 billion FMG, 95 percent of the total to formal sector enterprises) and for an increase in official reserves (11.6 billion FMG).

The ROW ran a current account surplus of 113.5 billion FMG (i.e., Madagascar had a current account deficit of the same magnitude). Grants to the Malagasy government (16.2 billion FMG) and loans (129.6 billion FMG) enabled Madagascar to actually increase foreign exchange reserves by 32.5 billion FMG.

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[21] The residual adjustment arising from the changes in returns to formal sector capital in agriculture (equal to 12,663 million FMG, see section on "Factor Payments to Institutions") is added to the accounting discrepancies in the households capital account and subtracted from the same line in the formal enterprises capital account.

Table 19 - Correspondence Between TOF and SAM Assets

TOF		SAM	
11	International means of payment	46	Official reserves
12	National means of payment		
121	Coins and bills	43	Currency
122	Transferable assets and liabilities	44	Deposits
123	Nontransferable assets and liabilities	44	Deposits
Investment instruments			
22	Fixed maturity notes	44	Deposits
23	Time deposits	44	Deposits
25	Investment bonds and debts	45	Loans
26	Stocks and other equity instruments	45	Loans
Financing instruments			
31	Short-term loans		
	Foreign	45c	Foreign loans
	Domestic	45	Loans
	Long-term loans		
	Foreign	45c	Foreign loans
	Domestic	45	Loans
Accounting adjustments		47	Accounting discrepancies
Technical reserves		45	Loans

Source: Madagascar SAM.

Table 20 - Capital Accounts (million FMGs)

	Total Savings	38 Hhlds	39 FEnt	39a CStk	40a CenB	40b ComB	41 PAdm	42 RoW	43 Curr	44a Dep1	44b Dep2	44c Dep3	45a Loan1	45b Loan2	45c Loan3	45d Loan4	46 OffRes	47 AccAd	Total
Total investment		14,058	70,380	28,665	131	1,633	43,385	0											
Capital account institutions																			
38 Households	46,207	-78	0	0	0	46	32	0	0	0	0	0	-1	2,793	0	-1,256	0	0	47,743
39 Formal enterprise	-28,511	0	0	0	0	0	58,227	0	0	0	0	0	8,953	60,465	0	28,816	0	18,238	146,189
39a Change in stocks	0	0	28,665	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28,665
40 Banks	1,262	0	0	0	0	0	0	0	14,717	46,732	21,251	20,819	796	0	93,021	6,547	1,711	12,587	219,443
a. Central	-23,924	0	0	0	0	0	0	0	14,717	46,732	0	0	0	0	92,499	0	-291	2,056	131,788
b. Commercial	25,186	0	0	0	0	0	0	0	0	0	21,251	20,819	796	0	522	6,548	2,003	10,531	87,655
41 Public Administr	25,758	0	0	0	0	0	5,298	16,200	0	0	0	-1,446	92,701	285	36,600	14,454	0	1,726	191,575
42 Rest of the World	113,536	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33,996	0	147,532
Assets																			
43 Currency	13,966	162	0	0	426	163	0												14,717
44 Deposits	5,502	29,582	0	-2	-4,243	56,517	0												87,356
a. in Central Bank	-4	0	0	0	-6,486	53,222	0												46,732
b. in Comm. Banks	-2,127	30,633	0	0	-8,044	788	0												21,251
c. Oth. deposits	7,633	-1,051	0	-2	10,287	2,506	0												19,374
45 Loans	1,362	25,980	0	102,453	64,846	19,912	129,621												344,174
a. by Central Bank	0	0	0	102,449	0	0	0												102,449
b. by Comm. Banks	0	0	0	0	63,542	0	0												63,542
c. by Foreigners	0	0	0	0	0	0	129,621												129,621
d. Other loans	1,362	25,980	0	4	1,304	19,912	0												48,562
46 Official Reserves	0	0	0	22,437	11,603	-44	1,711												35,707
47 Accounting Adjust	12,934	-8,580	0	6,768	13,345	8,084	0												32,551
Total	158,252	47,744	146,189	28,665	131,788	87,656	191,574	147,532	14,717	46,732	21,251	19,374	102,449	63,542	129,621	48,562	35,707	32,551	

Source: Madagascar SAM.

5. FINAL DEMAND AND CONSUMPTION BY HOUSEHOLD GROUP

Household consumption in the national accounts was disaggregated by the various household groups using the results of several household budget surveys. Relatively better data are available on urban consumption; total rural consumption is calculated as a residual.

URBAN EXPENDITURE SHARES

Using per capita consumption data from the MPARA surveys of urban households, total household consumption by the three urban socioeconomic groups was calculated as the 1982/83 per capita figure multiplied by estimated population in each household group and adjusted for 10 percent inflation between 1983 and 1984. These figures, expressed in market prices, were used as the basis for the calculations. Some adjustments were required, however, because the survey appears to have missed consumption of certain categories of goods[22] and because the expenditure categories in the survey do not correspond exactly with the national accounts or the SAM.[23]

Consumption of wood (as firewood) was assumed to be included in the MPARA survey category of energy. It was assumed that 80 percent of energy and water (subsector 6) consumption from the national accounts (in market prices) is in urban areas (most consumption of energy and water in rural areas is not recorded in the national accounts). The remainder of the MPARA-derived estimate of consumption of energy in urban areas was assigned to consumption of firewood (subsector 2).

For most subsectors (numbers 2 [other food crops], 5, 8, 9, 12) the figures from the MPARA budget surveys were used directly. Data from the surveys on consumption from the private services (14) subsector showed

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[22] The MPARA surveys were originally designed to focus on questions on rice consumption and marketing. Little information was collected on nonfood commodities, and the expenditure totals for these goods are likely to be incomplete.

[23] The resulting levels of per capita consumption in rural and urban areas are compared with other survey results in Section 6.

very low per capita consumption, and no consumption was reported from the manufacturing (10) or public administration (15) subsectors. Alternative estimates of the consumption of the output of these subsectors were constructed and added to the subtotal of the MPARA-based consumption from other subsectors.

Consumption of the output of the services subsector (14) was taken to equal the preliminary estimates of the BDE 1984 national account (in market prices) for large urban centers (GCU) and secondary urban centers. (These estimates are based on the 1978 and 1980 household surveys' figures for per capita consumption in quantity terms, and are adjusted for price inflation.)

The estimate of consumption of manufactured goods (subsector 10) was calculated to equal 8 percent of total consumption on the basis of data from the 1978 BDE urban survey. It was assumed that 80 percent of total household consumption of the output of the public administration subsector (15) was by urban households. In addition half of urban consumption of the construction subsector (11) reported in the MPARA surveys was assumed to be included as part of investment by households in the national accounts.

In calculating consumption by household group for subsectors 2, 5, 8, 9, and 12, the expenditures derived from the MPARA surveys were used directly. For manufactured goods (subsector 10), it was assumed that the budget share for urban group I (the highest income group) was 9 percent. The budget shares for urban group II was 8 percent and the residual expenditures were allocated to urban group III (resulting in a budget share of 6.7 percent). Budget shares of private services (14) and public administration (15) services were assumed to be constant across income groups.

RURAL EXPENDITURE SHARES

Given urban consumption, total rural consumption is calculated as a residual. Estimating expenditures by the various rural household groups required a number of additional steps.

Total expenditures of the rural rich were based on estimated shares of total rural income derived from results of the 1980 rural income survey. In each faritany, the percentage, X, of farmers with less than or equal to 1.5 hectares was calculated on the basis of landholdings in the 1984 agricultural census. Average revenues of the poorest X percent of farmers in each faritany then were estimated from the 1980 rural household survey (BDE 1987a). These calculations assume that household income is perfectly correlated with land size. If they assume that the average revenue of the rural nonfarm poor was the same as that of small farmers, then rural rich households (28.3 percent of the rural population) earned

55.4 percent of rural income in 1980. Finally, it was assumed that the average savings rate of rural rich households in 1980 was 10 percent and that, on average, rural poor households had no savings in 1980. Thus, the share of total rural expenditures of the rural rich in 1980 was 49.8 percent.

Budget shares of all subsectors for each rural group were set equal to the budget share of the subsector in total rural consumption for all subsectors except other food crops/forestry (2), livestock/fish (5), rice (7), and manufactured goods (10).

Total rice consumption in rural areas was calculated as a residual, given the total national rice consumption and urban rice consumption. Rice consumption of the rural poor was estimated using the following formula:

$$Q/Pop = k^* \ (Y/Pop)b$$

where Q/Pop is per capita consumption of rice (in FMG), Y/Pop is per capita income and b is the income elasticity of demand for rice in rural areas.[24]

The constant k was estimated using the data for the rural sector as a whole; per capita consumption of poor rural households was then estimated using their share of total rural income (44.6 percent), derived from the 1980 INSRE household budget survey. Rice consumption of the rural rich was calculated as a residual.

Regional differences in consumption of small farm households were calculated using the per capita consumption patterns from a 1962 survey of households (INSRE 1962, reported in AIRD 1984). If we use 1984 rural population weights, 1962 per capita consumption in the plateau was 12 percent higher than the rural average, while per capita rice consumption in the East Coast zone and the South and West zone were 7 and 10 percent below the rural average, respectively. The above figures were used to adjust per capita rice consumption of farmers in the three zones. Rice consumption by the nonfarm rural poor was then calculated as a residual of total rice consumption by all poor rural households less the rice consumption of the small farm households.

For livestock/fish (5), the budget shares were assumed to be 3 percent for small farm households in the Plateau region and 5 percent for other rural poor households (small farmers and nonfarm rural poor), slightly less than the share for rural consumption as a whole. Similarly, budget

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[24] The estimate of the income elasticity of demand for rice in rural areas (0.35) was taken from regressions using the MPARA 1982/83 household survey data reported in AIRD (1984, pp. 156, 157).

shares of manufactured goods (10) were assumed to be 5.5 percent for all rural poor households. Consumption of other food crops by each rural poor household group was then derived as the residual of total expenditures by the household group less expenditures on all other goods. Consumption of the output of each subsector by the rural rich is derived as the residual of total rural consumption less consumption by the rural poor.

Rural consumption of other food crops (2) was disaggregated to separate out consumption of export crops (3) and industrial crops (4). Total consumption of these crops was subtracted from the total for subsector (2). It was assumed that 80 percent of the consumption of export crops was by small farmers in the East Coast zone, with the remainder of the consumption by large farmers. For industrial crops, 40 percent of total consumption was assumed to be by small farmers in the East Coast, 40 percent by small farmers in the West and South zone, and the remaining 20 percent by large farmers. Budget shares for all household groups are shown in Table 21.

Table 21 - Estimated Budget Shares 1984 (percent)

	Urban I	Urban II	Urban III	Plateau	East Coast	South & West	Rural Rich	Rural Poor	Total
1 Paddy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 Other food crops/Forestry	9.8	11.3	13.0	26.4	18.9	21.3	19.9	24.4	19.2
3 Export crops	0.0	0.0	0.0	0.0	3.4	0.0	0.3	0.0	0.6
4 Industrial crops	0.0	0.0	0.0	0.0	2.1	3.1	0.4	0.0	0.7
5 Livestock/Fishing	1.5	1.6	1.9	3.0	5.0	5.0	7.9	5.0	5.3
6 Mines/Energy/Water	7.2	7.7	8.9	0.4	0.4	0.4	0.4	0.4	1.8
7 Rice milling	8.4	17.4	23.7	18.5	15.4	14.8	9.6	18.0	13.6
8 Food industries	16.6	14.5	12.8	17.0	20.1	20.6	25.8	17.5	20.9
9 Textile industries	3.5	2.9	3.1	6.7	6.7	6.7	6.7	6.7	6.0
10 Manufacturing industries	9.2	8.1	4.7	5.5	5.5	5.5	6.4	5.5	6.3
11 Construction	2.2	1.6	3.1	0.4	0.4	0.4	0.4	0.4	0.7
12 Transport/communications	10.3	3.7	2.3	12.6	12.6	12.6	12.6	12.6	11.2
13 Commerce	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14 Services	30.8	30.6	26.3	9.5	9.5	9.5	9.5	9.5	13.4
15 Public Administration	0.5	0.5	0.4	0.0	0.0	0.0	0.0	0.0	0.1
16 Non-competitive imports	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Direct taxes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Indirect taxes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Madagascar SAM.

6. THE STRUCTURE OF THE MALAGASY ECONOMY: LESSONS FROM THE SAM

Construction of the Madagascar SAM required a number of assumptions to fill data gaps and resolve data inconsistencies, as discussed in the previous sections. In this section, the implications of the most important assumptions for the SAM are discussed, and some major empirical results arising from construction of the SAM are highlighted. The completed SAM is presented in Appendix 2.

HOUSEHOLD CONSUMPTION AND SAVINGS

Table 22 presents income and consumption levels and savings rates for the household groups in the SAM. Only three household groups have positive savings rates: the urban rich (33.1 percent), the urban middle class (2.5 percent), and small farmers in the South and West zone (8.9 percent). These savings rates rely heavily on the assumptions made in estimating household expenditure levels and on the level and allocation of returns to informal capital.[25]

In the process of constructing a SAM, assessments are made as to which data sources are most reliable. The estimation of household expenditure levels for the SAM relied on two major assumptions: (1) the total consumption level in the national accounts is fairly accurate, and (2) the data from urban household surveys are more reliable than data on rural households.

As shown in Table 23, urban consumption expenditures per capita in the SAM are estimated as 173,000 FMG, a level that is 9 percent below the average urban (large urban centers plus secondary urban centers) figure of 191,000 FMG, derived from the 1978 and 1980 household budget surveys (INSRE 1987). Urban per capita expenditures in 1988 in Antananarivo were approximately equal to the 1978 level (in real terms). Since 1984 was a

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[25] Of course, in the SAM, assumptions made in the construction of each account have implications throughout the matrix, but the assumptions mentioned above have the largest and most direct impacts on household savings rates.

Table 22 - Per Capita Income, Expenditures, and Savings by Household Type

Household	Revenue per Capita	Expenditure per Capita	Savings per Rate	Consumption per Capita
	(1,000 FMG)	(1,000 FMG)	(percent)	(1,000 FMG)
Urban I	877.0	586.8	33.1	364.8
Urban II	181.2	176.7	2.5	150.8
Urban III	126.2	130.6	-3.5	117.6
Farm/Plateau	102.7	107.8	-5.0	105.0
Farm/East Coast	104.9	108.6	-3.5	105.0
Farm/South and West	118.3	107.7	9.0	105.0
Rural/rich	271.3	279.5	-3.0	264.6
Rural/nonagricultural	103.3	115.3	-11.6	105.1
Urban average	261.6	221.7	15.3	172.7
Rural average	153.6	157.0	-2.2	150.1
All Madagascar	171.8	167.9	2.3	153.9

Source: Madagascar SAM.

Table 23 - Urban Income and Expenditures

	Income per Household	Income per Capita	Expenditures per Household	Expenditures per Capita
	(1,000 FMGs)			
1978 EBM large urban centers				
Average			1,155	210
Antananarivo			1,241	220
1980 EBM secondary urban centers				
Average	923	174	743	140
EBM large urban center/ secondary urban centers average			1,041	191
1982/83 MPARA				
Antananarivo			707	113
1984 SAM				
Urban average	1,430	263	939[a]	173[a]
Household urban I	5,368	877	2,233	365
Household urban II	1,020	181	847	151
Household urban III	571	126	534	118
1988 Antananarivo				
Urban average	1,408	235	1,298	216

Source: Madagascar SAM.

[a] Figures from 1984 SAM show final consumption, not total expenditures.

year of relatively depressed economic activity compared with the boom years of 1978 and 1980, the lower figure for 1984 per capita urban consumption seems plausible.[26] Most rural household budget surveys appear to have greatly underestimated rural incomes and consumption. Rural per capita consumption in the SAM, calculated as a residual, is 150,000 FMG, almost double the level found in the 1983 MPARA survey or the 1988 Antananarivo survey (Table 24). Rural expenditures in the 1980 household survey were only about half of reported rural incomes (56 compared with 103,000 FMG per person). Average rural incomes in the SAM are about 50 percent higher than rural average incomes in the 1980 national survey.

Both the level and the distribution of the returns to informal capital paid to the various households were major uncertainties in determining household revenues. As discussed in Section 4, the national accounts figures for wages paid in the informal sector do not include imputed wages for the owner or unpaid family workers in individual enterprises. The split between wages and returns to capital is especially important for the transport (12), commerce (13) and other private services (14) subsectors, for which value added in the informal sector is 532 billion FMG, 33.3 percent of total value added in the economy. The distribution of salaries to various household groups is relatively straightforward, but little data exist on earnings from informal capital. As described in Section 4, the allocation of returns to informal capital for the urban III and rural poor households were set so as to give plausible savings rates for these households.

Alternative assumptions are possible as well, of course, but the result that rural households were net negative savers in 1984 seems plausible, especially given (1) the low returns to large-scale export crop production because of low producer prices and large wage bills and (2) the inclusion of large traders of agricultural products from small urban centers (who were likely to have had positive savings) with urban households in the SAM.[27] Nevertheless, accurate and detailed data on sources of income by household, especially in the rural areas, could bring about a major improvement in future SAMs concerned with income distribution in Madagascar. Such data would also help with determining the levels of transfers between households.

Table 25 shows small farmer revenues from agriculture, livestock, and forestry and from land, capital, and off-farm labor. Agriculture is the

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[26] By 1988, the Malagasy economy was again experiencing positive per capita income growth after the decline and stagnation of the mid-1980s.

[27] Rural households presumably financed their expenditures in excess of income through loans from private traders and others in large and small urban centers. Capital flows between household groups are not shown in the SAM, however.

main source of income accounting for 40.1 percent of revenues on the East Coast, 31.9 percent on the Plateau, and only 26.6 percent in the West and South where livestock is of greater importance (generating 27.6 percent of gross income). Rice accounts for more than 25 percent of gross agricultural income on the East Coast, more than 44 percent on the Plateau, and 43 percent in the West and South. Revenue from export crops exceeds that from rice on the East Coast, amounting to 33.7 percent of gross agricultural income. Off-farm labor is a significant source of farmer income, representing 39.2, 45.9, and 39.2 percent of gross household income in the East Coast, Plateau, and West and South regions, respectively.

Table 26 provides an indication of the reliance of small farmers on the market for supplies of rice. East Coast and Plateau households are on average deficit in rice, purchasing 14.8 and 16.0 percent, respectively, of total rice consumed.

PRODUCTION DATA FROM THE NATIONAL ACCOUNTS

As described in Section 4, the SAM takes the national accounts data on production as given, in spite of some problems with estimations of production and uses in agriculture (e.g., no losses for most crops, the use of export data as a proxy for production data for some export crops, and the treatment of value added in rice milling). Moreover, the data on inputs into agriculture are generally weak, apart from the information on paddy production. Such refinements in the national accounts data used in the SAM would likely have only a minimal effect on the analysis of structural adjustment policies conducted with the SAM. These marginal potential benefits are more than outweighed by the large costs in terms of other changes throughout the SAM that would be required to maintain the resource-use balance in all accounts and the loss of complete consistency with the national accounts.

Although the SAM keeps the major GDP aggregates unchanged (Table 27), the SAM presents a different disaggregation of GDP by payments to factors of production, by including imputed values of wages paid to family labor in the informal sector of Madagascar's economy as part of the wage bill. Total wages account for 49.0 percent of GDP in the Madagascar SAM, compared to 26.7 percent for capital, 13.7 percent for land and 10.5 percent for indirect taxes (Table 28).

Table 24 - Rural Income and Expenditures

	Income per Household	Income per Capita	Expenditures per Household	Expenditures per Capita
		(1,000 FMGs)		
1980 EBM rural average	540	103	294	56
Farmers	475	91		
Farmers/Antananarivo	501	96		
Farmers/Toamasina	348	67		
1982/83 MPARA				
Rural average			400	76
Central plateau			512	69
East			405	64
1984 MPARA				
Rural average			342	65
Central plateau			373	50
East			547	87
1984 SAM				
Rural average	801	154	785[a]	150[a]
Small farmers plateau	537	103	549	105
Rural rich	1,419	271	1,384	265
1988 Antananarivo				
Rural average	543	92	472	80
Farmers	408	67	359	59
Mixed	528	83	450	71

Source: Madagascar SAM.

[a] Figures from the 1984 SAM show final consumption, not total expenditures.

Table 25 - Small Farmer Revenues

	1,000 FMG			Gross Income Share		
	East Coast	Plateau	West& South	East Coast	Plateau	West& South
Number of households	381,432	365,125	257,120			
Population	1,996,076	1,910,740	1,345,536			
Irrigated rice	39.3	74.8	68.8			
Upland rice	18.4	3.3	6.4			
Total rice	57.7	78.1	75.1	10.3	14.1	11.9
Coffee	50.0	1.4	3.4	8.9	0.3	0.5
Cloves	6.5	0.0	0.0	1.2	0.0	0.0
Vanilla	16.8	0.0	0.0	3.0	0.0	0.0
Other export crops	2.0	0.0	1.1	0.4	0.0	0.2
Cotton	0.0	0.2	7.9	0.0	0.0	1.3
Groundnuts	0.2	4.2	2.4	0.0	0.8	0.4
Sugarcane	4.8	1.2	6.8	0.9	0.2	1.1
Other industrial crops	2.5	0.0	1.1	0.4	0.0	0.2
Cassava	27.9	26.7	18.8	5.0	4.8	3.0
Sweet potatoes/taro	5.2	10.4	5.7	0.9	1.9	0.9
Potatoes	0.0	19.5	0.2	0.0	3.5	0.0
Other food crops	50.9	34.9	45.4	9.1	6.3	7.2
Total agriculture	224.8	176.5	167.9	40.1	31.9	26.6
Livestock (net)	45.3	80.7	173.8	8.1	14.6	27.6
Labor	4.5	8.1	17.4			
Capital	40.8	72.7	156.5			
Forestry (net)	28.9	28.9		5.1	5.2	0.0
Informal capital	41.9	41.9	42.0	7.5	7.6	6.7
Off-farm labor	219.9	254.0	247.0	39.2	45.9	39.2
Gross income	560.7	553.2	630.8	100.0	100.0	100.0
Agricultural inputs	12.4	16.4	12.6	2.2	3.0	2.0
Net income	548.4	536.8	618.2	97.8	97.0	98.0
Per capita net income	104.9	102.7	118.3			
Total labor	383.4	383.4	383.4			
Own farm agricultural labor	159.0	121.3	119.0			
Livestock labor	4.5	8.1	17.4			
Off-farm labor	224.2	275.7	275.4			
Land	123.0	111.5	192.8			
Agricultural land	53.4	38.9	36.3			
Livestock	40.8	72.7	156.5			
Forestry	28.9	28.9				

Sources: Madagascar 1984 SAM; MPARA (1988a-f,1987b).

CONCLUSIONS

Data in Madagascar, although often criticized, are perhaps the most detailed and accurate of any sub-Saharan African country. Construction of the Madagascar SAM has benefited greatly from the availability of the detailed tables on the national accounts for the base year 1984, which in turn are derived from many other statistical sources. Although numerous assumptions were made concerning the many details involved with building the SAM, the data from the various sources appear to be consistent for the most part. Thus the broad outlines of the structure of the Malagasy economy, which form the basis of the SAM, are reasonably clear.

The countrywide household survey, scheduled to begin 1991, should provide further data on the distribution of income and expenditures by households – information that would greatly aid in construction of a SAM for 1990 or 1991, as well as provide an additional source for the estimation of aggregate consumption and household savings in the national accounts.

Finally, although information gained from the effort in reconciling diverse data sources in construction of the SAM is worthwhile, the SAM is not meant as an end in itself. Rather, the SAM is designed to be used directly for policy analysis of the effects of economic policies on various household groups, and it provides the necessary data base for more complex modeling of economic policies.

Table 26 - Small Farm Household Rice Balances

	Plateau	East Coast	West/ South
Production			
(MT paddy)	282,225	240,297	191,218
(MT rice)	189,091	160,999	128,116
(kg per capita)	99.0	80.7	95.2
(mn FMG)	28,505	24,270	19,313
(FMG/kg	101	101	101
(FMG/kg rice)	151	151	151
Rice consumption			
(MT own prod)	189,091	160,999	128,116
(kg per capita)	99.0	80.7	95.2
(MT purchases)	32,778	30,727	6,369
(kg per capita)	17.2	15.4	4.7
(MT total)	221,869	191,726	134,485
(kg per capita)	116.1	96.1	99.9
(mn FMG)	37,027	32,259	20,969
Rice purchases			
(MT)	32,778	30,727	6,369
(kg per capita)	17.2	15.4	4.7
(mn FMG)	8,522	7,989	1,656
(FMG/kg)	260	260	260
Purchases as a a percentage of consumption	14.8	16.0	4.7

Table 27 - National Income Aggregates

	bn FMG	Share (percent)
GDP by production sector		
Primary	565.9	35.4
Formal	66.8	3.8
Informal	499.0	28.1
Secondary	182.1	11.4
Formal	152.3	8.6
Informal	29.8	1.7
Tertiary	848.4	53.1
Formal	311.3	17.5
Informal	537.1	30.3
Total value added	1,596.4	89.9
Formal	530.4	29.9
Informal	1,065.9	60.1
Import taxes	25.0	1.4
Special taxes	81.8	4.6
Net sales tax	71.6	4.0
Total GDP	1,774.8	100.0
GDP by end use		
Private consumption	1,484.3	83.6
Private investment	114.9	6.5
Government	216.7	12.2
Consumption	173.3	9.8
Investment	43.4	2.4
Exports	223.2	12.6
Imports	264.2	14.9
Total GDP	1,774.8	100.0
Total savings	158.3	8.9
Private savings	91.4	5.2
Government savings	25.8	1.5
Foreign savings	41.1	2.3

Source: Madagascar national accounts (1984).

Table 28 - Returns to Factors of Production

	bn FMG	Share (percent)
GDP by factors of production		
Salaries	870.2	49.0
Highly skilled labor	114.4	6.4
Skilled labor	133.5	7.5
Unskilled labor	622.3	35.1
Returns to capital	474.1	26.7
Formal sector	175.9	9.9
Informal sector	298.2	16.8
Returns to land	243.6	13.7
Small farm Plateau	40.7	2.3
Small farm East Coast	46.9	2.6
Small farm West and South	49.6	2.8
Large farm	106.4	6.0
Net indirect taxes	186.9	10.5
Total GDP	1,774.8	100.0

Source: Madagascar national accounts (1984); Madagascar SAM.

The countrywide household survey, scheduled to begin 1991, should provide further data on the distribution of income and expenditures by households – information that would greatly aid in construction of a SAM for 1990 or 1991, as well as provide an additional source for the estimation of aggregate consumption and household savings in the national accounts.

Finally, although information gained from the effort in reconciling diverse data sources in construction of the SAM is worthwhile, the SAM is not meant as an end in itself. Rather, the SAM is designed to be used directly for policy analysis of the effects of economic policies on various household groups, and it provides the necessary data base for more complex modeling of economic policies.

Appendix 1. Comprehensive Economic Table (TEE, Millions of FMG)

OPERATIONS	ACCOUNT	USES: SECTORAL ACCOUNTS: FORMAL SECTOR ENTERP.	HOUSEHOLDS AND PRIV. NONPROFITS	FINANCIAL INSTITUTIONS	PUBLIC ADMINIS-TRATION	REST OF THE WORLD	GOODS & SERVICES: COMMERC	NONCOMM	TOTAL	TOTAL	SOURCES: SECTORAL ACCOUNTS: FORMAL SECTOR ENTERP.	HOUSEHOLDS AND PRIV. NON-PROFITS	FINANCIAL INSTITUTIONS	PUBLIC ADMINIS-TRATION	REST OF THE WORLD	GOODS & SERVICES: COMMERC	NON-COMM	ACCOUNT
P 50 Exports of Goods and Services						223,667			223,667	223,667						223,667		
P 60 Imports of Goods and Services							279,821		279,821	279,821					279,821			
P 10 Production of goods and services							2,481,689	180,374	2,662,063	2,662,063	819,631	1,619,194	27,246	195,992				
of commercial subsectors							2,481,689		2,481,689	2,481,689	819,631	1,612,262	27,246	22,550				PRODUCTION
of noncommercial sub-sectors	PRODUCTION							180,374	180,374	180,374		6,932		173,442				
P 20 Intermediate Consumption		421,227	550,254	8,990	68,561		16,542		1,065,584	1,065,584						1,065,584		
of commercial subsectors	C1	421,227	545,452	8,990			16,542		992,211	992,211						992,211		
of noncommercial sub-sectors			4,812		68,561				73,473	73,473						73,473		
B 1 Gross Value Added		398,404	1,065,930	18,256	127,331		-16,542		1,596,379	1,596,379	398,404	1,065,930	18,256	127,331		-16,542		
commercial		398,404	1,065,933	18,256			-16,542		1,466,051	1,466,051	398,404	1,065,933	18,256			-16,542		OPERATION
noncommercial			2,997		127,331				130,328	130,328		2,997		127,331				C2
R 30 Operating subsidies							17,136		17,136	17,136	17,136							
R 10 Wages and salaries	OPERATION	173,769	65,439	10,035	127,325				376,508	376,508		376,508						
R 20 Import and production taxes	C2	19,238	5,768	529	6		147,041		172,602	172,602				204,032		-31,430		
S 2 Gross operating surplus		222,593	997,703	7,692	0		-16,542		1,211,446	1,211,446	222,593	997,703	7,692	0		-16,542		
P 60 Adjustment for imputed banking Services				16,542			-16,542		0									INCOME
R 30 Operating subsidies					17,136				17,136	17,136						17,136		
R 40 Property income from enterprises	INCOME	38,651	10,257	79,942	25,468	2,900			157,218	157,218	7,053	3,137	52,688	4,178	90,162			C3
R 50 Damage insurance operations	C3	3,754	442	7,152	520				11,868	11,868	3,954	2,431	4,889	584				
R 60 Current unrequited transfers		250,624	68,327	5,145	102,288	40,300			466,684	466,684	43,571	232,222	44,774	135,997	10,420			
S 3 Gross disposable income		-15,846	1,532,975	1,252	199,079				1,717,469	1,717,469	-15,846	1,532,975	1,252	199,079				USES
P 30 Final consumption	USES		1,499,430		173,319				1,672,749	1,672,749						1,492,375	180,374	OF INCOME C4
S 4 Gross savings	OF INCOME C4	-15,846	33,545	1,252	25,760	113,536			158,255	158,255	-15,846	33,545	1,252	25,760	113,536			
R 70 Capital transfers					63,525	16,200			79,725	79,725	58,227			21,498				
P 40 Gross capital formation	CAPITAL C5	99,045	14,058	1,764	43,385				158,252	158,252						158,252		CAPITAL C5
P 70 Net acquisitions of land and intangible assets			-78	48	32				0	0								
S 5 Capacity (+) or requirement (-) for financing		-58,686	19,565	-548	-59,684	97,336			3	0								
TOTAL NONFINANCIAL OPERATIONS		949,582	2,233,492	129,597	561,981	380,403	2,908,551	180,374	7,343,980	7,343,977	949,582	2,233,492	129,597	561,981	380,403	2,908,548	180,374	
		NET FLOWS OF ASSETS									NET FLOWS OF LIABILITIES							
F 11 Foreign assets				34,040	-44	1,711			35,707	35,707			1,711		33,996			
F 12 National means of payment		30,799	11,430	-5,658	45,852				82,414	82,414			82,699	-285				
F 21 Money market securities									0	0								
F 22 Fixed maturity notes		-845	4,853	-1,748	-18				2,442	2,442			3,602	-1,161				
F 23 Time deposits		-402	3,185	3,567	10,848				17,217	17,217			17,217					
F 24 Savings deposits									0	0								
F 25 Investment securities and bonds		101	3	106	1				210	210	206			4				
F 26 Stocks and other equity instruments		467	233	759	1,425				2,884	2,884	2,184		700					
F 31 Short-term loans	FINANCING C6	18,855	268	158,111	14,812	-4,531			186,516	186,516	85,570	-142	-3,855	104,443				FINANCING C6
F 32 Medium- and long-term loans		4,643	0	8,286	3,589	134,152			150,650	150,650	9,976	1,679	99,404	39,592				
F 33 Accounting discrepancies		4,082	271	20,113	8,084				32,551	32,551	18,238		12,587	1,726				
F 41 Mathematical reserves			557						557	557			557					
F 42 Reserves for casualty allowances		2,714	301	58	285				3,358	3,358			3,358					
S 6 Balance of assets and liabilities											-58,666	19,565	-547	-59,687	97,336			
TOTAL FINANCIAL OPERATIONS		59,867	21,101	217,633	84,632	131,332			514,565	514,565	59,867	21,101	217,633	84,632	131,332			

SOURCE: Direction Generale de la Banque des Donnees de l'Etat.

(*) The SAM institutional category "Financial institutions" includes the TEE categories "Credit institutions" and "Insurance".

Appendix 2. Madagascar SAM - Condensed Version

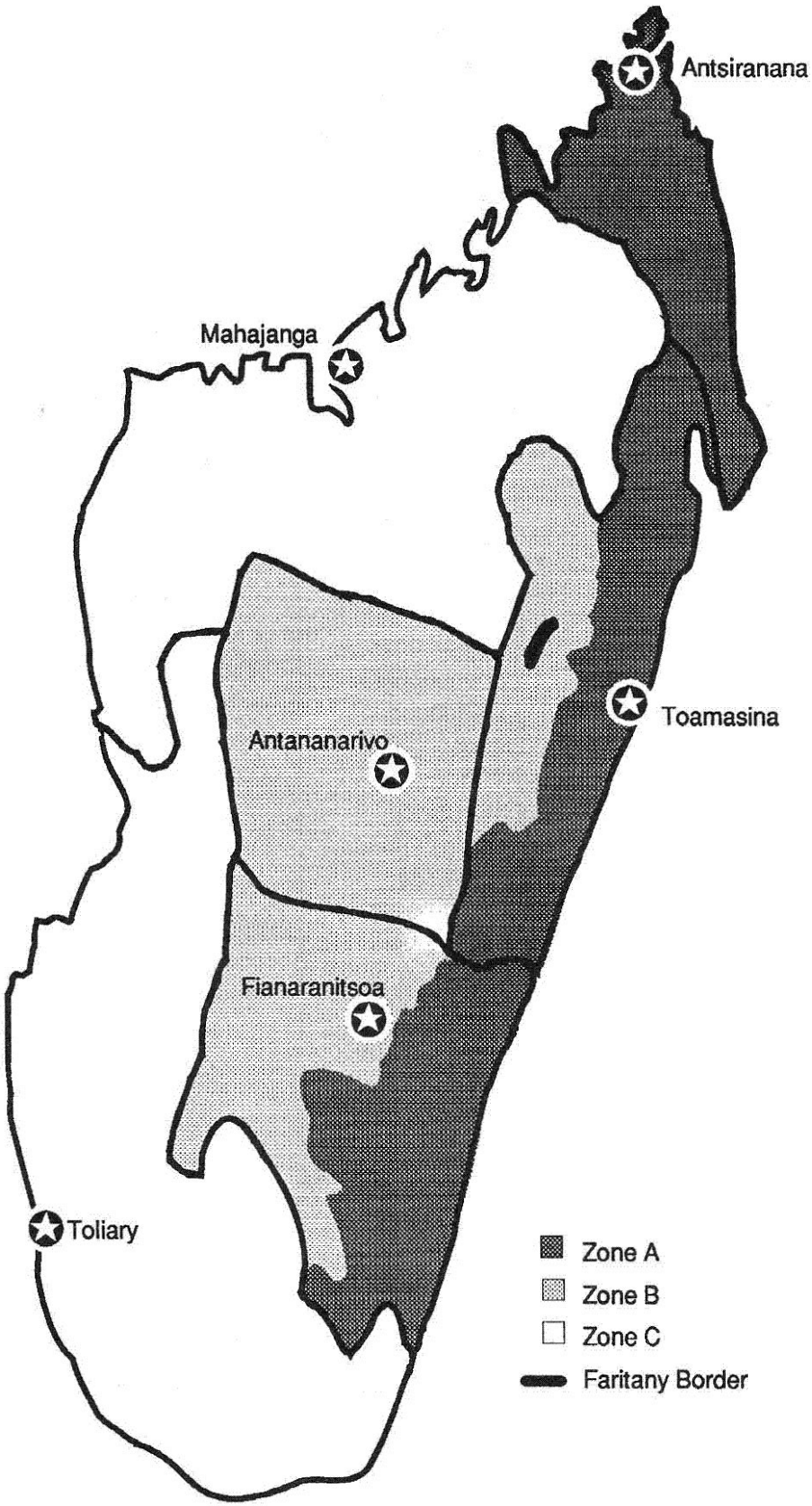
	Activ	Commod	Trv1	Trv2	Trv3	CapF	Capl	TerP	TerE	TerS	TerR	MnU1	MnU2	MnU3	MnRR	MnFI	MnEs	Mn3d	MnRP	IPSBL	EntF	InCr	AdmP	ROW	CapDom	CapROW	FinAsset	DecCMP	Total
Activities		2,662,065																						0					2,662,065
Commodities	1,865,682	361,923										76,870	169,069	34,272	200,600	209,559	141,262	597,489	48,856	5,354	0	0	173,319	223,167	158,253	0			3,466,574
FACTEURS																													
17 Trav I OEtav	114,431																												114,431
18 Trav II OMoy	133,496																												133,496
19 Travill OBas	622,271																												622,271
20 Capit Form	175,940																												175,940
21 Capit Inter	298,170																												298,170
22 Terre Plat	40,721																												40,721
23 TerreCoteEst	46,931																												46,931
24 TerreSud	49,571																												49,571
25 TerreLarge	106,423																												106,423
INSTITUTIONS																													
26 MenageUrb1			114,431	4,002	1,505	0	0	0	0	0	0	1,081	1,124	147				332	186	26	28,501	5,828	12,647	14,981					184,791
27 MenageUrb2			0	94,829	38,313	0	28,299	0	0	0	0									137	29,635	686	13,151						203,051
28 MenageUrb3			0	0	21,069	0	10,000	0	0	0	0									36	3,867	90	1,716						36,768
29 MenCultPlat			0	0	139,987	0	15,300	40,721	0	0	0									234									196,243
30 MenCultCEst			0	0	148,239	0	15,000	0	46,931	0	0									245									209,415
31 MenCultSud			0	0	98,579	0	10,500	0	0	49,571	0									165									159,115
32 MenageRurR			0	34,865	149,848	0	199,770	0	0	0	106,423				5,371	7,144	3,598			277	101,675		3,885						612,654
33 MenRurNonAg			0	0	26,743	0	20,000	0	0	0	0									58			2,179						48,981
34 IPSBL			0	0	0	0	0	0	0	0	0	54								0	5,604	401	8,422	419					14,900
35 EntrpriseForm			0	0	0	184,789	0	0	0	0	0	4,002	4,152	543				26,370	690	0	14,990	11,017	17,955	0					264,518
36 InstitCredit			0	0	0	-8,850	0	0	0	0	0	4,447	4,524	803				1,366	786	17	50,786	8,007	28,834	2,900					93,501
37 AdminPub	8,425	178,469	0	0	0	0	0	0	0	0	0	18,357	19,088	2,491				5,638	3,153	0	54,509	2,536	9,783	24,900					327,353
38 ResteDuMonde	0	264,221	0	0	0	0	0	0	0	0	0	18,838									3,462	63,676	29,704	0					379,903
CAPITAL ACCOUNT																													
CapInvs												61,142	4,985	-1,288	-9,729	-7,288	14,255	-18,541	-5,681	8,352	-28,511	1,262	25,756		92,190	16,200	447,958	32,551	633,616
ROW																								113,536	0		33,996	0	147,532
FinAssets																									350,622	131,332			481,954
DecalCompt																									32,551	0			32,551
	2,662,061	3,466,677	114,431	133,496	622,271	175,939	298,170	40,721	46,931	49,571	106,423	184,791	203,051	36,768	196,243	209,415	159,115	612,654	48,981	14,900	264,518	93,501	327,353	379,903	633,616	147,532	481,954	32,551	

Appendix 3 - Input-Output Table for Madagascar

		1a PadA	1b PadB	1c PadC	2 OFCC	3a XpCA	3b XpCB	4a InCA	4b IncB	5a LivA	5b LivB	6 Ener	7a RicA	7b RicB	8a FooA	8b FooB	9a TxtA	9b TxtB	10a ManA	10b ManB	11a ConA	11b ConB	12a TrnA	12b TrnB	13a ComA	13b ComB	14 Serv	15 PubAd
1C	Paddy	3539	3592	2443	0	0	0	0	0	0	0	0	131956	30202	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2C	Other Food/ Forest	0	7	0	12144	0	84	0	148	12217	219	7	0	0	3301	698	22	218	1566	857	9564	2391	448	101	391	163	4672	225
3C	Export crops	0	0	0	0	11	11	0	0	0	0	0	0	0	3577	501	0	0	0	0	0	0	0	0	0	0	0	0
4C	Industrial crops	0	0	0	0	0	0	336	36	0	0	0	0	0	4219	591	0	7292	0	0	0	0	0	0	0	0	0	0
5C	Livestock/ Fish	18079	3013	1139	4987	0	0	3013	0	4176	421	0	0	0	161748	3975	0	0	0	1	0	0	0	0	0	28	1073	111
6C	Mines/Energy/ Water	0	2423	0	1321	0	65	0	141	1193	5405	33446	0	1510	138	3789	418	2221	1097	6183	164	3291	18300	14162	7384	3941	5006	4856
7C	Rice milling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8C	Food processing	0	186	0	10	0	5	0	11	9231	204	0	0	0	9498	22574	291	1542	239	591	0	0	22	27	1827	793	20254	12111
9C	Textile industry	0	379	0	20	0	10	0	22	23	108	92	0	0	143	1100	3503	11208	6	1435	4	81	427	96	137	57	231	1911
10C	Other industry	0	16778	18	979	0	984	0	960	1401	6339	5008	0	0	747	13702	1936	11012	3407	30841	3096	22487	13068	8143	4432	4172	19030	16216
11C	Construction	0	0	0	46	0	0	0	0	0	12	215	0	0	36	364	19	104	42	278	0	0	213	471	416	301	2014	1539
12C	Transport/Commun.	0	6399	0	2246	0	171	0	373	123	1426	6779	0	2516	292	4766	387	2309	616	3346	259	5232	126	21015	8489	7012	4993	11943
13C	Commerce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14C	Services	0	10701	0	977	0	286	0	624	1055	5042	7238	0	0	380	6402	300	2002	879	4227	391	8357	3510	11924	6909	5274	26627	24560
15C	Public administr.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: National Accounts and Madagascar SAM.

Appendix 4. Madagascar by Faritany and SAM Zone



Appendix 5. Mapping of National Accounts Sectors into SAM Sectors

SAM Sector	National Accounts Sector	
Primary Sector		
1. Rice	CN01	Agriculture
2. Other Food Crops/Forestry	CN01	Agriculture
	CN03	Forestry
3. Export Crops	CN01	Agriculture
4. Industrial Crops	CN01	Agriculture
5. Livestock and fishing	CN02	Livestock and fishing
Secondary Sector		
6. Mines, Energy and Water	CN11	Extractice industries
	CN12	Energy
7. Rice Milling	CN21	Food industries
8. Food processing	CN04	Agro-industries
	CN21	Food industries
	CN22	Beverages
	CN23	Tobacco
	CN24	Oils and Fats
9. Textiles	CN41	Textiles
10. Other manufacturing	CN42	Leather
	CN51	Woodworking
	CN52	Construction materials
	CN53	Metalworking
	CN54	Transportation materials
	CN55	Electrical industry
	CN61	Publishing and paper
	CN62	Other industries
Services		
11. Construction	CN71	Construction and public works
12. Transportation and Communications	CN811	Merchandise transportation
	CN812	Passenger transportation
	CN82	Allied transportation
	CN83	Telecommunications
13. Commerce	CN91	Commerce
14. Private Services	CN921	Banking
	CN922	Insurance
	CN93	Services to private enterprises
	CN94	Services provided to communal entities
	CN95	Health, Leisure, and Community Services
15. Public Administration	CN96	Non-marketed services

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