IFPRI EGYPT Strategy Support Program

EGYPT SSP WORKING PAPER 02 | OCTOBER 2016

A Disaggregated Social Accounting Matrix

2010/11 FOR POLICY ANALYSIS IN EGYPT

Perrihan Al-Riffai, Suzane Moussa, Amani Khalil, Fayza Hussein, Eman Serag, Naglaa Hassan, Ahmed Fathy, Asmaa Samieh, Mahmoud ElSarawy, Embareka Farouk, Saad Souliman, and Amani Abdel-Ghafour

Central Agency for Public Mobilization and Statistics

Arab Republic of Egypt

PREFACE

The availability of comprehensive and coherent socio-economic data is an essential requirement for the development, implementation, and assessment of any national strategic plan, like Egypt's Sustainable Development Strategy 2030. Social accounting matrices (SAMs) combine many datasets produced by statistical agencies and national institutions – such as Central Banks and Ministries of Finance and Agriculture – including those on balance of payments, government budgets, national accounts, and household surveys. As such, SAMs are very comprehensive and provide the basis for policy analysis that focuses on the economy-wide and distributional implications of public policies and investments. An additional benefit of SAMs lies in the construction process itself, which requires the reconciliation of data from different sources and the discovery of existing data gaps and weaknesses.

The Central Agency for Public Mobilization and Statistics (CAPMAS) is pleased to present a disaggregated version of the Egypt SAM for 2010/11. This new SAM builds on the previous SAM 2010/11 built and published by CAPMAS with the support of the International Food Policy Research Institute (IFPRI). The value added of this new disaggregated version of the SAM is its focus on the agricultural sector and different types of households. By disaggregating the single agricultural sector into 22 agricultural sub-sectors and the single household of the previous SAM into 20 household groups, defined by expenditure decile and rural or urban residence, the disaggregated SAM now allows for analyzing agricultural issues at the detailed crop level and to better understand the potential impacts of policy changes for both better off and more vulnerable households.

As such, the disaggregated SAM provides a rich dataset on the economy for economic analysts and researchers in their quest to provide evidence-based policy analysis to decision makers. It is my hope that this new SAM will be widely used and results based on this SAM will help to inform policies in Egypt to improve the lives of the people. This disaggregated SAM is a product of the continuing CAPMAS-IFPRI collaboration. I would like to thank IFPRI for the technical support it provides to CAPMAS, especially that provided by Ms. Perrihan Al-Riffai and Dr. Clemens Breisinger. We acknowledge the CGIAR Research Program on Policies, Institutions and Markets for its financial support towards the capacity building sessions. CAPMAS looks forward to receiving feedback and comments on the disaggregated SAM from those interested in economic and financial studies, especially studies that may contribute to improving and building upon this body of work. The disaggregated SAM for Egypt for 2010/11 shall be accessible to all interested users online through the official websites of both CAPMAS and IFPRI.

Major-General Abo Bakr El-Gendy
President of the Central Agency for Public Mobilization and Statistics
http://www.capmas.gov.eg

The staff of the General Department of National Accounts extend their thanks and appreciation to all those who collaborated with us in preparing for and producing this significant output. We would like to pay special tribute to Major-General Abo Bakr El-Gendy, President of CAPMAS, for his continuous and on-going support to the Department's staff.

We would also like to express our appreciation to Ms. Perrihan Al-Riffai, Senior Research Analyst from the International Food Policy Research Institute (IFPRI), who has provided hands-on capacity building support to our department over several years. This interactive and gradual support has allowed us to learn the SAM construction process, step by step, including the use of GAMS software for constructing and balancing the SAM. We are now confident that we will be able to construct future SAMs for Egypt with minimal support and look forward to continuing the collaboration with IFPRI in doing so. We also wish to thank the Ministry of Agriculture and Land Reclamation for the data they provided and the clarifications that they offered to our queries whenever needed, the CAPMAS' sector leaders for their continuous and on-going support for the staff in constructing the SAM, and Dr. Mariam Raouf of IFPRI for her invaluable comments.

We acknowledge financial support from the CGIAR Research Program on Policies, Institutions and Markets for the capacity building sessions and from the German Federal Ministry for Economic Cooperation and Development and the CGIAR Research Program on Water, Land and Ecosystems (WLE) for the development of the SAM.

We hope that this work realizes its objective, which is to benefit economic researchers, analysts, and decision makers; and ultimately, to provide considerable added value to the work of CAPMAS, in general, and to the Department of National Accounts, in particular.

Table of Contents

List of Tables

List of Figures

CAPMAS	Central Agency for Public Mobilization and Statistics
CGE	Computable General Equilibrium
EGP	Egyptian Pound
GDP	Gross Domestic Product
GPC	General Petroleum Company
HIECS	Household, Income, Expenditure, and Consumption Survey
IFPRI	International Food Policy Research Institute
ROW	Rest of the World
SAM	Social Accounting Matrix

1. INTRODUCTION

Overview

Any economy shows significant and varied interlinkages among its production and consumption, investment and saving, all of its various sectors, and with the outside world. These relationships and interlinkages can be captured in a moment in time in a table known as a Social Accounting Matrix or, more commonly, a SAM. The SAM is the core database for computable general equilibrium (CGE) modeling, a modeling technique that allows ex-ante analysis of policy scenarios and dialogue and their impact on the economy as a whole.[1]

A SAM is a comprehensive and coherent socio-economic database, which portrays the abovementioned inter-linkages amongst the various domestic sectors as well as with the rest of the world. It is a square matrix where a column sum equals its corresponding row sum. The rows represent income received and the columns payments made. Each cell in the SAM represents payments from a column account to a row account, and income received by a row account from a column account. As a result, the SAM represents an analytical tool that highlights interactions throughout the economy in a circular flow of income. The SAM differs from supply and use tables because it is not restricted to only income generation and utilization across sectors. It also includes the distribution of income across institutions (financial, non-financial, and the government) as well as relationships between the domestic economy and the rest of the world. Subject to data availability, SAM accounts in each category may be disaggregated appropriately in order to address in more detail policy questions analyzed in economic models such as CGE models.

The Egypt disaggregated SAM for 2010/11, was constructed with a special focus on the agriculture sector and on income distribution amongst households. It is composed of 52 activity sectors, 49 commodity sectors, three types of factors of production: labor (unskilled labor, semiskilled labor, and skilled labor), land, and capital; a government account, as well as, enterprises, households, savings and investment, and the rest of the world (ROW). The household sector is divided spatially into urban and rural households, with each disaggregated into 10 deciles according to expenditure. In contrast, the previous (more aggregated) version of the 2010/11 SAM only included 53 sectors (with only one crop and livestock sector), one household sector that also included other domestic nongovernment institutions (enterprises), and one labor factor.

The availability of household and agricultural data based on the Household, Income, Expenditure and Consumption Survey (HIECS) and on information from the Ministry of Agriculture and Land Reclamation has greatly facilitated the construction of the disaggregated 2010/11 SAM for the Egyptian economy. The new SAM is composed of 136 rows x 136 columns. Its accounts are divided into seven broad categories:

i. activities;
ii. commodities (goods and services);
iii. factors of production;
iv. non-governmental domestic institutions;
v. the government;
vi. savings and investment; and
vii. the rest of the world (ROW).

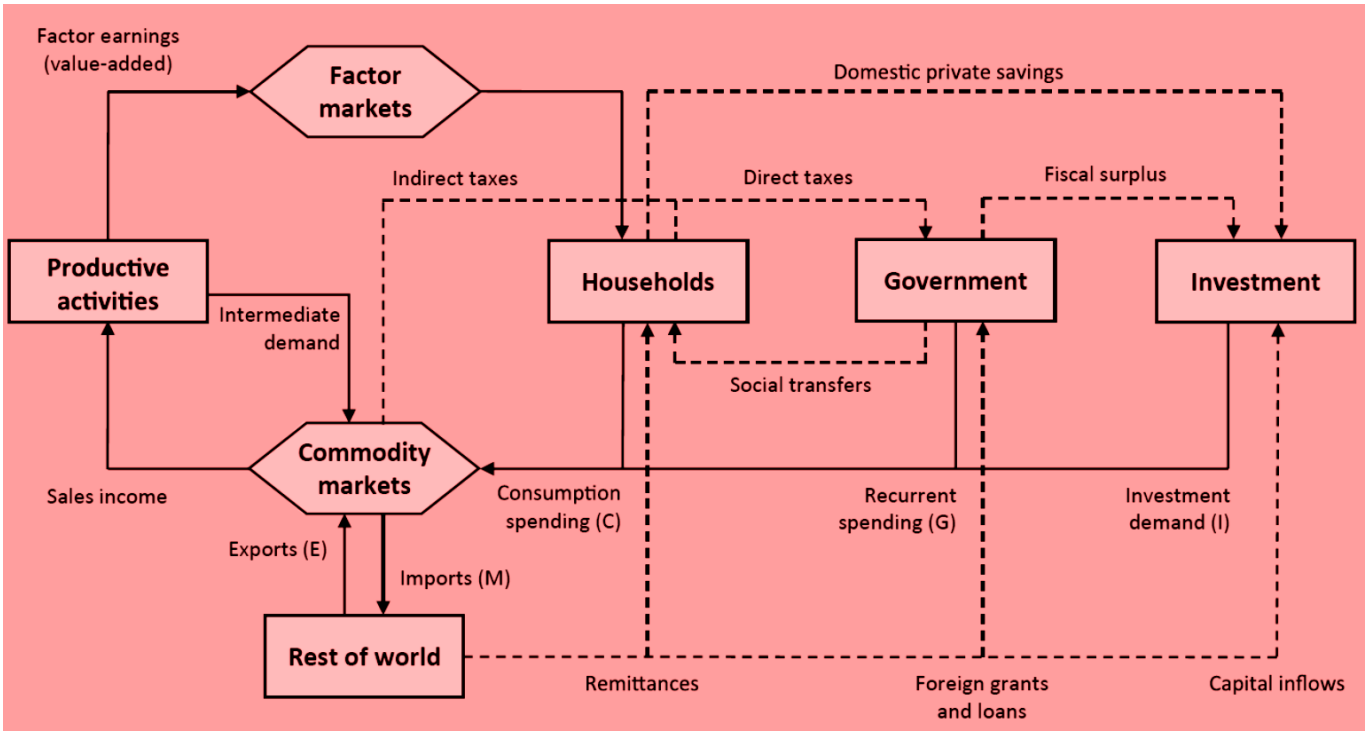
Circular flow of income

The SAM's circular flow of income in the economy is represented in Figure 1. Households (and enterprises) own the factors of production (labor, land, and capital) and receive payment (factor earnings or value added) from the production activities that make use of these factors. In turn, households use a portion of these factor earnings and other sources of income (such as; transfers and remittances) to purchase goods and services from commodity accounts and from the rest of the world (imports), making up private consumption. Activities, commodities, households, and other domestic institutions pay taxes to the government, which in turn uses a portion of those to spend on consumption of goods and services (government consumption) and on paying transfers to households (social transfers). In an open economy, the rest of the world provides goods and services (in the form of imports) and pays for its demand of domestically produced goods and services (exports). The rest of the world also pays out transfers to the domestic economy, through workers' remittances and as transfers to the government.

[1] This is a revised version of the Working Paper that reflects technical changes to the SAM made primarily in the Households accounts.

To illustrate the circular flow of income for an agricultural activity, let us consider the case of wheat production and trade. Wheat production requires intermediate inputs, such as seeds and fertilizers as well as land and labor. Those intermediate inputs can be either produced locally or imported. Agricultural labor often requires lower skills, and those lower skill

Figure 1—Circular flow diagram of the economy



Source: Breisinger, Thomas, and Thurlow (2009).

levels are more often found among poorer rural households. As such, these households tend to earn more of their income from farming (in our example, from wheat production), which in turn they spend on goods and services. These goods and services (such as food, fuel, and transport) can be either imported or domestically produced. These households engaged in wheat production may also pay taxes to the government and may receive social transfer payments from the state. The Government uses these and other revenues (e.g., from foreign grants or value added taxes) to provide public services, subsidize goods (e.g., fuel, food and fuel in Egypt), and invest. Going back to wheat – once the wheat is produced, it becomes a commodity traded on the market and may either be used for consumption (intermediate or final) or exported, whether as wheat in its raw form or as processed food, such as bread or pasta.

2. THE MACRO-SOCIAL ACCOUNTING MATRIX

The macro-SAM indicates the linkages and relationships within the economy as portrayed in a more compact presentation in which activities, commodities, and households (among other accounts) are aggregated into single accounts. It represents the circular flow of income underlying all SAM structures, but in a simple matrix format.

Table 1 presents the aggregated conceptual macro-SAM (10 rows x 10 columns) for the Egyptian economy and will be the reference table for this section. In general, the discussion below focuses on the conceptual underpinnings of the SAM, abstracting from any numerical examples.

Table 1—Basic structure of a macro Social Accounting Matrix (macro-SAM)

		1 Activities	2 Commodities	3 Factors of production	4 Enterprises	5 Households	6 Government	7 Taxes	8 Savings or Investment	9 Rest of the world	10 Total
1	**Activities**		Domestic supply								**Activity income**
2	**Commodities**	Intermediate demand				Consumption spending (C)	Recurrent spending (G)		Investment demand (I)	Exports (X)	**Total demand**
3	**Factors of production**	Value added								Factor income from abroad	**Total factor income**
4	**Enterprises**			Capital income to enterprises							**Enterprises income**
5	**Households**			Factor payments			Transfers			Worker's remittances	**Income of households and other domestic institutions**
6	**Government**				Transfers from enterprises to government			Net indirect & income taxes, custom duties		Foreign grants & loans	**Total government revenue**
7	**Taxes**		Net Indirect taxes and custom duties		Income taxes on the enterprises	Personal income tax					**Total net tax revenue**
8	**Savings or Investment**				Savings of the enterprises	Private savings	Fiscal balance			Current account balance	**Total savings**
9	**Rest of the world (ROW)**		Imports (M)	Factor income to the rest of the world	Transfers from enterprises towards the ROW	Transfer payment from household sector	Transfers from government				**Foreign exchange outflow**
10	**Total**	**Gross output**	**Total supply**	**Total factor spending**	**Total spending of enterprises**	**Total household spending**	**Total government spending**	**Total net tax**	**Total investment spending**	**Foreign exchange inflow**	

Source: Modified from Breisinger, Thomas and Thurlow (2009).

Activities and commodities

The macro-SAM distinguishes between "activities" and "commodities." Activities are the entities that produce goods and services, while commodities are the goods and services produced by activities. They are distinguished from each other, because sometimes an activity produces more than one kind of commodity (by-products). Similarly, commodities can be produced by more than one kind of activity – for example, maize can be produced by small or large-scale farmers. The values in the activity accounts are usually measured in producer prices (that is, farm or factory gate prices).

Activities

Activities produce goods and services by combining the factors of production with intermediate inputs. This is shown in the activity column of the SAM, where activities pay factors of production the wages, rents, and profits they generate during the production process (that is, value-added). This is a payment from activities to factors, and so the value-added entry in the SAM appears in the activity column and the factor row [R3-C1]. Similarly, intermediate demand is a payment from activities

to commodities [R2-C1]. Adding together value-added and intermediate demand gives gross output. The information on production technologies contained in the activity column is the input part of a typical "input-output table," or factor and intermediate inputs per unit of output.

Commodities

Commodities are either supplied domestically [Row 1-Column 2 in Table 1] or imported [R9-C2]. Indirect (sales) taxes and import tariffs are paid on these commodities, netting out the subsidies that the government pays to support some of the commodity sectors [R7-C2]. This means that values in the commodity accounts are measured at market prices. Commodities are purchased by a number of economic entities. As discussed, activities buy commodities to be used as intermediate inputs for production [R2-C1]. Final demand for commodities consists of consumption spending by households [R2-C5], government consumption (or recurrent expenditure) [R2-C6], gross capital formation or investment [R2-C8], and export demand [R2-C9].

Domestic institutions

A SAM is different from an input-output table because it not only traces the income and expenditure flows of activities and commodities, but it also contains complete information on the accounts of different domestic institutions, such as households, enterprises, and the government. [2] Households are usually the owners of the factors of production, and so they receive the incomes earned by factors during the production process [R5-C3]. They also receive transfer payments from the government [R5-C6] (for example, social security and pensions), and from the rest of the world [R5-C9] (such as remittances received from family members working abroad). Households then pay income taxes to the government through the taxes account [R7-C5] and purchase goods and services from the commodity account [R2-C5]. Households and enterprises transfer payments abroad to the rest of the world [R9-C5 and R9-C4, respectively] and enterprises transfer surpluses to the government [R6-C4]. Remaining income for households and enterprises is then saved (or dis-saved if expenditures exceed income) accordingly [R8-C5 and R8-C4, respectively].

The government receives transferred surpluses from the enterprise sector [R6-C4] and from the rest of the world [R6-C9] (such as foreign grants and development assistance). In addition, the government receives income in the form of net indirect taxes, custom duties and income taxes [R6-C7] thus making up total government revenues. The government uses these revenues to pay for recurrent consumption spending [R2-C6], for transfers to households and financial and non-financial sectors [R5-C6] and to send transfers to the rest of the world [R9-C6]. The difference between total revenues and expenditures is the fiscal surplus (or deficit if expenditures exceed revenues) [R8-C6].

Savings, investment and the foreign account

According to the ex-post accounting identity, investment or gross capital formation must equal total savings. So far we have accounted for enterprise and household savings [R8-C4 and R8-C5, respectively] and government savings [R8-C6]. The difference between total domestic savings and total investment demand is reflected in "foreign savings", or what is called the current account balance [R8-C9].

A macro-SAM for Egypt, 2010/11

The first step to constructing a SAM is to construct the numerical macro-SAM. In constructing the 2010/11 macro-SAM for Egypt, the sources of data listed in Table 2 were used.

[2] Domestic institutions in Egypt include the government, households, and enterprises, based on the National Accounts bulletin published by the Ministry of Planning, Monitoring and Administrative Reform. According to this bulletin, the domestic institutional sub-sectors are identified as follows: financial and non-financial organizations, government, households, and non-profit institutions serving households. The household sector includes both households and non-profit institutions serving households. The enterprises sector includes financial and non-financial organizations. The latter are made up of public agencies, private sector firms, and economic authorities.

Table 2—Key macroeconomic aggregates and sources of data used in constructing macro-SAM, 2010/11

Macro aggregate	Data sources	Value (EGP millions)
Household consumption expenditure (C)	Supply and use tables 2010/11- CAPMAS	1,005,613
Government consumption expenditure (G)	Supply and use tables 2010/11- CAPMAS	131,004
Investment demand (*Gross fixed capital formation*) (I)	Supply and use tables 2010/11- CAPMAS	246,449
Total exports of goods and services (E)	Supply and use tables 2010/11- CAPMAS	282,223
Total imports of goods and services (M)	Supply and use tables 2010/11- CAPMAS	362,715
Intermediate demand	Supply and use tables 2010/11- CAPMAS	941,156
Factors of production: Land, capital, labor (*GDP at factor cost*)	Supply and use tables 2010/11- CAPMAS	1,339,865
	BOP 2010/11 – Central Bank	
	Statistical bulletin of agricultural production requirements 2010/11- Ministry of Agriculture and Land Reclamation	
Domestic production (*intermediate demand + value added*)	Supply and use tables 2010/11- CAPMAS	2,281,021
Net taxes *(indirect taxes+ production subsidy + customs duties+ income taxes*)	Supply and use tables 2010/11- CAPMAS	-37,290
	Final accounts 2010/11 - Ministry of Finance (MOF)	
Current government transfers to households and other domestic institutions (*social insurance and retirement pensions*)	Final accounts 2010/11- MOF	103,630

Source: Construction of the Egypt 2010/11 SAM

Gross Domestic Product of the Egyptian economy at market prices: We first compute the Gross Domestic Product (GDP) of the Egyptian economy for 2010/11 at market prices using the aggregate demand components of the economy. As a first step towards construction of the macro-SAM, we start with data on aggregate final demand[3] and fill in the relevant cells according to the identity below.

GDP = Private consumption + Government consumption + Investment demand + Net trade balance

Or

GDP = C + G + I + (X-M)

GDP = (R2-C5) + (R2-C6) + (R2-C8) + [(R2-C9) – (R9-C2)]

GDP (EGP billion) = 1,005.6 + 131.0 + 246.4 + (282.2 – 362.7)

After deriving these macro aggregates the rest of the cells in the macro-SAM are then filled in giving us Table 3 that shows the constructed macro-SAM for Egypt for 2010/11. The total GDP for Egypt in 2010/11 based on the calculations for constructing the macro-SAM was EGP billion 1,302.6.

Table 3—Macro Social Accounting Matrix (macro-SAM) for Egypt, 2010/11, EGP million

		1 Activities	2 Commodi-ties	3 Factors of product-ion	4 Enter-prises	5 House-holds	6 Govern-ment	7 Taxes	8 Savings or Invest-ment	9 Rest of the world	10 Total
1	**Activities**		2,281,021								**2,281,021**
2	**Commodities**	941,156				1,005,613	131,004		246,449	282,223	**2,606,446**
3	**Factors of production**	1,339,865								1,869	**1,341,734**
4	**Enterprises**			552,319			97,039			524	**649,881**
5	**Households**			750,275	290,825		6,592			83,763	**1,131,455**
6	**Government**				84,843			61,755		1,316	**147,915**
7	**Taxes**		-37,290		82,911	16,134					**61,755**
8	**Savings or Investment**				191,254	107,995	-86,921			34,121	**246,449**
9	**Rest of the world**		362,715	39,140	47	1,714	201				**403,816**
10	**Total**	**2,281,021**	**2,606,446**	**1,341,734**	**649,881**	**1,131,455**	**147,915**	**61,755**	**246,449**	**403,816**	

Source: Egypt 2010/11 SAM

[3]Throughout the SAM construction and balancing process, these macro variables have to always coincide with the contents of the data source used to procure them.

Intermediate demand: Intermediate demand in 2010/11 was EGP billion 941.2 [R2-C1, Table 3].

Factor income: In the macro-SAM (Table 3) column 3 outlines how factor income is distributed to institutions. Rows 4 and 5 and column 3 show factor income that is received by households and other domestic institutions, i.e., incomes that compensate labor (wages and salaries), plus factor income coming from abroad (R3-C9). Total factor income amounted to EGP billion 1,341.7.

Domestic supply: Once total factor income and intermediate demand are calculated, we calculate domestically produced output sold on the domestic market as well as the produced output sold on the international market. Domestic output [R1-C2] was equal to EGP billion 2,281.0.

Households

Income received by households: Row 5 in the macro-SAM includes all current income received by households, namely: factor incomes (column 3), transfers from the enterprises (column 4), transfers from the government, e.g. pension payments (column 6), and transfers from the rest of the world, e.g. remittances (column 9).

- *Factor payments* (EGP billion 750.3) to households for their ownership of labor, capital, and land.
- *Enterprises' transfers to households* (EGP billion 290.8) as returns on their properties or as a result of partnerships in projects.
- *Government transfers to households* (EGP billion 6.6).
- *Worker's remittances* (EGP billion 83.8): Households across Egypt receive remittances from family members working abroad. As remittances are available in US dollars, their value was converted into EGP using the annual exchange rate for the year 2010/11 of EGP 5.849 per US$ 1.00.

Spending by households: Column 5 includes all spending by households on goods and services, income tax payments, and transfers to the rest of the world. The difference is savings/dissavings by the households.

- *Household final consumption* (EGP billion 1,005.6) covers household spending on goods and services.
- *Income taxes* (EGP billion 16.1): The households account pays direct taxes, such as income and property taxes to the government.
- *Transfers to the rest of the world* (EGP billion 1.7): Households send funds abroad to the rest of the world.

The difference between the income and expenditures is private savings or dissavings (EGP billion 108.0) [R8-C5].

Enterprises

Payments to enterprises (enterprise revenue): Row 4 includes all the current income received by enterprises, namely factor incomes (column 3), transfers from government (column 6), and transfers from the rest of the world (column 9).

- *Factor payments to enterprises* (EGP billion 552.3): Enterprises are paid for the use of the factors of production which they own.
- *Government transfers to enterprises* (EGP billion 97.0).
- *Rest of the world (ROW) transfers to enterprises* (EGP billion 0.5).

Spending by enterprises: The enterprise sector makes payments to the household sector, to the government through transferred surpluses and through the tax account in the form of income and property taxes, and to the rest of the world in the form of transfers.

- *Payments to the household sector* (EGP billion 290.8): This includes transfers to households from partnership agreements with the enterprise sector.
- *Transfers to government* (EGP billion 84.8): This includes the transfers of surpluses or losses from the economic authorities, public sector, and public business sector to the government of Egypt.
- *Income taxes* (EGP billion 82.9): The enterprise account pays direct taxes, such as income and property taxes to the government.
- *Transfers by enterprises to the rest of the world* (EGP billion 0.05).

The difference is the saving/dissaving by the enterprise sector (EGP billion 191.3) [R8-C4].

Government account

Payments to the government (government revenue): The government of Egypt receives payments from a series of taxes it levies on the economy (row 6). These include direct taxes, indirect taxes, import tariffs, and transfers it receives from the enterprise sector, as well as loans and grants from the rest of the world.

- *Taxes* (EGP billion 61.8): Net taxes include direct taxes, such as income taxes that households and enterprises pay to the government; and indirect taxes, which represent the amount paid by the business sector to the government for being a producer of goods and services,[4] less subsidies on production activities or the sale of commodities. Subsidies here appear as a negative tax, as they are paid by government to the productive sectors for specific economic purposes, whether in an effort to control consumer prices or as support to industries that are strategic to the Egyptian economy. The tax account also includes import tariffs, which are customs duties on imported goods collected by government.
- *Transfer of surplus from the enterprise sector* (EGP billion 84.8). The government receives transfers of surpluses from the economic sectors and public enterprises.
- *Foreign grants and loans (EGP billion 1.3)*: The government also receives income from foreign entities which include other governments and international and financial organizations abroad.

Spending by government: The government of Egypt spends on a variety of things (column 6), such as purchases of goods and services, paying out social benefits and transfers to households and enterprises, and paying out foreign grants and loans to the rest of the world.

- *Government consumption* (EGP billion 131.0): For its own consumption, the government spends on goods and services in the economy.
- *Transfers to the enterprise sector* (EGP billion 97.0): These transfers support the private and public economic sectors operating in the Egyptian economy.
- *Social transfers* (EGP billion 6.6): This account includes all of the financial support provided to households by government.
- *Foreign grants and loans to the rest of the world* (EGP billion 0.2): The government of Egypt also provides loans and grants to foreign entities.

The difference between government revenue and spending is either the fiscal surplus or deficit. In 2010/11, the fiscal deficit amounted to EGP billion 86.9.

Rest of the world (ROW)

Payments to the rest of the world: These include Egypt's purchases of goods and services (imports), factor payments, household transfers to family members residing outside Egypt, and loans and grants paid by the government of Egypt to foreign governments and entities.

- *Imports* (EGP billion 362.7): These are purchases of goods and services from abroad.
- *Factor payments* (EGP billion 39.1): These are repatriation of funds and income earned by factors of production abroad.
- *Enterprise transfers* (EGP billion 0.05): Transfers abroad by domestic and foreign organizations operating in Egypt
- *Household transfers abroad* (EGP billion 1.7): These are remittances by the household and private sectors in Egypt to family members living abroad.
- *Government loans and grants to the outside world* (EGP billion 0.2): This account highlights the support the government of Egypt provides to other governmental and non-governmental entities abroad.

Payments from the rest of the world: These payments received include export receipts, factor income earned from abroad, income earned from enterprises operating abroad, workers' remittances, and foreign loans and grants.

[4] These taxes have a direct impact on the prices of goods and services produced.

- *Exports* (EGP billion 282.2): A source of foreign exchange earnings, Egypt exports goods and services to the rest of the world.
- *Factor income earned from abroad* (EGP billion 1.9): This is income earned from factors of production owned by Egyptians being utilized in foreign countries.
- *Enterprise income earned* (EGP billion 0.5): Income earned from enterprises operating outside the country.
- *Worker's remittances* (EGP billion 83.8): This is income sent by family members working abroad back to their families in Egypt.
- *Transfer to the government by the rest of the world* (EGP billion 1.3): These are the loans and grants that are received by the government from the rest of the world.
- *Savings of the rest of the world* (EGP billion 34.1): This is the difference between the revenues and payments in foreign currency (surplus or deficit of the current account)

3. THE MICRO-SOCIAL ACCOUNTING MATRIX – ADDING SECTOR AND INSTITUTIONAL DETAIL

To be most useful for policy analysis, the SAM can be disaggregated in a number of ways depending upon data availability and the policy question under study. For example, any study related to agriculture requires a detailed representation of the various crop and livestock sub-sectors. A study on the distributional implications of fuel subsidy reform would require a detailed disaggregation of households to be able to analyze how poorer or better off households or rural or urban households are affected differently. Obviously, the more disaggregated the SAM, the more data is required. For the Egypt SAM, the most important sources of the data are the supply and use tables and statistical bulletins published by CAPMAS and other end of year fiscal accounts published by the Ministry of Finance (Table 4). Other important data sources are the Central Bank of Egypt's balance of payments accounts and bulletins from the Ministry of Planning, Monitoring and Administrative Reform for the year 2010/11. The Ministry of Agriculture and Land Reclamation is the main data source for disaggregating the agricultural sector in this version of the 2010/11 SAM. It provided detailed data on agricultural income and production, namely for crop, livestock and fishery production, and other data related to the costs of agriculture inputs.

Table 4—Key macroeconomic aggregates and sources of data used in disaggregating the SAM, 2010/11

Disaggregated SAM accounts	Value (EGP million)	Data sources
Household consumption expenditure (C)	***1,005,613***	• Supply and use tables 2010/2011, CAPMAS
Agricultural goods:	**161,072**	• HIECS 2010/2011, CAPMAS
Crops	92,475	
Livestock	52,671	
Fishery	15,927	
Mining	**11,248**	
Manufacturing goods:	**392,690**	
Food processing	155,881	
Other agro-processing	73,432	
Other manufacturing	163,377	
Other industry	**53,941**	
Services	**386,662**	
Total exports of goods and services (E)	***282,223***	• Supply and use tables 2010/2011, CAPMAS
Agricultural goods:	**15,720**	• International Trade Database 2010/2011, CAPMAS
Crops	15,416	• Balance of Payments: 2010/11, Central Bank of Egypt
Livestock	214	
Fishery	90	
Mining	**27,000**	
Manufacturing goods:	**129,800**	
Food processing	15,619	
Other agro-processing	24,399	
Other manufacturing	89,782	
Other industry	**4,725**	
Services	**104,978**	
Total imports of goods and services (M)	***362,715***	• Supply and use tables 2010/2011, CAPMAS
Agricultural goods:	**36,712**	• International Trade Database 2010/2011, CAPMAS
Crops	35,692	• Balance of Payments: 2010/11, Central Bank of Egypt
Livestock	1,009	
Fishery	10	
Mining	**15,328**	
Manufacturing goods:	**278,738**	
Food processing	29,464	
Other agro-processing	27,825	
Other manufacturing	221,449	
Other industry	**1,619**	
Services	**30,318**	
Intermediate demand	***941,156***	• Supply and use tables 2010/2011, CAPMAS
Factors of production: Land, capital, labor (GDP at factor cost)	***1,339,865***	• Supply and use tables 2010/2011, CAPMAS
Labor	**353,882**	• HIECS 2010/2011, CAPMAS
Unskilled	66,591	
Semi-skilled	183,456	
Skilled	103,835	
Land	**21,293**	

Disaggregated SAM accounts	Value (EGP million)	Data sources
Capital	**964,690**	
Domestic production (intermediate demand + value added)	***2,281,021***	• Supply and use tables 2010/2011, CAPMAS
Net taxes (indirect taxes + production subsidy + customs duties + income taxes)	***-37,290***	• Supply and use tables 2010/2011, CAPMAS • General Budget Final Account 2010/2011, Ministry of Finance (MOF)
Current government transfers to households and other domestic institutions (social insurance and retirement pensions)	***103,630***	• General Budget Final Account 2010/2011, Ministry of Finance (MOF)
Households	**6,592**	• HIECS 2010/2011, CAPMAS
Rural Households	1,808	
Rural households decile 1	*76*	
Rural households decile 2	*109*	
Rural households decile 3	*81*	
Rural households decile 4	*111*	
Rural households decile 5	*91*	
Rural households decile 6	*120*	
Rural households decile 7	*164*	
Rural households decile 8	*194*	
Rural households decile 9	*252*	
Rural households decile 10	*608*	
Urban Households	4,784	
Urban households decile 1	*115*	
Urban households decile 2	*138*	
Urban households decile 3	*172*	
Urban households decile 4	*212*	
Urban households decile 5	*257*	
Urban households decile 6	*302*	
Urban households decile 7	*444*	
Urban households decile 8	*554*	
Urban households decile 9	*810*	
Urban households decile 10	*1,780*	
Enterprises	**97,039**	

Source: Construction of Egypt 2010/11 SAM

With the exception of data on agriculture, electricity, water, food-processing, the household and enterprise sectors, and the labor factor, the main data source for the 2010/11 SAM structure were the supply and use tables, the Central Bank of Egypt's balance of payments accounts, and the Ministry of Finance's final accounts; all for the year 2010/11. Sectors are represented in the disaggregated SAM for 2010/11 as they appeared in the supply and use tables for 2010/11, so no further disaggregations were made.[5]

However unlike the previous more aggregated versions of the SAM for Egypt, this version focuses on disaggregating or highlighting the above-mentioned sectors and factors. In consequence, the remaining manufacturing, other industry, and service sectors were aggregated up under relevant categories in order to serve the objective of this exercise, which is focusing on the agriculture and household sectors. Table 5 lists the 135 accounts that make up the Egypt 2010/11 disaggregated SAM. More details on how the disaggregated SAM was constructed are presented in the Appendix of this working paper.

Disaggregating the agriculture sector

The agricultural production sectors now include sub-sectors for crop, livestock, and fishery production.

Crop activity: Crops were disaggregated according to their planting seasons; winter, summer, and *nili* (autumn). Crops that grow in more than one season are maize, root vegetables, and other vegetables (Table 5). The rest of the crop activities are grown in only one season and thus appear in the SAM as such. Data availability on crop production (area planted, quantity harvested) is available in considerable detail from publications of the Ministry of Agriculture and Land Reclamation. Calculating agricultural input use according to our SAM specifications, however, required considerable calculations and adjustments to available data.

[5] To access the previous more aggregated version of the Egypt 2010/11 SAM, which also was jointly constructed by CAPMAS and IFPRI, please go to the CAPMAS website (http://www.msrintranet.capmas.gov.eg/?lang=2).

Table 5—Accounts in the Egypt 2010/11 disaggregated Social Accounting Matrix

Activities
Agriculture (crop, livestock, fisheries)
Wheat
Nili (autumn) maize
Summer maize
Sorghum
Rice
Other cereals
Nili (autumn) root vegetables
Summer root vegetables
Pulses
Winter vegetables
Summer vegetables
Fruits and nuts
Ground nuts
Oilseeds
Sugar crops
Forage crops
Cotton
Other crops
Cattle
Poultry
Other livestock
Fishery and aquaculture
Mining
Crude oil and natural gas
Other mining
Food processing
Meat, fish, fruits, vegetables, oils & fats
Dairy
Grain milling, grain & other food products
Other manufacturing
Beverages
Tobacco processing
Textiles
Clothing
Leather and footwear
Wood and paper
Petroleum and products
Chemicals
Non-metal minerals
Metals and metal products
Machinery and equipment
Other industry
Electricity
Water
Construction
Services
Wholesale and retail trade
Transportation and storage
Accommodation & food services
Information & communication
Finance and insurance
Real estate activities
Business services
Public administration
Education
Health and social work
Other services

Commodities
Agriculture (crop, livestock, fisheries)
Wheat
Maize
Sorghum
Rice
Other cereals
Root vegetables
Pulses
Vegetables
Fruits and nuts
Ground Nuts
Oilseeds
Sugar crops
Forage crops
Cotton
Other crops
Cattle
Poultry
Other livestock
Fishery and aquaculture
Mining
Crude oil and natural gas
Other mining
Food processing
Meat, fish, fruits, vegetables, oils & fats
Dairy
Grain milling, grain & other food products
Other manufacturing
Beverages
Tobacco processing
Textiles
Clothing
Leather and footwear
Wood and paper
Petroleum and products
Chemicals
Non-metal minerals
Metals and metal products
Machinery and equipment
Other industry
Electricity
Water
Construction

Services
Wholesale and retail trade
Transportation and storage
Accommodation & food services
Information & communication
Finance and insurance
Real estate activities
Business services
Public administration
Education
Health and social work
Other services
Factors of production
Unskilled labor
Semi-skilled labor
Skilled labor
Land
Capital
Domestic institutions
Enterprises
Rural households decile 1
Rural households decile 2
Rural households decile 3
Rural households decile 4
Rural households decile 5
Rural households decile 6
Rural households decile 7
Rural households decile 8
Rural households decile 9
Rural households decile 10
Urban households decile 1
Urban households decile 2
Urban households decile 3
Urban households decile 4
Urban households decile 5
Urban households decile 6
Urban households decile 7
Urban households decile 8
Urban households decile 9
Urban households decile 10
Government
Taxes
Direct taxes
Import tariffs
Net sales taxes
Other
Transaction, transportation costs
Savings/Investment
Stock changes
Rest of the World
Total

Source: Construction of Egypt 2010/11 SAM

Farming requires agricultural inputs such as fertilizer, seed, pesticides, irrigation, fuel, and lubricants. The total cost of these inputs was estimated for each of the crops by multiplying their given average input cost per feddan[6] by their total cultivated area (in feddans), thus deriving total input cost for each crop. Once these costs were calculated, a share was derived for each of the crops to total costs and those shares were multiplied by total costs listed in the supply use tables to disaggregate these total costs among the different agriculture sub-sectors in the disaggregated SAM.

[6] One feddan = 0.42 hectares = 1.038 acres.

Livestock activity: The livestock activity sector was disaggregated into three categories: cattle (including buffaloes) and related products (raw dairy products); poultry and related products (all birds and eggs); and other livestock and their products, which includes goats, sheep, and other animals, in addition to wool, silk, and honey production.

In order to derive the value for the different livestock sector activities, other than poultry, the following steps were taken:

- *Estimating quantity of animal production according to age categories*: Animals, other than poultry, were first divided into three age-based categories. For cattle these were less than one year in age, one to two years, and three years and above. For sheep and goats, the three age categories were less than 1.5 years, 1.5 years to 2 years, and two years and above. In general, animals that were less than one year old were assumed to be part of that year's production.
- *Slaughtered animals*: Of the estimation for annual production, slaughtered animals were estimated also based on their above mentioned age categories[7].
- *Estimating the average annual price*: The value (in EGP) of the slaughtered animals was divided by the number of slaughtered animals in each age category.
- *Estimating the average weight*: The number of slaughtered animals in each age category was multiplied by an estimated average weight for each of the age groups.
- *Estimating the value of the annual production*: Once the average price and weight were calculated, the annual value of production becomes *price x quantity* for that sector.

The fishery and aquaculture sector included both fresh and frozen fish, as well as fresh crustaceans, mollusks, and other live, fresh, or chilled aquatic invertebrates.

The structure of domestic agricultural production for these activities was used to derive transportation and trade margins, as well as taxes and subsidies. Trade data was aggregated up from the detailed six-digit level of the International Standard Industrial Classification of All Economic Activities (ISIC ver.4). For customs duties for agricultural products, the share of agricultural commodity imports to total agricultural imports was used to disaggregate import tariffs on these agricultural commodities where applicable.

Disaggregating the food-processing sector

Another sector that bears a close relationship with the agriculture sector is the agro-processing sector. Made up of two types of sectors, food processing and non-food processing sectors, the former sector was disaggregated into three sub activities: a meat, fish, fruits, vegetables, oils & fats sub-sector, a dairy products sub-sector, and a grain milling, grain products and other food products sub-sector. The data on production for each disaggregated activity was obtained from the Industrial Production Bulletins produced by CAPMAS. In calculating intermediate demand of the agro-processing sector, the technical coefficients calculated from the previous year's data were used. In addition to that, other assumptions were imposed, including:

- Intermediate demand of the dairy sector for cereals (oats, wheat, and other cereals) does not exceed 3 percent of all cereals as intermediate goods.
- Intermediate demand for oilseeds does not exceed 3 percent of all oilseeds used as intermediate goods, including oilseeds used for the production of oil cakes and other animal feed.
- It is assumed that 15 percent of all vegetables are used as intermediate inputs in the food processing sector.
- It is assumed that 15 percent of all fruits used as intermediate inputs are used in the dairy production sector.
- Given that the livestock (agriculture) sector includes live animals as well as their raw products, it was assumed that 60 percent go towards the meat production, 30 percent go into dairy production, and the remaining 10 percent are used in the other agro-processing sectors.

[7] Animals that died of other causes (other than slaughter) were not included in the estimation as data was unavailable.

Electricity and water sector

In the previous version of the 2010/11 SAM, the production of electricity and natural gas, their distribution, and wastewater services made up three sub-sectors. For the purposes of this disaggregated version of the SAM, we needed two sub-sectors; one for electricity (generation and distribution) and one for water (supply and distribution).[8] As a first step in modifying the existing SAM, the original three sub-sectors were aggregated together, then in order to separate out electricity and water, we assumed that 70 percent of that aggregated sector represented electricity and the residual represented water. That 70/30 ratio was used to come up with the activity and commodity sub-sectors for electricity and water, respectively.

With regard to water, water is not priced for agriculture use in Egypt. This fact posed a difficulty when we attempted to isolate the intermediate use of water by the agriculture sector. In the cost calculations of the Ministry of Agriculture and Land Reclamation and relevant bulletins, crop use of petroleum products (diesel) and water appear together, since diesel is used to pump water from the ground when needed. We use a crude proxy to introduce the cost of water as an intermediate good in the agriculture sector. We assume that the cost of water as an intermediate good for the sector is half of its intermediate demand for petroleum (diesel). In the absence of finer data, we believe this serves as a reasonable starting point for the introduction of this integral component of crop production processes in Egypt into the disaggregated SAM.

Returns to factors of production

Factors of production were divided into labor, capital, and land.

Skill levels for labor: In the disaggregated SAM, capital and land remained as under the previous SAM version, whereas labor was disaggregated into three categories based on skill levels – unskilled, semi-skilled, and skilled. Educational attainment in the 2010/11 HIECS was used to define these three skill levels. Workers who were illiterate; could read and write, but without any educational certification; or only had a literacy certificate were categorized as unskilled labor. Those with an education level from below an intermediate level to below a university degree were assumed to be semi-skilled. Finally, workers with a university degree and above were categorized as skilled labor.

Returns to factors of production in the agriculture sector: An important adjustment to the earlier version of the SAM was made in estimating the returns to capital in the agriculture sector. Based on calculations from the supply and use tables, returns to capital in agriculture were uncharacteristically high for a sector in Egypt that is predominantly labor intensive. Also, since small and medium land owners in the agriculture sector do not report labor income for their own and family members' labor time and wages, it was considered safe to assume that labor income may be underestimated in the agriculture sector, thus resulting in higher than normal returns to capital for crop activity being estimated. Returns to capital were reevaluated for the agriculture sector using a ratio of 0.36.[9] Land rents were assumed to remain as they are and so, returns to labor became the residual after subtracting the newly adjusted returns to capital and the land rents.

Another adjustment was made to returns to factors of production for the public administration activity sector. The original returns to capital were negative. Consequently, the share of returns to national level capital as a proportion of total value added at national level was used instead, with returns to labor being the residual.

Domestic institutions

Based on the national accounts bulletin that is published by the Ministry of Planning, Monitoring and Administrative Reform, economic sectors (domestic institutions) include; the financial sector, the non-financial sector, the government, households, and the non-profit institutions serving households. In the previous version of the 2010/11 SAM, domestic institutions were divided into two – the government, and households and other domestic institutions. In this SAM, we separated the enterprise sector from the household sector. The enterprise sector includes financial and nonfinancial organizations, with the latter including households and all non-profit institutions serving households in the economy. Based on the 2010/11 HIECS, the household sector was divided spatially into urban and rural households with each being further disaggregated into 10 ascending deciles –from lowest to highest – according to average per capita expenditure. Each decile has an equal number of individuals, and weights were applied to ensure that the sum of the deciles represents the total population. Household expenditure shares derived from the HIECS 2010/11 were multiplied by total consumption in 2010/11 in order to arrive at household expenditure for each commodity.

[8] Wastewater activity was added under the water sector.

[9] This ratio of capital to total value added in the agriculture sector was estimated from the economic and financial bulletins for the private sector published by CAPMAS and applied to our calculations.

In order to obtain detailed household spending and income information for the SAM, detailed expenditure and income shares of each decile for each commodity and income source were derived as a share of total expenditure and income, respectively. Then using these shares, total household expenditure and total household incomes were derived for each of the rural and urban households.

4. CHARACTERISTICS OF THE EGYPTIAN ECONOMY IN 2010/11

The disaggregated 2010/22 SAM for Egypt that was produced from these procedures provides us with a rich set of information about the Egyptian economy in 2010/11 (Table 6).[10] The largest sector contributing to the Egyptian economy, by far, is the services sector. Making up slightly under 52 percent of GDP and providing employment to around 61 percent of all workers, the services sector also contributed significantly to foreign exchange earnings, mainly through the tourism sector and through the Suez Canal earnings. Egypt's manufacturing sector contributes just under 16 percent to Egypt's GDP and draws in close to half of the country's foreign exchange earnings through exports, but also makes up three-quarters of the country's imports. As for employment, the manufacturing sector comes in third, after the services and agriculture sectors, in providing jobs to the economy. In 2010/11, Egypt exported on average 12.4 percent of its domestic output of goods and services and imported just over 15 percent of the goods and services needed for domestic consumption.

Table 6—Structure of the economy of Egypt, 2010/11

				Exports		Imports	
	Share of total GDP	Share of total production	Share of labor value added	Share in exports	Export intensity*	Share in imports	Import intensity**
Agriculture	***12.1***	***9.4***	***15.7***	***5.6***	***7.3***	***10.1***	***15.6***
Crops	**6.3**	**5.0**	**9.3**	**5.5**	**13.6**	**9.8**	**26.7**
Wheat	0.8	0.6	0.6	-	-	4.6	55.9
Maize	0.7	0.6	1.2	-	0.2	2.2	38.4
Sorghum	0.1	0.1	0.1	-	2.7	-	3.2
Rice	0.4	0.3	0.4	-	-	-	0.2
Other cereals	-	-	-	-	14.4	-	13.8
Root crops	0.2	0.1	0.3	0.6	64.7	0.2	41.2
Pulses	-	-	-	0.3	113.7	0.3	110.1
Vegetables	0.9	1.1	1.6	0.9	10.7	-	0.3
Fruits	1.3	0.9	2.1	2.0	28.9	0.3	8.1
Groundnuts	0.1	-	0.1	0.1	18.9	0.0	4.8
Oilseeds	-	-	-	0.1	52.9	1.1	92.3
Sugarcane	0.3	0.2	0.6	-	-	-	-
Forage crops	-	0.2	0.1	-	2.7	-	-
Cotton and fibers	0.2	0.1	0.2	1.2	105.6	0.3	119.1
Other crops	1.2	0.7	2.0	0.2	3.3	0.8	14.8
Livestock & fisheries	**5.8**	**4.4**	**6.5**	**0.1**	**0.3**	**0.3**	**1.0**
Cattle	3.8	2.5	4.6	-	0.1	0.2	1.3
Poultry	0.4	0.8	0.5	-	-	-	-
Other livestock	0.6	0.5	0.9	0.1	1.5	0.1	2.1
Fish	1.0	0.6	0.5	-	0.6	-	0.1
Non-agriculture	***87.9***	***90.6***	***84.3***	***94.4***	***12.9***	***89.8***	***15.3***
Agro-processing	**6.1**	**11.1**	**6.4**	**14.2**	**15.9**	**15.8**	**21.3**
Food and beverages	**2.8**	**6.9**	**2.6**	**5.5**	**9.9**	**8.1**	**17.2**
Food	0.8	1.7	0.7	1.5	10.9	5.7	37.8
Dairy	0.4	1.0	0.3	1.8	22.6	1.0	17.2
Grains & other food	1.4	4.0	1.4	2.2	6.7	1.4	5.5
Beverages	0.2	0.3	0.2	0.1	5.4	0.1	5.9
Non-food	**3.3**	**4.1**	**3.8**	**8.6**	**25.8**	**7.7**	**28.4**
Tobacco	0.2	0.3	0.2	0.2	9.9	0.4	18.0
Textiles	0.6	0.9	0.9	3.5	45.8	2.2	41.3
Clothing	0.5	0.8	0.9	2.9	45.8	0.9	24.8
Leather & footwear	0.3	0.3	0.2	0.5	18.8	0.3	14.5
Wood & paper	1.7	1.8	1.6	1.6	10.9	3.9	27.7
Other manufacturing	**9.5**	**19.6**	**6.4**	**31.8**	**1.2**	**61.1**	**38.3**
Construction	**4.8**	**5.7**	**6.4**	**1.2**	**2.7**	**0.4**	**1.2**
Other industry	**15.7**	**13.5**	**4.2**	**10.0**	**9.2**	**4.2**	**5.2**
Services	**51.8**	**40.8**	**60.9**	**37.2**	**11.3**	**8.4**	**3.5**
Total	**100.0**	**100.0**	**100.0**	**100.0**	**12.4**	**100.0**	**15.4**

Source: Egypt 2010/11 SAM

* Export intensity is the share of exported goods and services to total domestic output.

** Import intensity is the share of imported goods and services relative to domestic consumption.

Totals may not add up to 100 due to rounding. Cells with a '-' imply a zero or near-zero value.

[10] For a better overview and due to the focus on agriculture in this representation, industrial and service sectors are presented in an aggregated manner. The full SAM is more detailed, as shown in Table 5.

The role of agriculture and agro-processing in the Egyptian economy

Agriculture often plays an important role in economic development, especially for lower and middle income countries. During the economic transformation process and as countries become richer, agriculture-related manufacturing and trade become more important (IFAD; 2016). In 2010/11, the agriculture sector as a whole made up about 12 percent of GDP, just under half of which resulted from livestock production. Agriculture accounted for just under 16 percent of total labor value added, provided around 6 percent of total export earnings, and 10 percent of imports entering Egypt in that year. Of domestic agricultural output, around 7.3 percent was exported and just over 15 percent of domestically consumed agricultural goods and services were imported.

Within the agriculture sector in 2010/11, the livestock and fisheries sector produced mainly for the domestic market with cattle accounting for the bulk of this production. The livestock and fisheries sector alone accounted for just under 6 percent of GDP, higher than the contribution of the construction sector and nearly equal to the share provided by the entire agro-processing sector. Furthermore, the share of employment in the livestock and fisheries sub-sectors to total employment surpassed the employment shares of all other sub-sectors in the SAM, except those in the (combined) services sector and the crop activity sector. This indicates that the livestock and fisheries sub-sectors are important sectors in the Egyptian economy with all cattle-related activities being particularly notable.

Trade patterns within the agriculture sector were mixed in 2010/11 (Table 6). Despite the cereal crop sub-sector's modest contribution to GDP (2.1 percent), it made up two-thirds of all agriculture imports in the economy and over a third of the agriculture and food processing imports as a whole. This trade pattern is predominantly driven by the wheat and maize sub-sectors, which show import intensities of 55.9 and 38.4 percent of domestic consumption, respectively. Fruits provided the largest contribution to the sector's export earnings, making up a third of the entire sector's export activity – just under 29 percent of all fruit produced domestically is exported abroad. Sub-sectors with the highest export intensities in 2010/11 were pulses, cotton and fibers, root crops, and oilseeds. Trade patterns for the pulses, cotton, and the oilseeds sub-sectors are interesting. Despite high export intensities (113.7, 105.6, and 52.9, respectively), they also have high import intensities (110.1, 119.1, and 92.3, respectively), indicating that trade takes place as a result of the demand for the different varieties of these crops both for final demand and as intermediate demand in the production process.

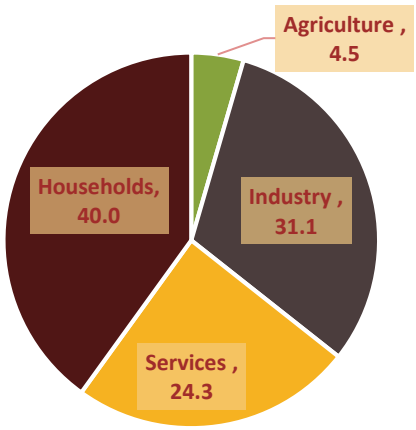
A sector closely related to the agriculture sector that shows potential for growth and has been instrumental in the economic transformation process in many countries is the agro-processing sector (Table 6). In 2010/11, it contributed just over 6.1 percent to GDP, 6.4 percent to labor value-added, and made up 14 percent of total exports of the Egyptian economy. Within the agro-processing sector, all non-food producing sub-sectors, with the exception of tobacco and the wood and paper producing sub-sectors, show a high export intensity compared to the non-agriculture sectors in the economy. Among the food processing sub-sectors, the dairy sub-sector shows a high export intensity. Given their strong backward linkages to the agriculture sector and their export potential, these agro-processing sub-sectors may provide real potential for rural economic growth in Egypt.

The role of fuel in the Egyptian economy

Egypt is the largest non-OPEC oil producer and the second largest dry natural gas producer in Africa (EIA; 2015). Despite this and the country having the largest oil refining capacity across Africa, Egypt is a net fuel importer and is the largest oil and natural gas consumer in Africa (EIA; 2015). The fuel sector is an important component of the Egyptian economy; being important as a final consumption good, an intermediate good, and as a significant and draining component of the government's spending on subsidies. Egypt has a long tradition of subsidizing fuel. In 2010/11, fuel subsidies as a share of GDP were just under 6 percent (IMF 2014). In 2011/12, the value of fuel subsidies were more than twice as much as the value of net subsidies on food and agricultural commodities, consuming about 20 percent of government spending (IMF; 2014). Subsidies were reduced in 2014 and there are plans for further reductions in 2016/17. Simple qualitative statistics from the 2010/11 disaggregated SAM for Egypt can help in understanding how a reduction in fuel subsidies, and, thus, an increase in fuel prices, may impact the economy and households.

As shown in Figure 2, the household sector has the highest consumption share of fuel in the economy, closely followed by industry, and then by the services sector. In 2010/11, net subsidies on petroleum reached EGP billion 76.7, making it the most heavily subsidized sector in the Egyptian economy.

Figure 2—Fuel consumption, 2010/11, sectoral share of total consumption, percent



Source: Egypt SAM 2010/11

Fuel is an important input in the production process, especially as economies transition from rural-based to industry-based economies. In 2010/11 in Egypt across the agricultural, industrial and service sectors, fuel use intensity varied (Table 7). The services and agriculture sectors had the highest fuel intensity relative to their production, higher even than the industry sector, despite the two sectors having the lowest absolute fuel consumption levels in total. Within the services sector, transportation – predictably - had the highest fuel intensity use.

Table 7—Fuel use in the Egyptian economy, 2010/11

	Share of total fuel consumption (percent)	Fuel intensity in production and consumption (percent)*
Agriculture	**4.5**	**9.8**
Cereals	1.0	11.1
Fruits and vegetables	2.5	19.7
Other agriculture	1.0	4.3
Industry	**31.1**	**5.0**
Mining	1.4	16.9
Crude oil	*1.1*	*17.8*
Agricultural processing	6.0	4.2
Construction	1.5	2.7
Other industry	22.2	6.7
Fuel	*1.8*	*1.5*
Services	**24.3**	**12.8**
Retail trade	5.7	13.6
Transportation	13.0	52.5
Other services	5.6	4.6
Households	**40.0**	**4.9**
Rural	16.3	4.4
Poor	*3.1*	*4.6*
Medium income	*5.9*	*4.4*
High income	*7.2*	*4.4*
Urban	23.8	5.3
Poor	*2.2*	*3.7*
Medium income	*4.8*	*3.6*
High income	*16.8*	*6.5*

Source: Egypt 2010/11 SAM

Notes: Poor households include deciles 1, 2, and 3; medium-income households are in deciles 4,5,6, and 7, while high-income households are those in deciles 8, 9, and 10. Egypt is a net fuel importer. Changes in stock are excluded in the calculations.

* Fuel intensity describes the share of fuel used in intermediate demand, in the case of production activities, and the share of fuel used in final consumption, in the case of households.

The service sector has the highest intermediate demand for petroleum in the economy (40.5 percent of all the fuel used as an intermediate good), half of which is used by the transportation sub-sector, followed closely by the retail trade and by the hotel and accommodation sub-sectors (Table 8). The manufacturing sector alone uses over a third of all the petroleum

used in the production process, where half of that is used in metal and iron-producing industries. The metal and iron manufacturing industries alone use almost as much fuel as the construction and other industry sub-sectors use and more than the intermediate fuel demand used by the entire agro-processing sub-sector.

Table 8—Intermediate demand for fuel, by sector and selected sub-sectors

	Share of total intermediate demand
Agriculture	**7.6**
Mining	**2.4**
Agro-processing	**10.0**
of which: Food processing	7.1
of which: Non-food processing	2.9
Other manufacturing	**27.2**
of which: Metal and iron manufacturing	13.7
Construction	**2.4**
Other industry	**9.9**
Services	**40.5**
of which: Transportation	21.7

Source: Egypt 2010/11 SAM

Studies show that better-off households often benefit disproportionately from fuel subsidies relative to the poor (Coady et al; 2015). However, a reduction of fuel subsidies also likely increases poverty through indirect effects, such as higher prices induced by higher costs for transport (Wiebelt et al. forthcoming; Coady et al. 2015). To get a hint of the impact of changes in fuel and transport costs for different types of households in Egypt, Table 9 shows the share of spending on fuel and transportation out of total household spending for rural and urban households categorized by income levels.

Table 9—Spending on fuel and transport, as percentage share of total household spending, 2010/11

	Fuel	Transport	Combined
Rural	4.4	5.3	9.7
Poor	4.6	4.5	9.1
Medium income	4.4	3.3	7.7
High income	4.4	7.2	11.6
Urban	5.3	4.5	9.8
Poor	3.7	3.1	6.8
Medium income	3.6	3.6	7.2
High income	6.5	5.2	11.7

Source: Egypt 2010/11 SAM

Fuel makes up a larger share of household expenditures for urban households than for their rural counterparts in Egypt. However, the share of household expenditures spent on fuel is lower for urban poor and urban middle income households than it is for their rural counterparts, whereas the share of all expenditures of urban high income households spent on fuel is more than two percentage points higher than for high-income rural households. Fuel use seems not to vary across rural income groups, unlike for urban income groups. Urban high income groups spend almost 80 percent more on fuel than the poor and middle income groups in urban centers. One possible reason may be that urban higher income groups own more cars and so spend more on fuel, in consequence.

On the other hand, poor rural households tend to spend more on transportation than do poor urban households. Many members of poor rural households work in urban centers, commuting daily to those jobs using public transportation. However, the share of all expenditures spent on transport of high income households in both rural and urban areas is higher than for poor and medium income households. As the transportation sector includes air transportation, a mode more frequently used by high income households, whether urban or rural, air transport expenses drive up the spending on transportation of such households.

But if we look at combined spending on fuel and transportation, the data shows that there is not much difference between urban and rural households in their spending, especially for the middle and higher income households. Despite their higher incomes overall, the share of all expenditures spent by urban households on fuel and transportation is similar to the share spent by their rural counterparts.

It is clear that fuel prices both directly and indirectly impact the economy and the welfare of most Egyptian households. The direct impacts are seen through the use of fuel in production processes and as a household consumption good, while the indirect impacts arise through the costs associated with transport and the resultant impact these costs have on production processes and on consumer spending. However, while these descriptive statistics from the SAM suggest that households will be affected by any fuel subsidy reform, more rigorous computable general equilibrium model-based analysis based on the SAM is required to fully capture the direct and indirect effects of fuel subsidy reform in Egypt, and the direction and key drivers of the effects.

5. CONCLUSION AND WAY FORWARD

Given the importance of the 2010/11 disaggregated SAM for the economy of Egypt as a database for policy modeling and policy making processes, the next step in the CAPMAS-IFPRI collaboration will be to further disaggregate and update the SAM documented in this paper. The SAM will be further disaggregated spatially by region to capture socio-economic differences across Egypt. Growth and development oftentimes are not homogeneous across sectors, across income groups, or even across regions. In Egypt, rural areas tend to be poorer than urban areas. Rural and urban areas in Upper Egypt are particularly lagging in their economic development relative to other regions of the country.

As such, CAPMAS will be constructing a regional SAM for Egypt for 2014/2015 in order to identify regional socio-economic differences so that region-specific policies can be designed for sustainable growth and to achieve the goals set forth in Egypt's Sustainable Development Strategy 2030. It is expected that this regionally disaggregated SAM for 2014/2015 will include seven regions (Greater Cairo; Alexandria; Delta; Suez Canal and Sinai; Northern Upper Egypt; Asyut; and South Upper Egypt), the agriculture sector will remain disaggregated in the new SAM in order to capture the heavier reliance on agriculture that exists in the southern regions in Egypt. Furthermore, and in order to capture the welfare and distributional impacts of such policies, as with the SAM described here, both the household sector and the labor factor will also remain disaggregated. In order to further explore links between the agricultural sector and the agro-processing sector, the food and non-food processing sectors will remain disaggregated. Depending on the patterns across the various regions of the country, it may be possible to identify win-win scenarios for agriculture and agro-processing that would work to improve the economy and welfare within each region and also for Egypt as a whole.

REFERENCES

Breisinger, C., M. Thomas, and J. Thurlow. 2009. "Social Accounting matrices and multiplier analysis: An introduction with exercises". IFPRI Food security in practice series. Washington, D.C.: International Food Policy Research Institute.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Annual Bulletin for Crop Areas and Plant Production Statistics: 2010-2011." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Annual Bulletin for Electricity and Energy 2010-2011." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Annual Bulletin for Purification and Distribution of Potable Water: 2010-2011." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Annual Economic Statistics and Indicators Bulletin for Economic Authorities, 2010/11." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Annual Economic Statistics and Indicators Bulletin for Formal Private Sector Companies, 2010." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Annual Economic Statistics and Indicators Bulletin for Investment Private Sector Companies, 2010." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Annual Economic Statistics and Indicators Bulletin for Public Business Sector and Public Sector Companies, 2010/11." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Annual Financial Statistics and Indicators Bulletin for Investment Private Sector Companies, 2010." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Annual Financial Statistics and Indicators Bulletin for Public Business Sector and Public Sector Companies: 2010/11." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Annual Financial Statistics and Indicators Bulletin for Formal Private Sector Companies, 2010." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Annual Financial Statistics and Indicators Bulletin for Economic Authorities, 2010/11." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Bulletins for Livestock Production Statistics 2010 and 2011." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Economic Authorities' Budget, 2010/11." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Industrial Production Statistics and Commodity Production Statistics Bulletins" Various Issues. Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Household Income, Expenditure, and Consumption Survey: 2010/11." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "International Trade Database." Cairo: CAPMAS.

CAPMAS (Central Agency for Public Mobilization and Statistics). "Supply and Use Tables 2010/11". Cairo: CAPMAS. http://www.capmas.gov.eg/Pages/StaticPages.aspx?page_id=5101

Central Bank of Egypt. "Balance of Payments: 2010/11." Cairo: Central Bank of Egypt

Coady, D., V. Flamini, and L. Sears. 2015. "The Unequal Benefits of Fuel Subsidies Revisited: Evidence for Developing Countries". IMF Working Paper. Washington D.C.: International Monetary Fund. Accessed September 29, 2016. https://www.imf.org/external/pubs/ft/wp/2015/wp15250.pdf.

EIA (U.S. Energy Information Administration). 2015. "Egypt country report, 2015." Accessed March 9, 2016. http://www.eia.gov/beta/international/analysis_includes/countries_long/Egypt/egypt.pdf.

IFAD (International Fund for Agricultural Development). 2016. *Rural Development Report 2016: Fostering Inclusive Rural Transformation*. Rome: IFAD. https://www.ifad.org/pub/rdr.

IMF (International Monetary Fund). 2014. "2014 Article IV Consultation – Staff Report." Washington D.C.: International Monetary Fund. Accessed September 29, 2016. http://www.imf.org/external/pubs/ft/scr/2015/cr1533.pdf.

MALR (Ministry of Agriculture and Land Reclamation). "Agriculture Income Bulletin 2010-2011." Cairo: MALR.

MALR (Ministry of Agriculture and Land Reclamation). "Bulletin of Prices, Costs and Net Returns: 2010-2011."

MALR (Ministry of Agriculture and Land Reclamation). "Livestock Production Statistics Bulletin.

MALR (Ministry of Agriculture and Land Reclamation). “Poultry Production Statistics.”

MALR (Ministry of Agriculture and Land Reclamation). “Prices of Livestock, Poultry and Fish Products Bulletin 2010-2011.”

MALR (Ministry of Agriculture and Land Reclamation). “Statistical Bulletin of Agricultural Production Requirements 2010/11.”

Ministry of Finance. 2011 “General Budget Final Account: 2010/11.”

Ministry of Planning, Monitoring and Administrative Reform. “National Accounts: 2010/11.” Cairo: Ministry of Planning, Monitoring and Administrative Reform. http://www.mop.gov.eg/MopRep/2010-2011.pdf.

Wiebelt, M., M. Raouf, and C. Breisinger. Forthcoming. “Distributional impacts of fuel subsidy reform in Egypt”. Cairo: International Food Policy Research Institute.

APPENDIX: THE FULL DISAGGREGATED SOCIAL ACCOUNTING MATRIX FOR EGYPT, 2010/11

The full disaggregated Social Accounting Matrix for Egypt, 2010/11 consists of a balanced matrix of 135 rows and 135 columns corresponding to the 135 accounts for the SAM listed in Table 5. The 2010/11 disaggregated SAM will be posted on the website of CAPMAS, the Central Agency for Public Mobilization and Statistics of the government of Egypt (http://www.capmas.gov.eg) and on the website of IFPRI, the International Food Policy Research Institute (http://www.ifpri.org/), from where all interested users can download it.

While a broad description of how the disaggregated SAM for Egypt, 2010/11, was constructed is presented in the main body of text of this working paper, this Appendix provides some additional detail related to specific data management and computation decisions for specific accounts, sub-sectors, or sectors.

- ***Taxes***: As sources of government revenue, taxes include direct and indirect taxes, and customs duties.
- ***Subsidies*** in the SAM are treated as negative taxes.
    - Values for the fuel subsidies were from the final accounts of the Ministry of Petroleum, which has been reconciled from the final accounts of the General Petroleum Company.
- ***Government final consumption expenditure*** has been estimated through the sales' receipts of marketed and non-marketed goods and services.
- ***Value of the surplus reported by public sector and public enterprises and the economic authorities*** used was a stated in the Financial and Economic Bulletins of the Public Sector, Public Business Sector and Economic Authorities. These values had to be reconciled with the reported surplus in the state's final accounts, since the government adopts a cash basis in reporting, whereas the Financial and Economic Bulletin reports using an accrual basis.
- ***Revenue and expenditure*** of previous years were excluded from the government account.
- ***"Other revenues and expenses for previous years" in the government account***: While this item appears in previous versions of the SAM for Egypt, it no longer is pertinent to the government account, so was removed for the 2010/11 SAM.
- ***Gross capital formation*** (investment) is equal to fixed capital formation plus changes in inventory.
- ***Informal sector's contribution to the Egyptian economy***: The informal sector's contribution to the economy was estimated using data from the Labor Force Survey and other specific bulletins for 2010/11. The Labor Force Survey enabled the estimation of the number of employees inside and outside of registered establishments. Estimation on the size and value of the informal sector was done for the following activities:
    - ***Agriculture***: Data on agricultural income was provided by the Ministry of Agriculture in order to estimate production and intermediate consumption. Indexes for both capital formation and wages were compiled to estimate these values.
    - ***Mining and manufacturing***: Production averages were estimated for establishments with less than 10 employees in the private sector, as a proxy for the informal sector. Then, the difference between the number of employees in the Labor Force Survey and the Industrial Production Bulletin was calculated and then multiplied by the estimated averages of production, intermediate consumption, wages, and capital formation.
    - ***Construction***: Production averages for construction in the private sector were estimated. Then the difference between the number of employees in the Labor Force Survey and the Construction Bulletin was calculated and multiplied by the estimated averages of production, intermediate consumption, wages, and capital formation, taking into consideration the methodology of commodity flow used.
    - ***Road transportation***: Tourism satellite accounts and the Bulletin of Passengers Transportation were the main sources of data.
    - ***Information and technology***: Production averages in the private sector were estimated. Then the difference between the number of employees in the Labor Force Survey and the Bulletin of Economic and Financial Indicators for the Private Sector, Public Sector and Public Business Sector, was calculated

and then multiplied by the estimated averages of production, intermediate consumption, wages, and capital formation.

- ***Scientific, technical, administrative and support activities***: Production averages in the private sector were estimated, then the difference between the number of employees in the labor force survey and the bulletin of economic and financial indicators for the private sector, public sector and public business sector, was calculated and then multiplied by the estimated averages of production, intermediate consumption, wages and capital formation.
- ***Art and innovation activities***: Production averages in the private sector were estimated. Then the difference between the number of employees in the Labor Force Survey and the Bulletin of Economic and Financial Indicators for the Private Sector, Public Sector and Public Business Sector was calculated and then multiplied by the estimated averages of production, intermediate consumption, wages, and capital formation.
- ***Personal services***: Data provided by the Household, Income, Expenditure, and Consumption Survey (HIECS) was used to estimate personal services, through the methodology of commodity flow.
- ***Home services***: Data provided by the HIECS was the main source use to estimate the value of home services provided.

- ***Activities*** were classified according to the second level of the International Standard Industrial Classification of All Economic Activities (ISIC ver.4) classification system.
- ***Commodities*** were classified according to the third level of agricultural products, and second level of the other products according to the Central Product Classification (CPC ver.1.1) classification system
- ***Merging of activities***: Some activities shared production of one product according to CPC 2. They were merged to appear in the matrix as one activity. These included water and sanitary drainage activities, financial services activities, information and communications activities, administrative activities, and subsidies, respectively.
- ***Commodities that have no intermediate consumption***: These were merged with other commodities that do involve intermediate consumption. For instance, domestic services were aggregated with other personal services; and domestic services activities with other services activities to avoid a non-invertible matrix including these activity sectors.
- ***Data from the income and expenditure survey*** were transformed from a Classification of Individual Consumption According to Purpose (COICOP) classification system to the Central Product Classification (CPC ver.1.1) system.
- ***Exports and imports*** data were transformed from a Harmonized System (HS Code) commodity classification system to the Central Product Classification (CPC1.1) system.
- ***Factors of production*** were classified and divided into labor, capital, and land according to the System of National Accounts used by the government of Egypt.
- ***Institutions***: For the sake of this SAM, institutions were divided into government and non-government sectors, including households, non-profit institutions serving households, financial sector institutions, and non-financial sector institutions.
  - ***Financial and non-financial sectors*** include public and private sectors and economic authorities.
  - ***Domestic non-government institutions*** include households, enterprises, public and private financial and non-financial institutions. All appear in the SAM together under the accounts for households.

ABOUT THE AUTHORS

Perrihan Al-Riffai is a Senior Research Analyst with IFPRI's Development Strategy and Governance Division and based in Washington, DC. **Suzane Moussa** is the Director General of the National Accounts Department at CAPMAS. **Amani Khalil** and **Fayza Hussein** are Senior Researchers in the National Accounts Department at CAPMAS. **Eman Serag** is a Researcher (II) in the National Accounts Department at CAPMAS. **Naglaa Hassan** is a Researcher (I) in the National Accounts Department at CAPMAS. **Ahmed Fathy**, **Asmaa Samieh**, **Mahmoud ElSarawy**, **Embareka Farouk**, **Saad Souliman**, and **Amani Abdel-Ghafour** are Statisticians in the National Accounts Department at CAPMAS.

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
A world free of hunger and malnutrition
2033 K Street, NW | Washington, DC 20006-1002 USA
T: +1.202.862.5600 | F: +1.202.467.4439
Email: ifpri@cgiar.org | www.ifpri.org

IFPRI – EGYPT STRATEGY SUPPORT PROGRAM
World Trade Center, 1191 Corniche El Nile, Cairo, Egypt
Office: +2(0)22577612
Mobile: +2(0)1066910782
http://egyptssp.ifpri.info/

This publication has been prepared as an output of the Egypt Strategy Support Program of IFPRI. It has not been peer reviewed. The contents of this publication and any opini
stated herein are the responsibility of the authors and do not necessarily reflect the views of IFPRI and its partners.