Empowering the modelling for Policy with the 2015 Social Accounting Matrix for Tanzania

An In-depth Look through the 2015 SAM

Contents

Abstract

A Social Accounting Matrix (SAM) is a comprehensive and economy-wide database that records data on all transactions taking place in an economy over a specific period, typically one year. The SAM serves two primary objectives. Firstly, it presents the economic structure and interrelationships among economic agents in the region under analyses. Secondly, it provides a database for analysing the economy's performance and simulating the effects of policy interventions through multisectoral linear models and computable general equilibrium (CGE) models. This report presents the 2015 SAM for Tanzania, offering a suitable database for implementing and evaluating the country's social and economic policies. The report outlines how to pass from a standard structure of the SAM to a detailed scheme by explaining all the accounts included, and covering key aspects of its construction and estimation. Considering the characteristics of the Tanzanian economy, this SAM shows a special structure to reflect the Home Production for Home Consumption (HPHC) issue and a high disaggregation of the agricultural sector. Furthermore, this SAM presents a high level of disaggregation by encompassing labour and household characteristics, considering regions, gender rural and urban areas, as well as income quintiles. The SAM is used as a database to perform a descriptive analysis of the Tanzanian economy.

Acknowledgements

Authors

Andrea El Meligi   JRC – Seville

Valeria Ferreira   JRC – Seville (Visiting Scientist) and Universitat Rovira i Virgili

Victor Nechifor   JRC – Seville

Ole Boysen   JRC – Seville

Emanuele Ferrari   JRC – Seville

Preface

The European Commission is committed to cooperating with developing countries to address issues related to inequality, nutrition and food security. This commitment is carried out through the evaluation of relevant policies and by facilitating access to analytical tools for researchers in these countries, enabling them to conduct their own assessments. In this regard, the Joint Research Centre (JRC), the European Commission's in-house science service, is committed to providing support for the following areas: i) improving information systems on agriculture, nutrition and food security, ii) conducting policy and economic analysis to support the policy decision-making process and iii) offering scientific advice on selected topics concerning sustainable agriculture, food and nutrition security.

The JRC is responsible for developing methodologies and tools to conduct economy-wide analysis related to the sustainability of policies in the agri-food sector, sustainable resources, and address the food and nutrition security issues. These analyses and tools aim to assist the EU institutions and partner countries in formulating and evaluating policies while providing demand-driven technical and scientific advice. Among the possible scientific tools, economic simulation models are used to depict the interrelationships between selected economic variables and provide a simplified representation of economic reality. These models are utilised to quantify the impacts of policy changes through ex-ante policy analysis.

The construction of databases to provide evidence-based policy support to partner countries is one of the objectives of the Pan-Africa Network for Economic Analysis of Policies (PANAP). PANAP is a network that brings together academic/research and institutional partners collaborating with the JRC to develop research on agricultural economics and policy issues, with a focus on Africa. PANAP is aligned with the Action Agenda of the Political Declaration of the 3rd AU-EU Agriculture Ministerial Conference held in Rome on June 21, 2019 (EC Decision C(2019) 4277).

PANAP engages key stakeholders, researchers, data analysts, and policy makers from national and multilateral institutions, in productive discussions on the role of science in supporting policy decision-making in Africa, particularly in the farming and food sectors (Morokong & Ferrari, 2020). The objective of PANAP is to enhance the collaboration between researchers/scientists and policymakers in Africa, including relevant multi-lateral African institutions, and to stimulate their cooperation on selected topics linked to policy priorities in Africa. PANAP also contributes to understanding and addressing scientific issues in the fields of agriculture and food security, with the aim of supporting effective policies and achieving sustainability of the agri-food sectors to enhance food and nutrition security. These efforts are in alignment with the Malabo Declaration Commitment 3, which aims to end hunger in Africa by 2025, as well as Sustainable Development Goal (SDG) 1 and SDG 2.

The primary audience for this paper comprises a diverse spectrum of stakeholders with a shared objective: to foster evidence-based policy decision-making in Africa. This inclusive audience encompasses statistical offices, researchers, modellers, key stakeholders, data analysts, and policy makers from both national and multilateral institutions. While policy makers are part of the intended readership, this paper's main focus lies in presenting and interpreting data rather than providing explicit policy recommendations.

By serving as a robust foundation of data and insights, this paper offers a database which empowers modelling for policy tools addressed to the decision-makers to craft policies that are firmly rooted in empirical evidence, ultimately contributing to the region's socio-economic advancement.

1   Introduction

Tanzania is a diverse and resource-rich Eastern African country, member of the East African Community (EAC) and it is one of the countries analysed in this context ([1]). It has a relatively diversified economy, including agriculture, raw material extraction, manufacturing and services. However, agriculture is a significant contributor to Tanzania's economy employing the majority of the population. The country produces a variety of crops, including maize, rice, cassava, coffee, cotton, and cashews.

Tanzania has faced challenges such as high poverty rates, income and labour inequalities. The main focus of the macroeconomic analysis is the use of a customized version of a single-country Computable General Equilibrium (CGE) model to analyse agricultural and rural policy priorities aimed at reducing inequalities while considering the specificities of the country's economy, as well as the impact of the African Continental Free Trade Area (AfCFTA) on the Tanzanian Economy. Consequently, there is particular interest in the promotion of policies focused on the development of key sectors, which requires the elaboration of a specific database that provides a description of the regional economies, their interlinkage, and the disaggregation of the main sectors. The calibration of CGE model requires a complex database system known as a Social Accounting Matrix (SAM).

A SAM is a comprehensive and economy-wide database that records data on all transactions occurring in an economy over a specific period, typically a year. This framework has found diverse applications across a variety of research disciplines, policy analysis, and economic modelling in diverse contexts. An illustrative example of its practical use, as developed by JRC, involves the creation of Bioeconomy Social Accounting Matrices, known as BioSAMs. Many studies have utilized data from these databases to extract valuable insights into the socio-economic dynamics within the European Union's economy, especially within the context of the Bioeconomy and its connection to the Green Deal (Mainar-Causapé & Philippidis, 2021, El Meligi et al., 2022, Kuosmanen et al., 2020), or at a country level, for example for Spain (Ferreira et al., 2021; 2023).

Additionally, the SAM framework has played a substantial role in supporting research activities related to the implementation of the African Continental Free Trade Area (AfCFTA). The AfCFTA represents a promising platform for boosting intra-African trade and economic growth, requiring a modelling framework based on country's' national accounts.

The estimation of a new SAM for Tanzania is an important achievement itself as it provides detailed information about the economic structure of the country and serves as the main database for linear multisectoral models. For this reason, the 2015 SAM for Tanzania presented in this report has been constructed to provide a database for the analysis of the different policies at stake. The main contributions of the SAM presented in this report include the breakdown of the accounts by region and rural and urban areas, households by quintiles as well as gender for the labour factor.

Finally, this represents one of two research studies, with the second one concentrating on the evolution of the DEMETRA model and the execution of policy scenarios linked to AfCFTA (Maskaeva et al., 2024).

This report is structured as follows: Section 2 presents the concept, advantages and limitations, along with the description of the accounts of Social Accounting Matrices. Section 3 describes the structure of the 2015 Tanzania SAM, detailing the accounts and data used, as well as the disaggregation procedures, final adjustments and SAM balancing. Additionally, that section introduces the Home Production for Home Consumption approach, a key feature of the SAM. In Section 4, a description of the Tanzanian economy's structure is provided using SAM data. Finally, Section 5 includes conclusions, and the Annexes provide additional tables and presents the downloadable application.

([1])   Similar SAM databases have been constructed for other African countries, for example for Senegal (Boulanger et al., 2017), Kenya (Mainar-Causapé et al., 2018a), Ethiopia (Mengistu et al., 2019), and Cote d'Ivoire (Ferreira et al., 2021). All these SAMs are freely available in the JRC DataM repository.

2 Social Accounting Matrix framework

2.1 General concepts, advantages and limitations

A Social Accounting Matrix (SAM) is an extensive and economy-wide database that offers a comprehensive overview of an economy, showing the economic and social information on all transactions carried out among economic agents within a specific country or region under analysis during a specific period, typically one year.

The origins of SAMs can be traced back to the pioneering works of Stone (1947) among others, and subsequent advancements in their use as an economic analysis model (Defourny & Thorbecke, 1984; Pyatt & Round, 1985). A SAM goes beyond the information provided by the Input-Output table by incorporating a more complex accounting structure that captures all economic transactions. This allows for the representation of the circular flow of income and expenditure, illustrating the interlinkages among production, trade, demand, income generation, and its subsequent distribution among institutional sectors (Pyatt & Round, 1985).

SAMs serve as a valuable tools for understanding the structure of an economy and provide a suitable database for economic modelling. They can be used as a database for multisectoral linear models, which enables the calculation of multipliers and also as database for the application of more complex Computable General Equilibrium (CGE) models. This facilitates the analysis of how the economy operates while taking into account socio-economic factors such as employment, poverty, growth, and income distribution, among others. Furthermore, it allows for the assessment of the impact of different policy interventions.

The concept of the circular flow of income stays at the foundation of SAM development, as depicted in Figure 1([2]).

Figure 1. The circular flow of income and expenditure.
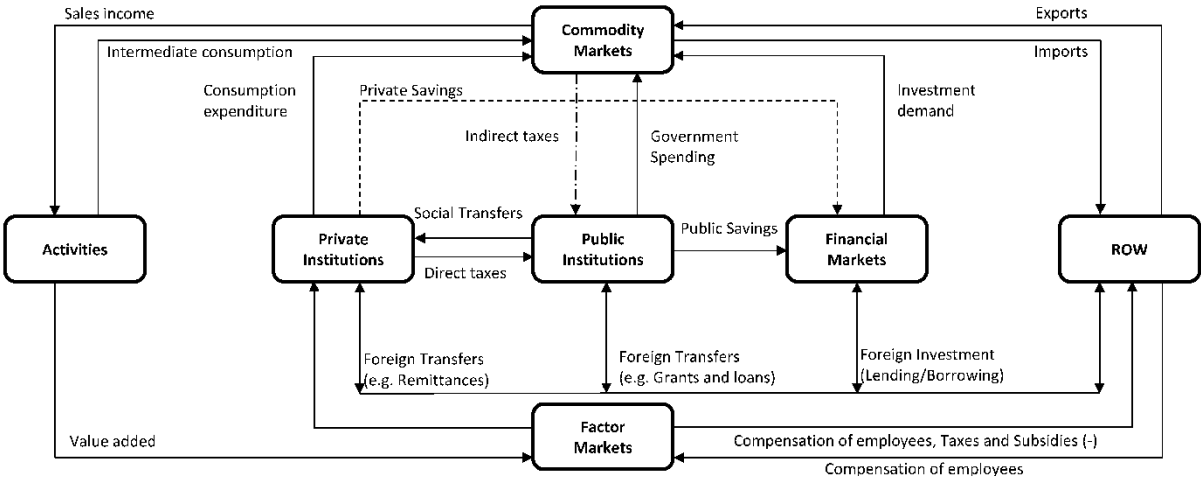
Source: Own elaboration.

The compilation of this accounting framework is described in the System of National Accounts, which is an international accepted, consistent, flexible and comprehensive collection of macroeconomic accounts designed to fulfil the requirements of policymakers, government, decision-makers, and private sector analysts. To develop a SAM, different statistical sources are employed, as for example trade and socio-economic data concerning household income, employment, and expenditure, typically obtained from household budget surveys and labour force surveys. By employing this information, employment and households can be disaggregated based on socio-economic characteristics, such as income, education, regions, rural-urban areas, etc. This kind of disaggregation facilitates the analyses of income distribution or job creation. The specific additional data required will vary depending on the accounts to be disaggregated, according to the type of analysis to be performed.

---

[2] This circular flow of income and expenditure scheme not shows intra-flows such as transactions among institutions, e.g. Private Institutions to Private institutions.

2.2 Structure of a SAM

The SAM database is structured as a square matrix, organized logically to provide a visual representation of all economic transactions among different agents in an economy. It reveals how income is both generated and expended. To achieve this, each account is represented as a row, displaying the sources of income of each agent, and as a column, representing the payments made, both in monetary values. Thus, each cell (i,j) shows the transaction between account i and j, where account i receives income from j.

Generally, a Social Accounting Matrix consists of six fundamental groups of accounts:

— Activities or Commodities (or both, separated).

— Factor Markets.

— Private Institutions (Households and Corporations/Enterprises).

— Public Institutions (Government).

— Financial markets.

— Rest of the World.

While the standard structure of a SAM is presented in Figure 2 ([3]); the matrix's layout can vary based on the inclusion of specific accounts within the six fundamental groups and how these accounts are subdivided. Additionally, the geographical scope of the SAM (national, regional, multi-regional, etc.) is influenced by the type of analysis being conducted.

The interpretation of the SAM reveals that the production process utilizes inputs to produce goods and services, which are then sold (either as intermediate or final products) to generate revenue. To carry out production, apart from the intermediate consumption, it is necessary to remunerate the factors of production, thereby generating income for institutional sectors (e.g., wages for households). This income is subsequently spent on consumption, transferred to other institutions, or saved. As a result of consumption, there is a need to expand production, and the cycle repeats itself.

([3]) The general characteristic of this structure, as well as specific issues of its definition and composition can be found in Miller & Blair (2009), Eurostat (2008) or Mainar-Causapé et al. (2018b).

Figure 2. A Social Accounting Matrix (SAM) standard structure.

	Commodities	Margins	Activities	Factors	Households	Enterprises / Corporations	Government	Investment-Savings	Rest of the World	*Total*
Commodities		Transaction costs (trade / transport)	Intermediate (inputs) consumption		Household consumption		Government expenditure	Investment and stock changes	Exports	*Demand*
Margins	Transaction costs (trade / transport)									*Margins*
Activities	Domestic production									*Gross output / Production (activity income)*
Factors	Net taxes on products		Remuneration of factors and taxes on production / Factor income						Factor income from RoW	*Factor income*
Households				Factor income distribution to households	*(Inter Household transfers)*	Distribution of enterprise income to households	Government transfers to households		Transfers to Households from RoW	*Household income*
Enterprises / Corporations				Factor income distribution to enterprises			Government transfers to enterprises		Transfers to Enterprises from RoW	*Enterprise income*
Government				Factor income to Government / Factor taxes	Direct Household taxes / Transfers to Government	Direct Enterprise taxes / Transfers to Government			Transfers to Government from RoW	*Government income*
Investment-Savings				*(Depreciation)*	Household saving	Enterprise saving	Government saving	*(Capital accounts transfers)*	Capital transfers from RoW (Balance of Payments)	*Saving*
Rest of the World	Imports			Factor income distribution to RoW	Households transfers to RoW	Enterprise income to Row	Government transfers to RoW			*Payments to RoW*
Total	*Supply*	*Margins*	*Costs of production activities*	*Expenditure on factors*	*Household expenditure*	*Enterprise expenditure*	*Government expenditure*	*Investment*	*Incomes from RoW*	

Source: Own elaboration based on Aragie et al. (2017) and Round (2003a).

2.3 Economic agents and accounts

2.3.1 Activities and Commodities

The standard structure of the SAM, as presented in figure 2, distinguishes between Supply and Use schemes. The first table depicts Activities involved in the production of one or more Commodities (representing goods and services) and the flows are valued at basic prices. The supply of Commodities at purchaser prices is then calculated by encompassing domestic production by Activities, imports from other countries (rest of the world) or regions, trade and transport margins, and taxes less subsidies on products (both domestic and imported) (Mainar-Causapé et al., 2018a).

In the second table, flows are valued at market prices (including indirect taxes on products and margins). This scheme presents the intermediate use of commodities in the production of final goods and services. Commodities can be sold domestically (to activities, households, and government) or exported. Activities that use inputs and the factors of production (such as labour, capital, land, etc.) are illustrated by columns. The sum of the primary factors plus taxes less subsidies on production represents the value added by Activities. The rows describe the Commodity demand, including intermediate consumption (by Activities), final consumption demand by institutional sectors (Household and Government), investment and exports. The sum of the values of commodities produced by each activity gives the gross output value.

For each commodity, the SAM records the associated costs of trade and transport (margins). These transaction costs are linked to the expenses incurred in moving goods among producers, markets, and national borders, whether for domestic consumption, import or export, and are considered part of the supply costs of commodities (Mainar-Causapé et al., 2018b).

2.3.2 Home Production for Home Consumption (HPHC) approach

In developing countries, the dual role of households, both as producers and consumers, is a common characteristic, particularly in economies with a large share of subsistence agriculture. Consequently, there is a necessity to define and estimate home production for home consumption (HPHC) within a SAM.

The traditional concept of the Representative Household Group (RHG) includes the household behaviour as consumer of goods and services and as providers of factors of production (and receptor-contributors of transfers). The HPHC concept is introduced in the SAM by assuming that households function as units of production of commodities, consuming part or all of what they produce. This expansion of the SAM structure requires additional sets of column and rows as sub-columns and sub-rows of the commodity and activity accounts.

In the case of the Commodities accounts, this requires additional rows and columns to distinguish between the commodities produced by households for their own consumption (HPHC, whether as input or final product) and other marketed commodities (produced by both conventional productive activities and households). The rows of these commodity accounts show how HPHCs are use as intermediate inputs in the households productive activities and their consumption in the final demand of household (RHG). The column summarizes the contribution of the household activities to each of these goods.

HPHC commodities can only be produced by the RHGs that consume those commodities; therefore, each RHG must simultaneously be a household and an activity. The columns of the household's activities show how they use inputs (both HPHC and marketed), while the rows depict the destination of their production, wheather as inputs for own-consumption or for the market. All the incurred tax and trade and transport costs should be allocated exclusively to the marketed component of the commodity (Mainar-Causapé et al., 2018a).

The incorporation of HPHC into a SAM requires more comprehensive data from surveys and censuses, along with additional estimations. Obtaining Data for HPHC involves segmenting consumption demand between marketed and HPHC commodities and identifying the costs structures used in production. Typically, this will require reconciling data from different sources, especially household income and expenditure data, labour force and agricultural (production) surveys.

2.3.3 Factors

The factors of production refer to the resources employed in the production process (combined with intermediate inputs to produce goods and services). Traditionally, these factors include capital and labour, and can also encompass other types such as land. The specific types and disaggregation of factors of production

depend on the purpose of the analysis. For example, the labour account can be disaggregated based on educational level distinguishing between skilled and unskilled workers.

In term of presentation, the production factors accounts depict the income received (such as wages, rent, etc.) from the activities and the rest of the world by rows. By columns, these incomes are allocated to the owners of the factors of production (Households, Enterprises and Government), as well as to the rest of the world. In the standard structure, based on the Aragie et al. (2017) and Round (2003a) schemes, factors also include net taxes on production and net taxes on products.

2.3.4   Households

The household sector provides information on the income and expenditure patterns of individuals within an economy. Typically, Households are organized into Representative Household Groups (RHGs), often categorized based on factors such as income level or geographic location. This information is crucial for studying socioeconomic issues such as income inequality and unemployment, as it allows the modeller to examine how different types of households are affected by an economic shock (Burfisher, 2016).

The Household row account records various sources of income, including income from factors of production (as owners of labour, capital, land, or natural resources), transfers from enterprises (such as distributed profits and direct transfers), direct transfers from the Government, transfers from the Rest of the World (usually for labour services and remittances) and transfers from other households (Mainar-Causapé et al., 2018b). By columns, the Household expenditure is detailed, offering a breakdown of how household income is used for purchasing commodities, paying direct taxes to the government, making transfers to other households (both domestic and foreign), as well as household saving (or financing need if negative).

2.3.5   Enterprise

Enterprises represent the institutional component of the productive sector, typically not consuming inputs like activities. In the enterprise accounts, the rows compile the incomes received from asset ownership (such as capital, land, or natural resources) and income form transfers originating from other institutions. The column illustrates how these revenues are transferred to other institutions, e.g., households in the form of dividends, the payment of direct taxes (enterprise tax) or savings.

Within this group, further disaggregation is possible, such as distinguishing between financial and non-financial corporations, or categorizing companies as public or private.

2.3.6   Government

The institutional sector of the Government generally differentiates between Local and Central Government. Government income is presented by rows and includes revenue from various sources, encompassing taxes, transfers (both domestic and foreign), and compensation for factors of production (including any assets owned by the government). In contrast, Government expenditure is depicted by columns, and it is categorized into various components, such as consumption demand for goods and services, transfers to other institutions (including subsidies or benefits to households and enterprises), and payments to other countries (such as debt service payments). The investment-saving cell serves to indicate whether the government is running a trade surplus or deficit (if negative) by showing its saving.

2.3.7   Investment-Savings

The savings generated by all domestic institutions (households, enterprises, and government) as well as the balance of foreign trade on capital account with the rest of the world, are represented by rows in this account. The column displays the capital investment made in goods and services, which includes the Gross Fixed Capital Formation (GFCF) and changes in inventories.

2.3.8   Rest of the World

The foreign sector is comprised of two trade accounts: imports and exports, which illustrate the economic interaction between the country (or region) under analysis and the rest of the world. Depending on the type of analysis, the rest of the world can be represented as a single account or disaggregated to include other regions or countries (e.g., ECCAS, African Union and rest of the world).

The income received by the rest of the world account, represented by row, includes imports of goods and services (commodities), transfers to foreign institutions (households, businesses, and government), and the compensation of factors of production abroad. On the other hand, the expenditures of the rest of the world are shown by column, which encompass the purchase of goods and services (exports), payments to domestic factors of production used abroad, and transfers from other economies (such as factor payments, foreign loans and aid, remittances, etc.). The investment-saving cell indicates the surplus or deficit with the rest of the world, indicating the capital inflow (in the case of a negative trade balance) or outflow (in the case of a positive trade balance) between the rest of the world and the country under analysis.

3 The 2015 SAM for Tanzania

3.1 Structure and estimation of the 2015 Tanzania SAM

This study presents the development of a new SAM for Tanzania (base year 2015), based on the standard structure while incorporating country-specific factors. The new SAM includes specific accounts for the treatment of HPHC and includes a high regionalisation. Additionally, the SAM includes specific accounts for labour which have been further differentiated by region and separated into rural and urban areas, and also separated by gender. Furthermore, the households' accounts are disaggregated by income quintiles and rural and urban areas. This framework enables the analysis of regional issues, such as income and productivity disparities, with the aim of reducing poverty and inequality within and between regions.

The Tanzania SAM distinguishes between activities and commodities, and the structure as well as a summarized version of the SAM is detailed in Table 1.

Table 1. 2015 SAM for Tanzania with aggregated values. Millions of Tanzanian Shilling (TSh).

	HPHC Commodities	Commodities	Margins	Households as activities	Activities	Value Added	Taxes-subsides	Institutional sectors	Investment/ Saving	Rest of the World	Total
HPHC Commodities				937,217	2,253			8,597,331			9,536,801
Commodities			14,009,317	3,403,383	56,126,158			62,439,955	30,907,602	12,332,764	179,219,179
Margins		14,009,317									14,009,317
Households as activities	8,980,060	13,274,122									22,254,182
Activities	556,741	124,142,824									124,699,565
Value Added				17,913,141	68,376,317					44,732	86,334,190
Taxes-subsides		8,177,207		440	194,838						8,372,485
Institutional sectors						86,267,982	8,372,485	28,359,774		2,639,437	125,639,679
Investment/ Saving								24,491,605		6,415,997	30,907,602
Rest of the World		19,615,709				66,208		1,751,014			21,432,930
Total	9,536,801	179,219,179	14,009,317	22,254,182	124,699,565	86,334,190	8,372,485	125,639,679	30,907,602	21,432,930	

Source: Own elaboration using the 2015 Tanzania SAM.

The regional breakdown in the SAM correspond to 25 regions (representing the sub-national regions prior to the 2016 modification) (see table 5). Each regional household is disaggregated into rural and urban and further separated across income quintiles. Finally, 10 different Representative Household Group (RHG) are detailed in the SAM. Furthermore, each region has a specific agricultural activity producing 18 "subsistence commodities" destined for home consumption, and 18 marketed commodities. The remaining 73 marketed commodities are produced by specific activities aggregated at a national level. The Tanzania SAM further contains 99 accounts of production factors. There are 98 types of labour and I account for capital. Labour is disaggregated across the regions and rural and urban areas, with labour factors are also separated between rural and urban. Moreover, a distinction is made between gender (feminine and masculine).

In summary, the 2015 Tanzania SAM accounts for:

— 99 activities;

- o 25 household agricultural activities
- o 74 activities.

— 109 commodities;

- o 18 home commodities
- o 91 marketed commodities.

— 99 factors of production (98 labour accounts and 1 capital factor);

— Net taxes on products, Net taxes on production, Imports taxes;

— Trade margins and Transport margins;

— 10 households (disaggregated by rural/urban and by income quintiles);

— 2 Other institutional sectors: Corporations/Enterprises and Public Institution as the Government;

— Rest of the world;

— Investment-Saving.

All the accounts considered in the 2015 SAM for Tanzania are detailed in Annex 1.

3.1.1 Data sources and accounts

To construct the 2015 SAM for Tanzania, several statistical sources have been used. The table 2 provides a detailed breakdown of the data sources used for the disaggregation of each section.

As a starting point, the Supply and Use table and the National Accounts for 2015, as well as data on trade and microdata provided by different surveys conducted by the National Bureau of Statistics were used. The integrated economic accounts provided an overview, by institutional sector, of the flow of payments to and from institutions, organized as double-entry accounts, which encompassed the entire production process and the distribution of income. Due to data unavailability, the secondary distribution have been estimated by considering an average structure of the transfers among institutional sectors.

Furthermore, data from the Household Budget Survey (2017/2018), the National Panel Survey (2019/2020), the National Census of Agriculture (2019/2020) and the Integrated Labour Force Survey (2014; 2020/2021) were considered in the SAM for the labour, agriculture and household disaggregation.

Table 2. Summary of Data Sources for the Tanzania SAM.

Data item	Data source	Data year
Macroeconomic scheme		
Supply and Use Tables	National Bureau of Statistics	2015
Integrated Economic Accounts	Estimated	2015
National Accounts	National Bureau of Statistics	2015-2019
	FAOSTAT	2015
Import taxes	Market Access Map, International Trade Centre	2014
Labour disaggregation		
Integrated Labour Force Survey (ILFS)	National Bureau of Statistics	2014
		2020/2021
National Panel Survey	National Bureau of Statistics	2019/2020
Other labour force aggregate	UNData, Statista and World Bank	2015
Households' disaggregation		
Household Budget Survey	National Bureau of Statistics	2017/2018
National Panel Survey – Extended Panel with Sex Disaggregated Data	World Bank	2019/2020
Agriculture disaggregation		
National Sample Census of Agriculture	National Bureau of Statistics	2019/2020
National Panel Survey – Extended Panel with Sex Disaggregated Data	World Bank	2019/2020

Source: Own elaboration

3.1.1.1   Activities and Commodities

The initial values for the rows and columns representing commodities and activities were obtained from the Supply and Use tables for the year 2015. The SAM for Tanzania presents a total of 99 activities and 109 commodities.

As mentioned previously, this SAM includes the disaggregation of agriculture into household agriculture by regions and national agricultural activities separately. Therefore, the activities in the primary sector consist of 25 regional activities and 10 national activities. The remaining activities amount to 64, totalling 99 (see Table 3).

The National Panel Survey (NPS-SDD 2019/20) and the National Sample Census of Agriculture (2019/20) census played a pivotal role in disaggregating households, with a particular emphasis on the primary sector. The National Sample Census of Agriculture 2019/20 main objective was to provide baseline data on Agricultural Statistics. This data serves a valuable role in national agricultural planning, execution, and policy intervention, all aimed at enhancing the agricultural sector through increased productivity, promoting agro-processing and enhancing the well-being of farmers.

The agricultural census is divided into three parts: Large scale farmers, small scale farmers, and community. In this case, data from the sections of Large Scale Farmers and Small Scale Farmers have been used. More specifically, data on agricultural production considering long and short rainy season and permanent crops for each region were obtained. Additionally, data on the major costs associated with this production were collected, primarily including seeds, labour, capital, chemicals, irrigation, and transportation. Regarding consumption, the census also enables us to obtain data to differentiate between production used for sale and products consumed by the household.

As for the National Panel Survey (NPS-SDD 2019/20), was originally launched in Tanzania in 2008, with support from the Living Standards Measurement Survey – Integrated Surveys on Agriculture [LSMS-ISA1] program at the World Bank and other donors. The NPS-SDD 2019/20 survey collects information on a wide range of topics, including agricultural production, non-farm income generating activities, individual rights to plots, consumption expenditures, and a wealth of other socioeconomic characteristics.

The data obtained from the agricultural census was supplemented by with information provided by the survey NPS-SDD 2019/20, which was also related to the total production by products and regions in both monetary and physical units, the land used, and details of some costs.

Leveraging this data has allowed for the detailed breakdown of the primary sector by region, enabling the identification of household production and self-consumption. The use of these data has allowed for a detailed breakdown of the primary sector by region, which has made it possible to identify household production and self-consumption.

Therefore, the disaggregation of the SAM shows that each region has a specific agricultural activity producing 18 "subsistence commodities" destined for home consumption, and 18 marketed commodities. The remaining 73 marketed commodities are produced by specific activities aggregated at a national level, as shown in Table 4.

3.1.1.2   Households

The 2015 Tanzania SAM incorporates a distinction between rural and urban households and further disaggregates them by income quintiles.

As mentioned earlier, the agricultural census was used to identify household consumption derived from their own agricultural production. However, to obtain the household consumption details for the rest of the products, data from the Household Budget Survey (2017/2018) and the National Panel Survey (2019/2020) was used.

The household survey (knows as HBS 2017/18), was conducted by the National Bureau of Statistics with the main objective to obtain current information on poverty levels and the living standards of the people. Therefore, it contains a wide range of socio-economic information at both individual and the household levels. To this end, the HBS 2017/18 provides valuable data on various aspects, including the status of employment and income, education, household consumption, expenditures and savings, food security and non-farm household businesses, among others. Data collection was carried out starting from 1st December 2017 to 30th November 2018 covering a period of one complete year, with 9,465 households successfully interviewed (response rate of 99%). It serves as the main data source for both the planning and monitoring of various commitments at

national, regional, and global levels, such as the National Five-Year Development Plan II (FYDP-II), East Africa Vision 2050, Africa Development Agenda 2063, and the Sustainable Development Goals (SDGs).

The survey includes a file called "Consumption Aggregate and Poverty Analysis Variables," in which household consumption is detailed, considering grouped products, and distinguishing between regions, rural and urban areas. Additionally, the National Panel Survey (2019/2020) was used to enhance the estimation of the disaggregation of consumption for some products. Specifically, section J of the survey was utilized, which provides data on household consumption by regions and rural and urban areas with a finer level of disaggregation than the household survey.

As a result, the 2015 Tanzania SAM includes 10 representative household groups (RHG), which are additionally divided into rural and urban areas, along with the income quintiles (see table 3). This classification will allow for a more in-depth analysis of redistributive factors and the differential impacts of various policies on different types of households.

3.1.1.3 *Factors of production*

Depending on the specific objectives of the analysis, the categorization of production factors is crucial. In the 2015 Tanzania SAM, the factors of production are divided into two main groups: labour and capital.

Under the labour factors, in order to account for regional disparities, a differentiation was made among the 25 regions, and it became necessary to distinguish between urban and rural areas due to the variations in average consumption, employment, and income levels. Additionally, to facilitate gender-focused analyses aimed at promoting equality, the employment accounts were segregated accordingly. This disaggregation is based on data obtained from the Integrated Labour Force Survey (2014; 2020/2021) and the National Panel Survey (2019/2020).

While the household survey offers some employment-related information, a more comprehensive understanding of labour-related data was obtained by considering the Integrated Labor Force Surveys (ILFS) for 2014 and 2021/2021. Both surveys were conducted by the National Bureau of Statistics (NBS) in Tanzania Mainland. The primary objective of these surveys was to collect labour market information and other socio-economic data necessary for policy formulation and decision-making in planning processes. Therefore, they encompass extensive data on labour market participation, job characteristics, the informal sector, unemployment, income, child labour, and time use.

Taking into account the employment surveys, the comparison between both has shown that the 2014 survey is more comprehensive. Therefore, the use of the 2014 survey has been prioritized, with recourse to the 2020/2021 survey only in case any estimations are necessary.

The survey provides a detailed view of the working-age population, taking into account the worker's gender, rural and urban areas, as well as regions of the country. Additionally, it offers information about the worker's skill levels and their specific activity. Regarding the income-related aspect, it is divided into paid employees, self-employed not in agriculture, and self-employed in agriculture.

Data from UNData were used to account for the total corresponding to Gross Operating Surplus and Compensation of Employees. Additionally, data from Statista, based on the World Bank, were considered to obtain an estimation of the total number of workers for the year 2015.

As a result, the labour accounts for the 2015 national SAM for Tanzania are disaggregated into 98 distinct accounts.

3.1.1.4 *Other accounts*

The Tanzania SAM includes three distinct types of taxes: taxes less subsidies on production (indtax), taxes less subsidies on products (saltax) and imports taxes (imptax). Taxes on production are imposed on production activities based on their output, while taxes on products and import taxes are levied on domestic firms for their purchases of intermediate input, as well as on consumers and investors for their acquisitions of final goods and services.

The import tariff rates have been derived from the MAcMap (Market Access Map) database for the year 2014 (International Trade Centre, www.macmap.org, retrieved on 20 April 2020). The MAcMap database is constructed to consistently represent bilateral import tariff protection at the six-digit level of the Harmonised System (HS) classification of the World Customs Organization, see Guimbard (2012) for the methodology. The 2014 data covers the trade of 196 countries categorised into 5205 product lines. The tariff rates included are

effectively applied tariffs and assume that importers always adopt the most beneficial preferential tariff available to them. For integration into the SAM, the import tariff rates are aggregated up to the product groups represented in the SAM using trade value weighting. The trade values utilised are averages over the years 2013 to 2015 to reduce volatility. The resulting tariff rates are then applied to the associated SAM accounts' imports to yield import tax values for integration into the SAM.

The margins include the cost related to trade and transport. Trade margins are defined as the actual revenue realised on goods purchased for resale, minus cost of purchased products for trade (Eurostat, 2008). The transport margins consist of those transport charges paid separately by the purchaser in taking delivery of the goods at the required time and location (UNSC, 2009).

The Investment-Saving block represents by row, the domestic private savings of enterprises and households, as well as the fiscal surplus (or deficit) of the government; and by column, includes the gross fixed capital formation (representing investment in commodities such as machinery and equipment, vehicles, etc.) and the change in inventories. Detailed household savings data by region was obtained from the survey National Panel Survey (2019/2020).

Detailed description and codes for all accounts are provided in Annex 1.

3.1.2 SAM final adjustment and balancing

The microdata provided by these surveys played crucial role in the disaggregation of the sub-accounts specified in this SAM. Given that multiple data sources were used in constructing the SAM, techniques such as the RAS method were applied to reconcile and balance the data. This technique is a biproportional balancing method, which through an iterative process, adjusts rows and columns back and forth, over and over. These adjustments help balancing the matrix when there is insufficient information by utilizing macroeconomic targets or targets specific to certain accounts, cells or sub-matrices (Bacharach, 1970; Mcdougall, 1999; Robinson et al., 2001).

Table 3. Activities disaggregated in the 2015 Tanzania SAM.

Representative Households Groups as activities		
Arusha; Dar Es Salaam; Dodoma; Geita; Iringa; Kagera; Katavi; Kigoma; Kilimanjaro; Lindi; Manyara; Mara; Mbeya; Morogoro; Mtwara; Njombe; Pwani; Rukwa; Ruvuma; Shinyanga; Simiyu; Singida; Tabora; Tanga.		
National Activities		
Primary sector	Cotton	Sisal
	Cashew nuts	Cloves
	Tobacco	Support services to agriculture
	Tea	Forestry and logging
	Coffee	Fishing and aquaculture
	Mining of coal and lignite	Mining of metal ores
	Extraction of crude petroleum and natural gas	Other mining and quarrying
	Manufacture of food products	Repair and installation services of machinery and equipment
	Manufacture of beverages	Manufacture of rubber and plastics products
	Manufacture of tobacco products	Manufacture of other non-metallic mineral products
	Manufacture of textiles	Manufacture of basic metals
	Manufacture of wearing apparel	Manufacture of fabricated metal products
	Manufacture of leather and related products	Manufacture of computer electronic and optical products
	Manufacture of wood and of products of wood and cork	Manufacture of electrical equipment
	Manufacture of paper and paper products	Manufacture of machinery and equipment
	Printing and reproduction of recorded media	Manufacture of motor vehicles, trailers and semi-trailers
	Manufacture of coke and refined petroleum products	Manufacture of other transport equipment
	Manufacture of chemicals and chemical products	Manufacture of furniture
	Manufacture of basic pharmaceutical products	Other manufacturing
	Electricity, gas, steam and air conditioning	Sewerage services; waste collection, treatment and disposal services
	Natural water; water treatment and supply services	
	Construction	
	Wholesale and retail trade, repair services of motor vehicles and motorcycles	Insurance, reinsurance and pension funding services
	Wholesale trade services, except of motor vehicles and motorcycles	Services auxiliary to financial services and insurance services
	Retail trade services, except of motor vehicles and motorcycles	Real estate services and imputed rents of owner-occupied dwellings

Land transport and transport via pipelines	Professional, scientific, technical and veterinary services
Water transport	Rental, leasing and employment services
Air transport	Travel agency, tour operator and related services
Warehousing and support activities for transportation	Other administrative and support services
Postal and courier activities	Public administration, defence services and social security services
Accommodation services	Education services
Food and beverage serving services	Human health services
Publishing services	Social work services
Motion picture, video and television programme production, and others	Arts, entertainment and recreation services
Programming and broadcasting services	Services furnished by membership organisations
Telecommunications	Repair of computers and personal and household goods
Computer programming, data processing and information services	Other personal services
Financial services, except insurance and pension funding	Domestic services

Table 4. Commodities disaggregated in the 2015 Tanzania SAM.

HPHC Commodities	
Wheat	Cassava
Maize	Other roots and tubers
Rice	Pulses
Other cereals	Oilseeds
Vegetables	Other crops
Fruits	Cash crops
Sweet potatoes	Bovine cattle

Marketed Commodities	
Wheat	Tobacco
Maize	Tea
Rice	Coffee
Other cereals	Sisal
Vegetables	Cloves
Fruits	Bovine cattle
Sweet potatoes	Sheep, goats, other ruminants
Cassava	Poultry
Other roots and tubers	Other livestock
Pulses	Raw milk
Oilseeds and oleaginous fruits	Support services to agriculture
Other crops	Products of forestry, logging and related services
Cotton	Fish; aquaculture products; support service
Cashew nuts	
Coal and lignite	Metal ores
Crude petroleum and natural gas	Other mining and quarrying products
Manufacture of food products	Manufacture of rubber and plastics products
Manufacture of beverages	Manufacture of non-metallic mineral products
Manufacture of tobacco products	Manufacture of basic metals
Manufacture of textiles	Manufacture of fabricated metal products.
Manufacture of wearing apparel	Manufacture of computer electronic and optical products
Manufacture of leather and footwear	Manufacture of electrical equipment
Manufacture of wood and products of wood and cork	Manufacture of machinery and equipment
Manufacture of paper and paper products	Manufacture of motor vehicles, trailers and semi-trailers
Printing and reproduction of recorded media	Other transport equipments
Manufacture of coke and refined petroleum products	Furniture
Manufacture of chemicals and chemical products	Other manufactured articles
Manufacture of basic pharmaceutical products	Repair and installation services of machinery and equipment
Electricity, gas, steam and air conditioning	Sewerage services; waste collection, treatment and disposal services
Natural water; water treatment and supply services	
Construction	
Wholesale and retail trade, repair services of motor vehicles and motorcycles	Insurance, reinsurance and pension funding services
Wholesale trade services, except of motor vehicles and motorcycles	Services auxiliary to financial services and insurance services
Retail trade services, except of motor vehicles and motorcycles	Real estate services and imputed rents of owner-occupied dwellings
Land transport and transport via pipelines	Professional, scientific, technical and veterinary services
Water transport	Rental, leasing and employment services
Air transport	Travel agency, tour operator and related services
Warehousing and support activities for transportation	Other administrative and support services
Postal and courier activities	Public administration and defence services; compulsory social security services

Accommodation services	Education services
Food and beverage serving services	Human health services
Publishing services	Social work services
Motion picture, video and television programme production services, others	Arts, entertainment and recreation services
Programming and broadcasting services	Services furnished by membership organisations
Telecommunications	Repair of computers and personal and household goods
Computer programming, data processing and information services	Other personal services
Financial services	Domestic services

Table 5. Regional description in the 2015 Tanzania SAM.

Region name	Region code
Arusha	Aru
Dar Es Salaam	Dar
Dodoma	Dod
Geita	Gei
Iringa	Iri
Kagera	Kag
Katavi	Kat
Kigoma	Kig
Kilimanjaro	Kil
Lindi	Lin
Manyara	Man
Mara	Mar
Mbeya	Mbe
Morogoro	Mor
Mtwara	Mtw
Mwanza	Mwa
Njombe	Njo
Pwani	Pwa
Rukwa	Ruk
Ruvuma	Ruv
Shinyanga	Shi
Simiyu	Sim
Singida	Sin
Tabora	Tab
Tanga	Tan

4 Economic overview and income distribution

4.1 Analysis of the economic structure of Tanzania

A SAM serves as a valuable instrument for describing the economic structure of a country in detail. In this section, the aim is to offer an overview of the key characteristics of the Tanzanian economy by using the 2015 SAM.

Figure 3. Domestic absorption, imports, and exports as % of the GDP. Tanzania 2015.
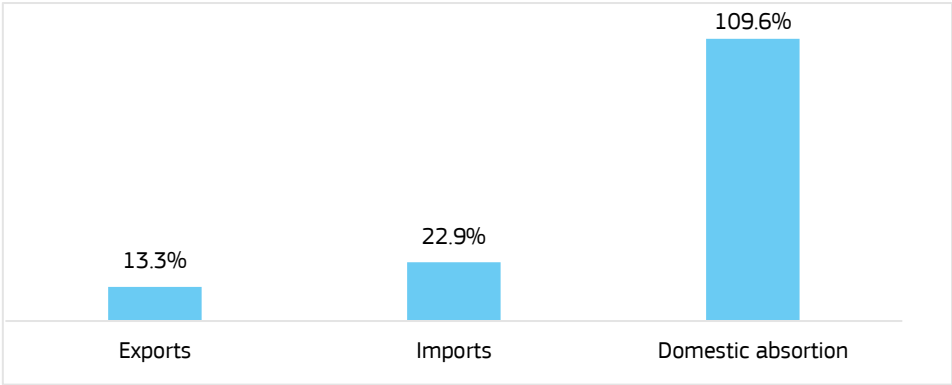
Source: Own elaboration using the 2015 Tanzania SAM.

In terms of domestic absorption, it accounts for 109.6% of country's GDP. When considering the foreign sector, exports represent 13.3% of GDP, while imports accounts for 22.9% (Figure 3). A more detailed breakdown of domestic absorption shows that the largest portion is attributed to private household consumption at 60.5%, followed by investment at 30.3%, and government expenditure at 9.2% (as illustrated in Figure 4).

Figure 4. Domestic absorption composition. Tanzania 2015.
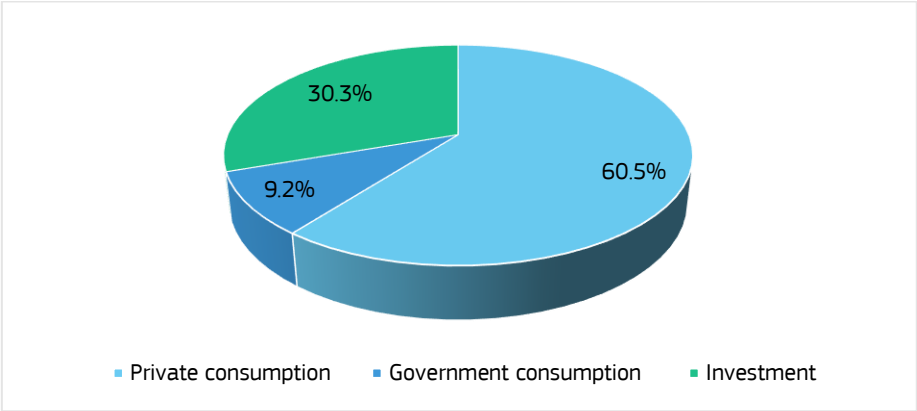
Source: Own elaboration using the 2015 Tanzania SAM.

When examining the consumption patterns of households, it becomes clear that the primary sector and food industry play a significant role, accounting for 57.3% of total expenditure. Following closer is the services sector, which represents 24.4% of household consumption (Figure 5). Within the services sectors, 7% of expenditure are designated to transport and information and communications services, while 3.2% directed towards real estate services. Additionally, expenditure on manufacturing commodities represents 13.7% of the total, with textiles and clothing accounting for 3% and chemicals representing 2%.

18

Figure 5. Household consumption pattern. Tanzania 2015.
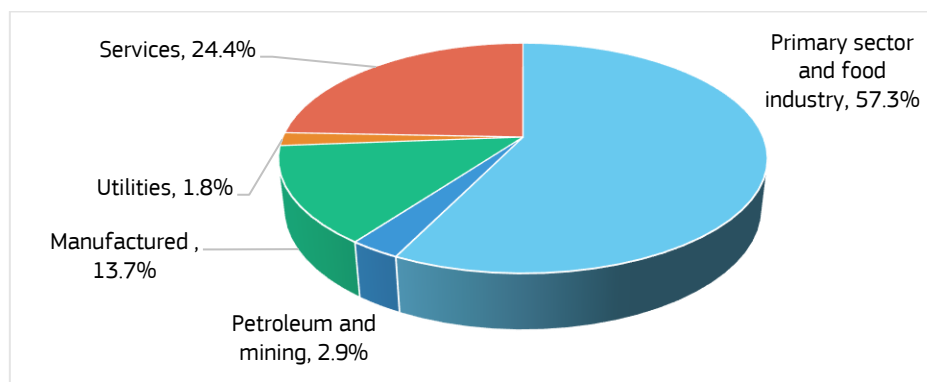
The composition of commodities in terms of exports and imports are presented in Figure 6. In the case of exports, the primary sector and food industry represent the 34.4%. Services represent 28.2%, while Petroleum and mining sectors make up 24.3% of the exports. Within the services, 19.9% corresponds to transports. For imports, the manufacturing sectors stand out with 59.6%, due to imports of chemicals (10.2%) and machinery and equipment (7.8%) (Figure 6).

Figure 6. Exports and imports composition. Tanzania 2015.
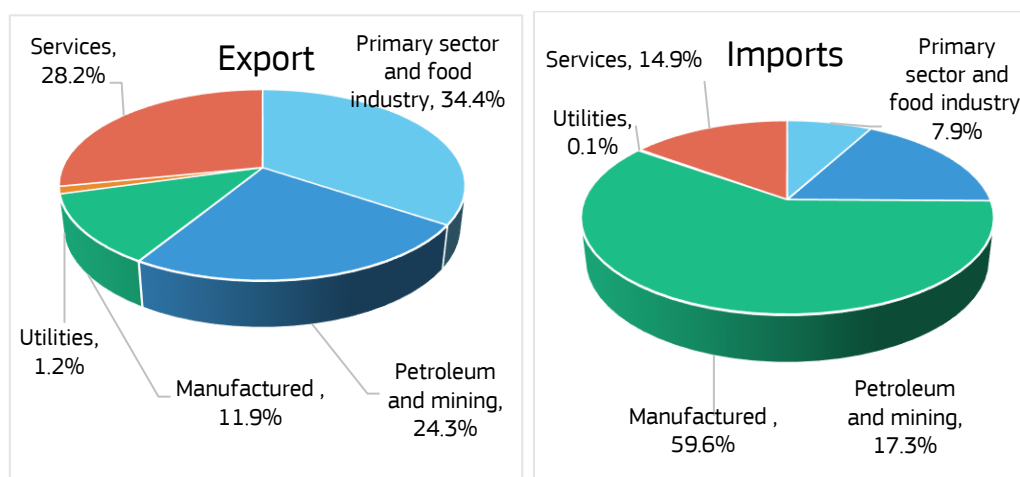
Focusing on the primary factors, labour and capital represent 66.58%, and 33.42% of the value added, respectively (Table 6). When analysing employment, urban labour represents nearly 65.5% of the workforce, with the majority being male and primarily engaged in the services sector. On the other hand, rural labour have a lower representation in the services sector, but they are prominent in the primary sector. Regarding capital, services take the lead with 37.31% of the capital allocation, followed by the primary sector (34.63%).

Table 6. Distribution of factors by aggregate activities. Tanzania 2015.

| Activity group | Labour | | | | Capital |
| | Rural | | Urban | | |
	Female	Male	Female	Male	
Primary sector	3.66%	15.39%	1.86%	5.62%	34.63%
Food industry	0.04%	1.02%	1.08%	0.73%	3.08%
Petroleum and mining	0.10%	3.24%	0.36%	0.83%	5.13%
Manufactured	0.17%	0.42%	1.09%	3.92%	5.37%
Utilities	0.00%	0.00%	0.32%	1.18%	1.11%
Construction	0.01%	2.34%	0.12%	9.00%	13.36%

Services	1.53%	6.56%	9.29%	30.11%	37.31%
Total	**5.52%**	**28.98%**	**14.12%**	**51.38%**	**100.00%**
% of the Value added	*66.58%*				*33.42%*

Continuing with the analysis of the labour distribution by activities (Figure 7), services stand out representing 47.5%, followed by the primary sector. As for capital, services play a significant role accounting for 37.3%, followed by the primary sector with 34.65%.

Figure 7. Distribution of factors by aggregate activities. Tanzania 2015.
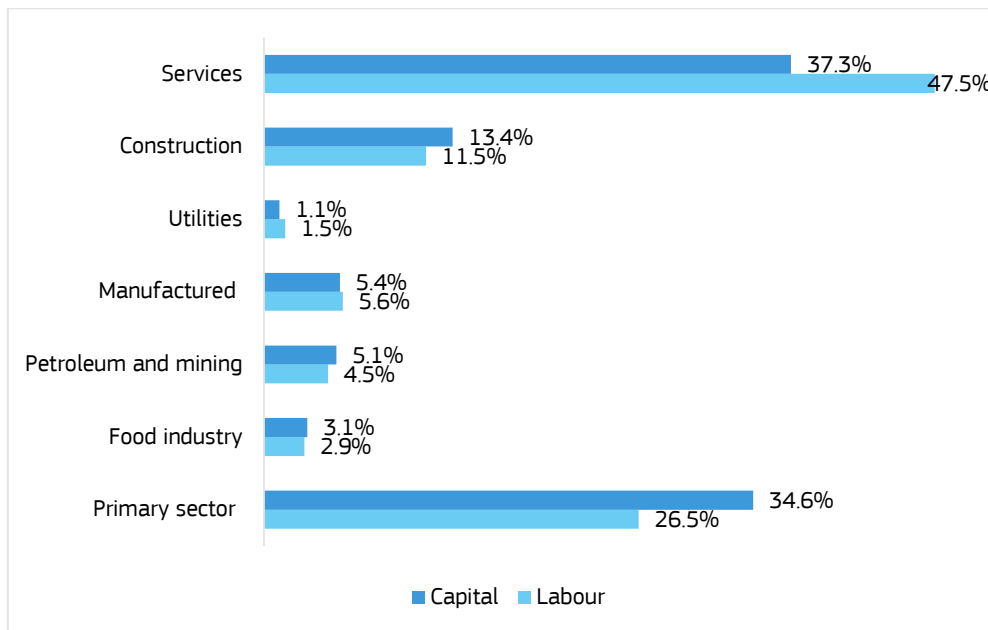
Moving on the distribution of household income by factors of production and transfers from enterprises, the government, and the rest of the world, Table 7 provides and overview. Approximately 89.6% of households' income comes from labour compensation, while 0.3% comes from capital incomes and 10.2% from transfers. The transfers received by the government are more concentrated in rural zones.

Table 7. Income distribution by household group. Tanzania 2015.

	INCOME		TRANSFERS		
	Labour	**Capital**	**Enterprise**	**Government**	**Rest of the World**
Tanzania Mainland	**89.6%**	**0.3%**	**7.3%**	**1.6%**	**1.3%**
Rural – quintile 1	70.7%	3.4%	5.7%	19.2%	1.0%
Rural – quintile 2	82.4%	1.5%	6.7%	8.3%	1.2%
Rural – quintile 3	86.3%	0.8%	7.0%	4.7%	1.2%
Rural – quintile 4	88.9%	0.4%	7.2%	2.3%	1.3%
Rural – quintile 5	90.6%	0.1%	7.4%	0.7%	1.3%
Urban – quintile 1	87.8%	0.6%	7.1%	3.2%	1.2%
Urban – quintile 2	89.8%	0.3%	7.3%	1.4%	1.3%
Urban – quintile 3	90.0%	0.2%	7.3%	1.2%	1.3%
Urban – quintile 4	90.1%	0.2%	7.3%	1.1%	1.3%

Urban - quintile 5	90.6%	0.1%	7.4%	0.6%	1.3%
Rural	**88.78%**	**0.41%**	**7.22%**	**2.34%**	**1.25%**
Urban	**90.04%**	**0.21%**	**7.32%**	**1.16%**	**1.27%**

Source: Own elaboration using the 2015 Tanzania SAM.

5 Conclusions

This report outlines the construction of the 2015 Social Accounting Matrix (SAM) for Tanzania, incorporating a satellite account focused on employment. The primary goal is to establish a comprehensive database that facilitates the execution and assessment of the nation's social, economic, and environmental policies and initiatives. The central aim of this undertaking is to furnish a robust database supporting the implementation and evaluation of Tanzania's developmental policies across social, economic, and environmental domains.

The resulting SAM will serve as a foundational resource for employing advanced economic modelling techniques like linear or general equilibrium modelling. This database proves especially valuable in modelling the repercussions of significant initiatives such as the African Continental Free Trade Area (AfCFTA), aiding in simulating various policy scenarios tied to trade liberalisation across Africa.

Furthermore, the SAM-based modelling approach aids in policy coordination across sectors by elucidating linkages and spillover effects within the economy. This helps policymakers discern potential trade-offs and synergies among various policy objectives, such as economic growth, environmental sustainability, and social welfare. This evidence-based decision-making process assists in crafting policies that promote sustainable development, inclusive growth, and address socio-economic challenges.

In summary, the newly presented Tanzania SAM for 2015 encompasses 327 accounts, including activities, commodities, labour, and capital, with detailed disaggregation for various parameters such as gender, region, and household quantiles. The report also highlights the SAM's availability for download from the DataM portal. Moreover, the framework underpins the "Jobs calculator" tool in the DataM portal, widely utilised for estimating job creation in both the EU and African countries.

Lastly, this is one of two report studies, with the second focusing on the development of the DEMETRA model and the implementation of policy scenarios related to AfCFTA.

References

Bacharach, M. (1970). Biproportional matrices and input-output change (Vol. 16). CUP Archive.

Boulanger, P., Dudu, H., Ferrari, E., & Mainar-Causapé, A. (2017). Matrice de comptabilité sociale désagrégée de l'économie sénégalaise en 2014 (No. JRC108772). Joint Research Centre (Seville site).

Breisinger, C., Thomas, M., & Thurlow, J. (2009). Social accounting matrices and multiplier analysis: An introduction with exercises (Vol. 5). Intl Food Policy Res Inst.

Burfisher, M. E. (2021). Introduction to computable general equilibrium models. Cambridge University Press.

Defourny, J., & Thorbecke, E. (1984). Structural path analysis and multiplier decomposition within a social accounting matrix framework. The Economic Journal, 94(373), 111-136.

El Meligi, A., Ferreira, V., Mainar Causapé, A., Philippidis, G., Ronzon, T., Ferrari, E. and M'barek, R., (2022). The food system in the wider bioeconomy: the BioSAM perspective, EUR 31107 EN, Publications Office of the European Union, Luxembourg, 2022, ISBN 978-92-76-53302-3, doi:10.2760/66011, JRC128716.

Eurostat (2008). Eurostat Manual of Supply, Use and Input-Output Tables. Luxembourg, Luxembourg, European Commission.

Ferreira V, Pié L, Terceño A., (2021). Economic impact of the bioeconomy in Spain: Multiplier effects with a bio social accounting matrix. Journal of Cleaner Production, No 298. https://doi.org/10.1016/j.jclepro.2021.126752

Ferreira, V., Almazán-Gómez, M., Nechifor, V., Ferrari, E., & Diallo, S. S. (2021). Social Accounting Matrix for Côte d'Ivoire 2015 (No. JRC125648). Joint Research Centre (Seville site).

Ferreira, V., Pié, L., Mainar-Causapé, A., & Terceño, A., (2023). The bioeconomy in spain as a new economic paradigm: the role of key sectors with different approaches. Environment, Development and Sustainability, pp. 1-25.

Guimbard, H., Jean, S., Mimouni, M., & Pichot, X. (2012). MAcMap-HS6 2007, an exhaustive and consistent measure of applied protection in 2007. International Economics, 130, 99-121.

Kuosmanen, T., Kuosmanen, N., El-Meligi, A., Ronzon, T., Gurria, P., Iost, S., M'Barek, R., (2020). How big is the Bioeconomy? Reflections from an economic perspective. EUR 30167 EN, Publications Office of the European Union, Luxembourg, ISBN 978-9276-17858-3, doi:10.2760/144526, JRC120324.

Mainar-Causapé, A., Philippidis, G., (2021). BioSAMs 2015 Estimation and basic considerations, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-37268-4, doi:10.2760/622777, JRC124810.

Mainar-Causapé, A., Philippidis, G., & Caivano, A. (2018). BioSAMs for the EU Member States: Constructing Social Accounting Matrices with a detailed disaggregation of the bio-economy (No. JRC111812). Joint Research Centre (Seville site).

Mainar-Causapé, A., Ferrari, E., & McDonald, S. (2018). Social accounting matrices: basic aspects and main steps for estimation (No. JRC112075). Joint Research Centre (Seville site).

Maskaeva, A., Mgeni, C., Msafiri, M., Kinyondo, G., Mbazi, E., Nechifor, V., El Meligi, A., Ferreira, V., (2024). The Impact of the African Continental Free trade Area on the Tanzanian Economy, Publications Office of the European Union, Luxembourg, JRC136637.

McDonald, S., Thierfelder, K., & Aragie, E. (2016). STAGE_DEV Version 2: August 2016. A Static Applied General Equilibrium Model: Technical Documentation, mimeo. Retrieved from http://www.cgemod.org.uk/STAGE_DEV.pdf

McDougall, R. A. (1999). Entropy theory and RAS are friends (No. 1237-2019-181).

Mengistu, A. T., Woldeyes, F. B., Dessie, E., Ayalew, Z., Yeshineh, A., Mainar-Causapé, A., Ferrari, E. Caivano, A. Castro-Malet, J. (2019). Ethiopia social accounting matrix 2015/16. Luxembourg: Publications Office of the European Union.

Miller, R. E., & Blair, P. D. (2009). Input-output analysis: foundations and extensions. Cambridge university press.

Morokong, T., & Ferrari, E. (2020). The launch of the Pan-African Network for Economic Analysis of Policies (PANAP) in Addis Ababa, Ethiopia. AgriProbe, 17(1), 40-41.

Pyatt, G., & Round, J. I. (1985). Social accounting matrices: A basis for planning. The World Bank.

Round, J. (2003). Constructing SAMs for development policy analysis: lessons learned and challenges ahead. Economic Systems Research, 15(2), 161-183.

Round, J. (2003). Social accounting matrices and SAM-based multiplier analysis. The impact of economic policies on poverty and income distribution: Evaluation techniques and tools, 14, 261-276.

Robinson, S., Cattaneo, A., & El-Said, M. (2001). Updating and estimating a social accounting matrix using cross entropy methods. Economic Systems Research, 13(1), 47-64.

Stone, R. (1947). Measurement of national income and the construction of social accounts: Report of the Sub-committee on National Income Statistics of the League of Nations Committee of Statistical Experts (Vol. 7). UN.

United Nations Statistical Commission (2009). System of national accounts 2008. European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations and World Bank, New York.

List of abbreviations and definitions

AfCFTA   African Continental Free Trade Area

CGE   Computable General Equilibrium

DataM   JRC data portal of agro-economic modelling

EAC   East African Community

ECCAS   Economic Community of Central African States

GDP   Gross Domestic Product

GFCF   Gross Fixed Capital Formation

HBS   Household Budget Survey

HPHC   Home Production for Home Consumption

ILFS   Integrated Labour Force Survey

JRC   Joint Research Centre

NPS   National Panel Survey

PANAP   Pan-Africa Network for Economic Analysis of Policies

RoW   Rest of the World accounts

RHG   Representative Household Group

SDG   Sustainable Development Goals

List of figures

List of tables

Annexes

Annex 1. Accounts of the 2015 Tanzania Social Accounting Matrix

HPHC Commodities	
Wheat	Cassava
Maize	Other roots and tubers
Rice	Pulses
Vegetables	Oilseeds
Fruits	Other crops
Sweet potatoes	Cash crops
Bovine cattle	
Ruminants	
Poultry	
Other Livestock	
Raw milk	

Marketed Commodities	
Wheat	Tobacco
Maize	Tea
Rice	Coffee
Other cereals	Sisal
Vegetables	Cloves
Fruits	Bovine cattle
Sweet potatoes	Sheep, goats, other ruminants
Cassava	Poultry
Other roots and tubers	Other livestock
Pulses	Raw milk
Oilseeds and oleaginous fruits	Support services to agriculture
Other crops	Products of forestry, logging and related services
Cotton	Fish; aquaculture products; support service
Cashew nuts	
Coal and lignite	Metal ores
Crude petroleum and natural gas	Other mining and quarrying products
Manufacture of food products	Manufacture of rubber and plastics products
Manufacture of beverages	Manufacture of non-metallic mineral products
Manufacture of tobacco products	Manufacture of basic metals
Manufacture of textiles	Manufacture of fabricated metal products.
Manufacture of wearing apparel	Manufacture of computer electronic and optical products
Manufacture of leather and footwear	Manufacture of electrical equipment
Manufacture of wood and products of wood and cork	Manufacture of machinery and equipment
Manufacture of paper and paper products	Manufacture of motor vehicles, trailers and semi-trailers
Printing and reproduction of recorded media	Other transport equipments
Manufacture of coke and refined petroleum products	Furniture
Manufacture of chemicals and chemical products	Other manufactured articles
Manufacture of basic pharmaceutical products	Repair and installation services of machinery and equipment
Electricity, gas, steam and air conditioning	Sewerage services; waste collection, treatment and disposal services
Natural water; water treatment and supply services	
Construction	
Wholesale and retail trade, repair services of motor vehicles and motorcycles	Insurance, reinsurance and pension funding services
Wholesale trade services, except of motor vehicles and motorcycles	Services auxiliary to financial services and insurance services
Retail trade services, except of motor vehicles and motorcycles	Real estate services and imputed rents of owner-occupied dwellings
Land transport and transport via pipelines	Professional, scientific, technical and veterinary services
Water transport	Rental, leasing and employment services
Air transport	Travel agency, tour operator and related services
Warehousing and support activities for transportation	Other administrative and support services
Postal and courier activities	Public administration and defence services; compulsory social security services
Accommodation services	Education services
Food and beverage serving services	Human health services
Publishing services	Social work services
Motion picture, video and television programme production services, others	Arts, entertainment and recreation services
Programming and broadcasting services	Services furnished by membership organisations
Telecommunications	Repair of computers and personal and household goods
Computer programming, data processing and information services	Other personal services
Financial services	Domestic services

Annex 2 – On-line resources.

The 2015 Social Accounting Matrix of Tanzania is available on the public website "EC Data-Modelling platform of resource economics DataM". Links can be also accessed with the QR codes listed in this annex.

Figure A2. QR code – DataM URL:

https://datam.jrc.ec.europa.eu

Source: JRC, 2024.

Bulk download

Using DataM, users can make a bulk download of SAM in a ZIP file containing a CSV file in English. The hyperlinks for the direct bulk download is in Figure A2 and Figure A3.

Figure A3. QR Code – direct bulk data download in English:

https://datam.jrc.ec.europa.eu/datam/perm/dataset/7c3f4d48-f213-4f88-b0af-bcd51e3119b4/download/dataset.zip

Source: JRC, 2024.

In the bulk download, the SAM is presented in a standard flat format as CSV file with header row. Conceptually, it contains a column for the spending agent, a column for the receiving agent and a column for the value in Millions of TZN shilling.

Interactive download

— DataM includes also a function for interactive download, which allows filtering the only part of interest of the datasets. Find the direct link for the SAM in the figure A4.

Figure A3. QR Code – direct link to the data warehouse page of the dataset in English:

https://datam.jrc.ec.europa.eu/datam/perm/dataset/7c3f4d48-f213-4f88-b0af-bcd51e3119b4

Source: JRC, 2024.

Interactive dashboard

— Users may explore and analyse the data through an interactive dashboard placed in the "PANAP network" section of the website (Figure A10).

Figure A4. QR Code – direct link to the SAM:

https://datam.jrc.ec.europa.eu/datam/mashup/SAM_TZ

Source: JRC, 2024.

— The interactive dashboard allows users to undertake their own analysis of the dataset.

— It consists of a number of sheets that allow analysing data from different perspectives.

Jobs calculator

— The jobs calculator is a tool included in DataM where the user can simulate changes of exports for products or services while dynamic charts will show you real-time the impact on employment in the different fields of the economics. It includes Tanzania among other African countries.

Figure A5. QR Code – direct link to the Jobs Calculator:

https://datam.jrc.ec.europa.eu/datam/mashup/JOBS_CALCULATOR?SAM=TZ

Source: JRC, 2024.

Open data portals

— In the period subsequent to the publication of this report, following pages will be gradually activated[4] on relevant open data portals, enabling to easily find this dataset on the web:

1. On the JRC Data Catalogue: https://data.jrc.ec.europa.eu/dataset/7c3f4d48-f213-4f88-b0af-bcd51e3119b4

2. On the EU Open Data Portal: https://data.europa.eu/euodp/data/dataset/7c3f4d48-f213-4f88-b0af-bcd51e3119b4

List of abbreviations and definitions

CSV   Comma separated value

QR code   Quick response code

XLSX   Microsoft Excel file format

---

[4] The time necessary for the activations of these services is beyond the control of the authors.

Science for policy

The Joint Research Centre (JRC) provides independent, evidence-based knowledge and science, supporting EU policies to positively impact society

EU Science Hub
joint-research-centre.ec.europa.eu

- @EU_ScienceHub
- EU Science Hub – Joint Research Centre
- EU Science, Research and Innovation
- EU Science Hub
- @eu_science