

# **Manoogian Simone Research Fund (MSRF)**

## **Constructing an up-to-date Social Accounting Matrix (SAM) for Armenia**

### **Final Report (including constructed final SAM in digital form)**

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### Abbreviations

AUA	American University of Armenia
BEC	Broad Economic Categories, version 5
BoP	Balance of Payments
CGE	Computable General Equilibrium
Cif.	Cost Insurance and Freight
COICOP	Classification of Individual Consumption by Purpose
COFOG	Classification of the Functions of Government
CPA	Central Product Classification
EEU	Eurasian Economic Union
HS	Harmonized Commodity Description and Coding System
PSRC	Public Services Regulatory Commission
EMSUIOT	Eurostat Manual of Supply, Use and Input-Output Tables
EU	European Union
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investments
FoB	Free on Board
GFSM	Government Finance Statistics Manual
IOT	Input-Output Table
MSRF	Manoogian Simone Research Fund
MOE	Ministry of Economy
MOF	Ministry of Finance
NACE	Statistical Classification of Economic Activities in the European Community
NEC	Not Elsewhere Classified
NES	Not elsewhere specified
NPISH	Non-Profit Organizations Serving Households
NSC	National Statistical Committee of Armenia
SIOT	Symmetric Input-Output Table
SNA	System of National Accounts
SUT	Supply and Use Table

### Preface

This document presents “Final Report (including constructed final SAM in digital form)”, developed under the Contract on Provision of Services for “Constructing an up-to-date Social Accounting Matrix (SAM) for Armenia” signed on May 07, 2021 between the American University of Armenia and the team of researchers led by Dr. Nairuhi Jrbashyan, Associate Professor at Yerevan State University (hereinafter referred to as the “Team” or “Research Team”).

The Report presents detailed description of the methodology and technical approach applied by the Research Team for SAM construction for Armenia and provides the actual results of SAM compilation. Excel files are attached to this report, including calculations of tables underpinning SAM construction, supply and use tables, SIOT table and the SAM.

### 1. Social Accounting Matrices: an overview of the concept and the structure

There are several definitions of Social Accounting Matrix (SAM), which could be summarized, as follows: “The SAM is a comprehensive, economy-wide database that records transactions between economic agents in a particular economy over a certain period”<sup>1</sup>.

SAM is a comprehensive accounting system, representing the processes of production, distribution and redistribution of income between all economic agents in the economy and the “rest of the world”, in a given period (usually a year).

The SAM consists of a set of connected subsystems that, on the one hand, give an analytical picture of the economy in a certain period and, on the other hand, serve as an instrument for assessing the effects of different changes (including policy effects) on the income flows. Unlike other economic accounting/statistical systems (national accounts, input-output and supply-use tables), SAM also covers the transactions of households and other institutions of the economy. That is why it is called the social accounting matrix.

The SAM provides a detailed and comprehensive snapshot of an economy and is being used to enhance decision-making, policy formulation and policy impact analysis processes. The SAM is a valuable source of essential information related also to external activities, trade and transport margins, distribution of factor earnings across economy, as well as of better understanding of wealth distribution within a country.

Spectrum of analysis inferred from a SAM varies from a set of fiscal policy tools, spillover estimations of economic shocks to analysis of climate changes and beyond. Moreover, significant number of cutting-edge analytical tools in the form of linear input-output, multi-sectorial or more sophisticated computable general equilibrium models (CGE) extensively rely on data provided by SAM. Development and implementation of mentioned tools can significantly increase the quality of evidence-based decision-making, and seriously boost overall efficiency and effectiveness of economic policymaking.

As noted by leading experts in the field of macro-calculations, the roots of the concept of SAM go back to the French economist Francois Quesnay, who first reflected the basic concept of SAM in "Tableau Economique"<sup>2</sup>. Then, development of the theory of Input-Output analysis in 1930s largely contributed to the SAM concept development<sup>3</sup>. Further development is attributed to R. Stone, who developed the idea of integrating the disaggregated production accounts (in the form of input-output systems) into the national accounts. He developed and applied the methodology of SAM construction in the first published SAM (based on the UK economy) in 1960<sup>4</sup>. Then, G. Pyatt<sup>5</sup>, J. Round, B. King<sup>6</sup>, E. Thorbecke<sup>7</sup> and others have a significant input in formalizing the concept of the SAM and facilitating its use as a formal framework for economic analysis and planning. Significant development in implementing the SAM concepts was performed by S. Keuning, who

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<sup>1</sup> Alfredo Jose Mainar-Causapé et al. “Social Accounting Matrices: basic aspects and main steps for estimation”, European Commission, Publications Office of the European Union, 2018.

<sup>2</sup> G. Pyatt, J. Round “Social Accounting Matrices: A Basis for Planning”. WB, USA, 1985.

<sup>3</sup> Input-output analysis/table was developed by Wassily Leontief. Leontief is credited with developing early contributions to input-output analysis and received the Nobel Prize in Economics (1973) for development of the associated theory.

<sup>4</sup> Stone, R. (with Alan Brown and others) “A Social Accounting Matrix for 1960”. No. 2 in “A Programme for Growth”, Chapman and Hall, London, 1962. Richard Stone was awarded the Nobel Prize for his work on the national account system in 1984.

<sup>5</sup> G. Pyatt. “SAMs, the SNA and National Accounting Capabilities”. In Review of Income and Wealth, Series 37, No. 2, 1991.

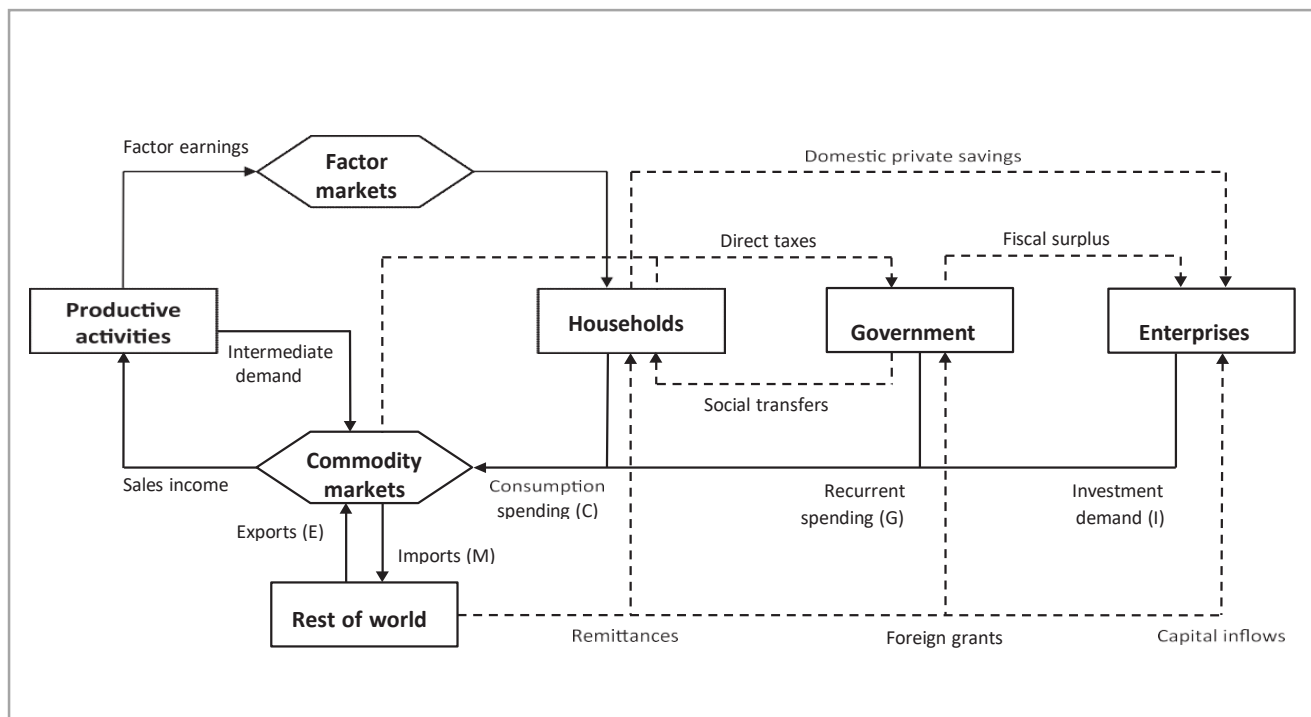
<sup>6</sup> B. King. “What is a SAM? A layman's guide to social accounting matrices”. WB Staff working paper; no. SWP 463. Washington, DC: World Bank, 1981.

<sup>7</sup> E. Thorbecke. “The Use Of Social Accounting Matrices In Modeling”. Conference Paper in 26th General Conference of the International Association for Research in Income and Wealth. Cracow, Poland, 27 August - 2 September 2000.

presented the concepts and numerical examples of a System of Economic and Social Accounting Matrices and Extensions (SESAME), which encompasses a whole family of SAM modules<sup>8</sup>. Covering all economic agents, SAMs have become a powerful instrument for estimation of expanded general economic models - such as computable general equilibrium (CGE) models, which in contrast to the previous models (based on input-output tables), covers also the relationships between economic output and the living standards/welfare.

Thus, to represent the whole socio-economic system, the SAM highlights the inter-linkages and the circular flow of payments and receipts between the different components of the system such as goods, activities, factors, and institutions. To capture all these flows, the SAM includes different accounts. The typical SAM usually includes 6 basic groups of accounts: productive activities, factor accounts, private institutions' (households and enterprises) and government (public) institutions' accounts, capital (combined) and rest of the world accounts. Each account is splitted/disaggregated into several more detailed accounts and the final dimension of the SAM depends on the level of this disaggregation. The circular flows of income represented in a SAM include all transactions: productive activities acquire factors - land, labor, and capital, as well as intermediate inputs from commodity markets, and use these to produce goods and services. The produced goods and imported services then sold through commodity markets to institutions - households, government, enterprises, and to the rest of the world. Each institution's expenditure becomes another institution's income. The inter-institutional transfers (taxes, transfers, etc.) are also represented in the circular flows.

Figure 1-1. Economy-wide simplified circular flows of income in a basic SAM



Source: C. Breisinger, M. Thomas, and J. Thurlow. "Social accounting matrices and multiplier analysis: An introduction with exercises". International Food Policy Research Institute. Washington, D.C, 2009

<sup>8</sup> S. Keuning and W.A. de Ruijter. "Guidelines to the Construction of a Social Accounting Matrix", in Review of Income and Wealth, Series 34, Number 1, March 1988.



A SAM is a square matrix in which each account is represented by a row and a column. Each cell shows the payment by column account to the account in the row. Thus, incomes of an account are shown in the row and payments - in the column. In each SAM account, total incomes are equal to the total payments, and the total of each row is equal to the corresponding column total.

In SAM, each account is represented by a row and a column. Thus, SAM is a square matrix, where each cell shows the payment made by the account in the corresponding column to the account in the corresponding row. Thus, the account's revenues are displayed in the row, while payments are displayed in the column. For each account, total revenues (total amount of each row in SAM) are equal to total payments (total amount of corresponding column in SAM).

Production activity accounts represent all agents that produce goods and services (i.e. commodities) and thus provide the domestic production volume by activity. Total volume of domestic production, imports, net product taxes, and margins in sum gives the volume of the total supply of commodities. The supplied commodities are being sold domestically or exported. Activity expenditures reflect the use of commodities as intermediate inputs and the use of factors of production (labor, capital, land, etc.). Activity incomes report the value of the commodities produced, in basic prices<sup>9</sup>.

Commodity incomes record intermediate consumption and final demand (consumption by institutions) as well as investments and exports, while expenditures represent the domestic production by activities, imports and payment of taxes. Commodity supply is valued at purchaser prices<sup>10</sup>s.

The production factors receive income from productive activities and the Rest of the World. These incomes are being distributed to households, enterprises and the government domestically, and to the Rest of the World.

Households are owners of production factors, thus they collect incomes from the factors, which are being supplied to domestic or foreign markets, as well as from the transfers made by the government, enterprises, the Rest of the World and other households. Households' expenditures are being employed to use/consume commodities, to pay the direct taxes and to make transfers to other institutions. Disaggregation of household accounts is one of the most important issues during the SAM construction. It depends on the availability of the relevant data. Subject to the purposes of SAM construction, different disaggregation levels of households are being applied: geographic, living standards, etc.

Enterprises implement their own activities and receive payments related to asset ownership and transfers from other institutions. These revenues are being used to pay taxes, transfers to other institutions or to make savings.

General government receives incomes for transferring own production factors, transfers and taxes. It uses its income to buy goods and services, to transfer money to other institutions (households and enterprises) or to the rest of the World. The difference between income and expenditure represent the government savings.

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<sup>9</sup> “The **basic price** is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output minus any tax payable, and plus any subsidy receivable, by the producer as a consequence of its production or sale. It excludes any transport charges invoiced separately by the producer.” Source: World Bank. 2009. *System of national accounts 2008 (English)*. Washington, DC: World Bank.

<sup>10</sup> “The **purchaser's price** is the amount paid by the purchaser, excluding any VAT or similar tax deductible by the purchaser, in order to take delivery of a unit of a good or service at the time and place required by the purchaser. The purchaser's price of a good includes any transport charges paid separately by the purchaser to take delivery at the required time and place.” Source: World Bank. 2009. *System of national accounts 2008 (English)*. Washington, DC: World Bank.

Capital account reflects the savings generated by all domestic institutions as well as transfers of capital from the Rest of the World (in row). In the column it presents the investment expenditure in goods and services to produce new capital, the Gross Fixed Capital Formation and changes in inventories, including investment in the economy.

The Rest of the World account's incomes are related to the imports of commodities, payments to the factors of production from outside and transfers from the domestic institutions to institutional sectors elsewhere. Foreign sector accounts expenditures are the purchase of goods and services (exports), payments to national factors of production used abroad and transfers recorded from other economies. The balance reflects the current account (surplus or deficit) with the Rest of the World.

In a SAM, trade flows are being computed adding transaction costs (trade and transport margins). Trade and transport margins for domestic production sold on the domestic market or exported represent the cost of moving the product from producers to consumers or dock gate. For imported products, margins represent the cost of transferring the goods from dock gate to domestic consumers.

The main data sources to achieve this aim are statistical systems of National Accounts, household, labor force surveys, government budget accounts, trade statistics, tax statistics, balance of payments statistics, etc.

Depending on the data availability, the so-called "bottom-up" or "top-down" approaches to SAM construction could be applied. The bottom-up approach envisages starting the compilation directly from the National Accounts and the SUT framework and estimating the relationships between agents and institutions in a disaggregated way from the beginning. The necessary transformations in this case are being made later, to achieve consistency with the macroeconomic aggregates and come up with the macro-SAM. The "top-down" approach suggests estimation of a Macro-SAM - based on the aggregated data coming from National Accounts and several other different sources. The Macro-SAM is then has to be disaggregated with the desired degree of economic activities, commodities, production factors, representative households groups, taxes and subsidies, institutional sectors and the rest of the World accounts. Then, the balancing procedure has to be applied, using additional statistical data or econometric optimization methods (like RAS or Cross Entropy Method).

The SAM consists of sub-matrices. The basic/simplified structure of the SAM by sub-matrices as the Joint Research Centre (JRC) of the European Commission's science and knowledge service recommends it, is presented below:

## Constructing an up-to-date Social Accounting Matrix (SAM) for Armenia

Table 1-1. A Social Accounting Matrix (SAM) standard structure by sub-matrices

	Commodities	Margins	Activities	Factors	Households	Enterprises / Corporations	Government	Savings-Investment	Rest of the World	Total
Commodities (C)		$T_{C,M}$ Transaction costs (trade / transport)	$T_{C,A}$ Intermediate (inputs) consumption		$T_{C,H}$ Household consumption		$T_{C,G}$ Government expenditure	$T_{C,S-I}$ Investment and stock changes	$T_{C,ROW}$ Exports	Demand
Margins (M)	$T_{M,C}$ Transaction costs (trade / transport)									Margins
Activities (A)	$T_{A,C}$ Domestic production									Gross output / Production (activity income)
Factors (F)			$T_{F,A}$ Remuneration of factors / Factor income						$T_{F,ROW}$ Factor income from RoW	Factor income
Households (H)				$T_{H,F}$ Factor income distribution to households	$(T_{H,H})$ (Inter Households transfers)	$T_{H,E}$ Distribution of corporations income to households	$T_{H,G}$ Government transfers to households		$T_{H,ROW}$ Transfers to Households from RoW	Household income
Enterprises (E)				$T_{E,F}$ Factor income distribution to enterprises			$T_{E,G}$ Government transfers to enterprises		$T_{E,ROW}$ Transfers to Enterprises from RoW	Enterprise income
Government (G)	$T_{G,C}$ Net taxes on products		$T_{G,A}$ Net taxes on production	$T_{G,F}$ Factor income to Government / Factor taxes	$T_{G,H}$ Direct Household taxes / Transfers to Government	$T_{G,E}$ Direct Enterprise taxes / Transfers to Government			$T_{G,ROW}$ Transfers to Government from RoW	Government income
Savings-Investment (S-I)				$(T_{S-I,F})$ (Depreciation)	$T_{S-I,H}$ Household savings	$T_{S-I,E}$ Enterprise savings	$T_{S-I,G}$ Government savings	$(T_{S-I,S-I})$ (Capital accounts transfers)	$T_{S-I,ROW}$ Capital transfers from RoW (Balance of Payments)	Savings
Rest of the World (RoW)	$T_{ROW,C}$ Imports			$T_{ROW,F}$ Factor income distribution to RoW	$T_{ROW,H}$ Household transfers to RoW	$T_{ROW,E}$ Corporations income to Row	$T_{ROW,G}$ 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: Alfredo Jose Mainar-Causapé et al. "Social Accounting Matrices: basic aspects and main steps for estimation", European Commission, Publications Office of the European Union, 2018.

## 2. Social Accounting Matrix and Supply and Use tables’ framework

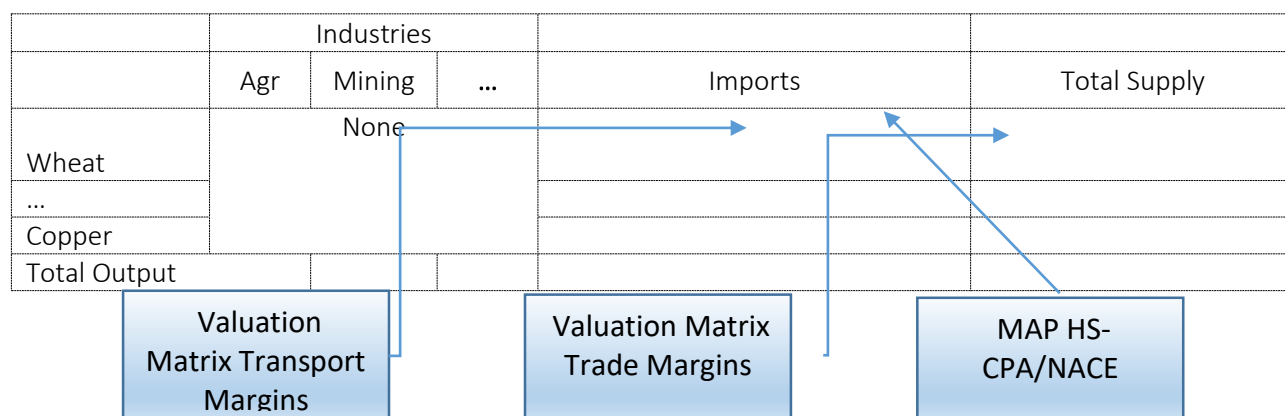
A SAM is an extension of the Symmetric Input-Output Table (SIOT). The latter provides the detailed portrayal of inter-sectorial relations. The estimation of a SAM requires taking as a basis the information provided by Input-Output framework or by modern frameworks with the most detailed Supply and Use tables (SUTs).

“Supply and use tables provide a detailed picture of the supply of goods and services by domestic production and imports and the use of goods and services for intermediate consumption and final use (consumption, gross capital formation, exports). The use table also shows how the components of value added (compensation of employees, other net taxes on production, consumption of fixed capital, net operating surplus) are generated by industries in the domestic economy. Thus, supply and use tables give detailed information on the production processes, the interdependencies in production, the use of goods and services and generation of income generated in production”<sup>11</sup>.

The Supply and Use Tables (SUTs) are an integral part of the System of National Accounts (SNA) forming the central framework for the compilation of an estimate of the GDP. The SUTs consist of two interlinked tables: the Supply Table and the Use Table. The Supply Table shows the supply of goods and services by type of product and by type of industry differentiated between the supply by domestic industries and imports of goods and services.

Thus, **Supply Table** introduces supply of goods and services to domestic economy within a given time period. It includes some valuation sub-matrices, necessary for transformation from basic into the purchaser’s prices. Typically, three different matrices in this stage are required, i.e. differentiation between output for own use, output for market use and output for non-market use. The totals in the last column represent the total supply by products and the totals in the bottom row represent the total output by economic activity and total imports.

*Table 2-1. Simplified structure of the Supply Table at basic prices and transformation components to purchaser’s prices*



<sup>11</sup> “Eurostat Manual of Supply, Use and Input-Output Tables”, Eurostat, EC, 2008.

## Constructing an up-to-date Social Accounting Matrix (SAM) for Armenia

Taking into account, that any good or service that is presented in the market should be either imported or produced domestically, two separate tables need to be introduced. The first is domestic output table representing outputs of industries by different types of products. This matrix represents output of domestically produced goods and services. The columns stand for industries, whilst the rows is for a product(s) that are the result of activities. Any row entry of the table stands for the output of that product produced by corresponding industry. Thus, the row dimension of the table portrays production of some product by various industries.

As can be inferred from the structure of the table, diagonal entries correspond to the volumes of primary activity of any industry whilst off-diagonal elements stands as an output of a secondary activity of the corresponding industry.

Table 2-2. An Overview of General Supply Table: An Illustration

		Industries			Output At Basic Prices	Imports	Total Supply At Basic Prices	
		01.11	...	10.12				Σ
<b>Products</b>	01.11.11	Wheat	<b>Domestic Output</b>					
	01.11.31	Barley						
	01.11.70	Leguminous crops						
	...	...						
	10.51.40	Cheese and curd						
	23.52.20	Plaster						
	24.10.12	Ferro-alloys						
	...	...						
	61	Telecommunication						
	49	Land trans.						
	56	Food and beverages						
<b>Total</b>								
<b>Adjustments</b>		CIF Fob						
		...						
		Direct Purchases Abroad						
<b>Total</b>								
	<i>Of which</i>							
		<i>Market output</i>						
		<i>Output for own final use</i>						
		<i>Non-market output</i>						

Source: Handbook on Supply, Use and Input-Output Tables with Extensions and Applications. New York, UN DESA, 2018

The **Use Table** typically represents the use of goods and services by product or industry, intermediate consumption by industry, final consumption expenditure, gross capital formation and exports. The use table also shows the components of gross value added compensation of employees, other taxes less subsidies on production, consumption of fixed capital as well as net operating surplus. While the totals by row represent the total uses by product, the total by column represent the total output by economic activity, total final consumption, total gross fixed capital formation and total exports.

*Table 2-3. Simplified structure of the Use Table*

	Industries			Agents of Final Consumption				Exports	Total Demand/Use
	Agr.	Min	...	HH 1	...HH N	Government	Capital Formation		
Wheat	Intermediate Use								
...									
Value Added									

Valuation Matrix  
Taxes and  
Subsidies on

MAP HS-  
CPA/NACE

Use Table typically contains four integral parts

- Matrix of intermediate consumption at purchasers’ prices;
- Vector of Exports;
- Matrix of final demand at purchasers’ prices;
- Matrix of value added at basic prices.

The classification of products, in practice, is often more detailed than the classification of industries thus generating rectangular SUTs.

There are three basic identities that hold between the Supply Table and the Use Table<sup>12</sup>, which are fundamental in the balancing process when compiling SUTs. The identities are:

Output = Intermediate consumption + Gross Value added (GVA).

Output + Imports = Intermediate consumption + Final consumption + Capital formation+ Exports.

For each industry, the Gross Value Added (GVA) using the production approach = the GVA estimate using the income approach.

<sup>12</sup> “Handbook on Supply, Use and Input-Output Tables with Extensions and Applications”. New York, UN DESA, 2018

## **Constructing an up-to-date Social Accounting Matrix (SAM) for Armenia**

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Once balanced, the Supply Table and the Use Table can be integrated into a single matrix - referred to as the Supply and Use Tables framework. Balancing usually reveals errors and inconsistencies caused by the data and in the end, inconsistencies are dealt with and removed.

Table 2-4. Simplified structure of the SUT framework

		Products				Industries				Final uses			Total
		Agriculture, forestry, etc.	Ores and minerals; etc.	...	Services	Agriculture, forestry, etc.	Mining and quarrying	...	Services	Final consumption	Gross capital formation	Exports	
Products	Agriculture, forestry, etc.					Intermediate consumption by product and by industry				Final uses by product and by category			Total use by product
	Ores and minerals; etc.												
	...												
	Services												
Industries	Agriculture, forestry, etc.	Output by product by industry											Total supply by industry
	Mining and quarrying												
	...												
	Services												
Value added						Value added by component and by industry							Value added
Imports		Total imports by product											Total Imports
Total		Total supply by product				Total output by industry				Total final uses by category			

Source: Handbook on Supply, Use and Input-Output Tables with Extensions and Applications. New York, UN DESA, 2018

Compilation of Supply and Use tables are always interlinked. More precisely, for each product or group of products total supply at purchaser’s prices should be equal to the total use in the purchaser’s price. In other words, the demand for any product should be equal to its supply. Another interconnection of supply and use tables is so-called input-output identities stating that for each industry total output should be equal to total inputs of that industry. In statistical terminology - output at basic prices should be equal to the intermediate use of that industry at purchaser’s prices, plus value added by the industry.

The SUTs bring together the components to measure the GDP by production, income and expenditure sides.



Table 2-5. Calculations of GDP by Different Approaches

Production approach	Income approach	Expenditure approach
Total Output At Basic Prices  - Intermediate consumption at purchasers prices     =Gross Value Added At Basic Prices  +Taxes less subsidies on products  =GDP	Compensation of employees +Other taxes on production  +Consumption of fixed capital +Operating surplus, net -Subsidies on production  =Gross Value Added At Basic Prices  +Taxes less subsidies on products  =GDP	Private consumption +Government consumption  + Gross fixed capital formation + Change in inventories + Exports - Imports  =GDP

Source: System of National Accounts 2008 - 2008 SNA. UNSTATS, <https://unstats.un.org/unsd/nationalaccount/sna2008.asp>

In order to obtain main macroeconomic identities introduced in **Table 6**, all the components of Supply and Use tables should be estimated, including:

- Output at basic prices by industry and by product
- Imports Cif. by product;
- Trade and transport margins by commodity;
- Taxes and subsidies on products;
- Intermediate consumption by industry;
- Private, individual and collective consumption by purpose;
- Gross fixed capital formation by category;
- Changes in inventories;
- Exports FoB by product.

The SUT framework forms the basis for deriving input-output tables (IOT) by applying certain assumptions on the relationship between outputs and inputs. An IOT focuses on the inter-relationships between industries in an economy with respect to the production and uses of their products and the products imported from abroad. The main difference between SUTs and IOTs is the consideration of multi-production and by-products and the possibility to incorporate differences in input structure for activities that can produce the same commodity. The SUT considers different activities producing the same commodity, and activities producing multiple commodities. The IOT supposes homogenous economic branches (commodities or activities) with a direct one by one mapping (one activity to one commodity). Having the mentioned limitation, IOTs, however, are being

compiled for analytical purposes, which are based on models that depend on a set of simplifying assumptions. For this reason, the further compilation of SUT to IOT is usually being applied.

### 3. The practice of construction of SAM in Armenia

Taking into account, that the SAM provides a comprehensive data set for analyzing key socio-economic issues related to production, employment, poverty, growth and income distribution, food security, environmental resources, trade, etc., the demand for SAM is constantly growing over last few decades among decision makers and academics.

Thus, absence of SAM for any economy should be viewed as a serious limitation in efforts of policy makers and academics to design and evaluate economic processes, government policies and programs in a sound quantitative base.

Despite the growing importance of SAMs, the experience of SAM and input-output tables (IOT) construction in Armenia remains limited, at least at the institutional level. In the Soviet period, in accordance to the requirements of the planning economy, the State Planning Committee annually developed inter-sectorial balance sheets, which can be considered as a prototype of IOTs. After the collapse of the Soviet Union and gaining independence in early 1990s, the dramatic change of the structure of economy and the subsequent loss of industrial capacities led to termination of the development of inter-sectorial balance sheets.

After the independence, the first attempt of SAM construction was performed in 2002, when with the efforts of World Bank Team (Artsvi Khachatryan, Ekaterina Vashakmadze) and professor of the University of Colorado Miles K. Light the Armenian SAM had been constructed and presented. Construction methodology relied on top-down approach, where with the usage of aggregate macro figures compiled by Statistical Committee of Armenia (SCA) - so called Macro SAM, had been constructed. It was a representation of SNA accounts in a single table through main macroeconomic identities. Then obtained Macro SAM was further disaggregated using production and government activities and other relative statistics on hand. At the end, the SAM for households, disaggregated by their income and factor supplies had been added to the existing SAM. The final SAM incorporates 25 economic activities, along with 20 different household groups distributed by their incomes. Table handles four types of production factors, which - as it is claimed by the report covering it, can be successfully implemented for understanding interrelationships of growth within the sectors as well as their linkages to poverty and employment<sup>13</sup>.

The next attempt was the development of the industry-by-Industry symmetric input-output table (SIOT) for Armenia, which was performed by the SCA in 2006, with the technical assistance of the EU TACIS project. The table covers 17 economic activities by the second level of NACE\_1 classification, but in contrast to the previous one, is dealing with only one single household and employ only two types of production factors<sup>14</sup>. The documentation on the general methodology applied for compilation of the SIOT is not available, while the trade and transport margins presumably used for compilation of appropriate parts of it are reported.

After 2006, no more reports or data were published on any activity related to the SAM or update of input-output table in Armenia. Thus, the construction of an updated SAM for Armenia is essential in terms of both decision-making and academic activities.

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<sup>13</sup> "The Caucasian Tiger. Sustaining Economic Growth in Armenia", Saumya Mitra et al., World Bank, 2007

<sup>14</sup> "Input-Output Table 2006", <https://www.armstat.am/en/?nid=202>

### 4. Data sources reviewed for Armenia SAM construction

For elaboration of a methodology for construction of an updated SAM for Armenia, the Research Team firstly reviewed the theoretical and practical literature on the SAM, IOT and SUT construction methodologies, guidelines and manuals related to National Accounts and SAM construction. The list of reviewed literature included, but was not limited to:

- European Commission (2018). Social Accounting Matrices: basic aspects and main steps for estimation. (Luxembourg: Publications Office of the European Union, 2018);
- EUROSTAT (2008). Eurostat Manual of Supply, Use and Input-Output Tables. (Luxembourg, European Commission);
- UN DESA (2018). Handbook on Supply, Use and Input-Output Tables with Extensions and Applications (New York, UN DESA);
- Eurostat (2008) NACE Rev. 2 Statistical classification of economic activities in the European Community, European Commission 2008. <https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-RA-07-015>;
- Eurostat (2008) CPA 2008 structure and explanatory notes. <https://ec.europa.eu/eurostat/web/cpa-2008>;
- World Bank (2009). System of national accounts 2008. (Washington, DC);
- System of National Accounts (1993 and 2008). System of National Accounts (SNA). United Nation website: <http://unstats.un.org/unsd/nationalaccount/sna.asp>;
- ADB (2012) Supply and Use Tables for Selected Economies in Asia and the Pacific. A Research Study (Manila, Philippines);
- Saumya Mitra et al (2007) “The Caucasian Tiger. Sustaining Economic Growth in Armenia”, World Bank, 2007
- Pyatt, G.; Round, J. (1985) Social Accounting Matrices: a Basis for Planning (Washington, The World Bank);
- Pyatt, G. “SAMs, the SNA and National Accounting Capabilities”. In Review of Income and Wealth, Series 37, No. 2, 1991.
- Pyatt, G. (2001) Some Early Multiplier Models of the Relationship between Income Distribution and Production Structure, Economic Systems Research, 13 (2), pp. 139-163;
- Pyatt, G. (1991) Fundamentals of Social Accounting, Economic Systems Research, Vol. 3, No 3, pp. 315-341.
- Stone, R. (with Alan Brown and others) “A Social Accounting Matrix for 1960”. No. 2 in “A Programme for Growth”, Chapman and Hall, London, 1962.
- B. King. “What is a SAM? A layman's guide to social accounting matrices”. WB Staff working paper ; no. SWP 463. Washington, DC: World Bank, 1981.
- Breisinger, C., Thomas, M. and Thurlow, J. “Social accounting matrices and multiplier analysis: An introduction with exercises”. International Food Policy Research Institute. Washington, D.C, 2009
- E. Thorbecke. “The Use of Social Accounting Matrices In Modeling”. Conference Paper in 26th General Conference of the International Association for Research in Income and Wealth. Cracow, Poland, 27 August - 2 September 2000.

In order to carry out SAM construction, the Research Team reviewed: i) publicly available (published) data sources (publications) and databases for SAM construction for Armenia; ii) reporting forms through which the

## Constructing an up-to-date Social Accounting Matrix (SAM) for Armenia

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NSC collects the raw data from economic agents and their filling guidelines; iii) openly available other data sources.

The list of reviewed publicly available data sources (publications) for SAM construction for Armenia included, but was not limited to the following publications and open databases of the NSC:

- National Accounts of Armenia;
- Statistical yearbook of Armenia;
- Armenia in figures;
- Socio-Economic Situation in RA;
- Agricultural Census 2014;
- The Total Sums of Census on Sown Area Under Agricultural Crops;
- Realization (Use) of Agricultural Product by individual (rural) households;
- Sum Totals of Exhaustive Livestock Census;
- Output of Main Commodities in the Industrial Organizations;
- Main Indicators of Industrial Organizations by Sizes Based on Number of Employees and by Economic Activities;
- Main Indicators of Industrial Organizations by Economic Activities;
- Construction in the Republic of Armenia;
- Foreign Trade of the Republic of Armenia;
- Prices and Prices Indexes in the Republic of Armenia;
- Trade and Transport Margins;
- Social snapshot and poverty (household living standard surveys);
- Labor market in Armenia.

The list of reviewed openly available and other data includes the following resources:

- State Budget Execution Reports (MOF);
- Balance of Payments of Armenia (CBA);
- National Accounts Database (NSC);
- Household's Integrated Living Conditions Survey anonymized database -2018 (NSC);
- The database of annual mandatory reports submitted to NSC by enterprises<sup>15</sup>. (NSC);
- Information of 1000 largest taxpayers (TAX Service);
- FAOSTAT databases (<http://www.fao.org/faostat/en/#data>);
- Social Accounting Matrices of different countries (Spain, Ireland, Japan, other OECD countries), available online.

The summary of analysis of the available data sources carried out by the Research Team allowed coming up with the main data gaps and limitations for SAM construction. The main characteristics of the SAM, taking into account the existed data limitations are described below.

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<sup>15</sup> 11-ՀՄ -annual; 1-սարք -annual; 1-ԷՀ; 1-ՏԳ-annual; 1-ԳԻՆ -production; 1- tariff (vehicles); 1-tariff (railway); 1-tariff (pipes); 1-tariff (aviation); 1-ԿՇ -annual:

### 5. Steps of SAM construction, assumptions, coverage and some methodological issues

**Steps to Construct a SAM.** As “Eurostat Manual of Supply, Use and Input-Output Tables” points out: construction of input-output tables is solving puzzle with big datasets coming from set of heterogeneous data sources. This procedure, in the absence of appropriate information can be quite laborious and challenging. Experience shows that limitations and disparities appear mostly in phases of actual compilation. Hence, it is nearly impossible precisely estimate the size of the final product in advance. Therefore, final design and overall coverage of SAM and related tables could objectively be less detailed than one could envision beforehand. Much will depend on availability and consistency of data, success in valuation procedures and balancing.

In this respect, the Team applied the following procedures to construct the final SAM:

1. Full Review of all necessary literature, information/data, assessment of shortages;
2. Compilation of the 2018 proto macro-SAM based on macro aggregates/data ;
3. Estimation of necessary components of SAM: underpinning tables (Output at basic prices by industry and by product; Imports Cif. by product; Trade and transport margins by commodity; Taxes and subsidies on products; Intermediate consumption by industry; Private, individual and collective consumption by purpose; Gross fixed capital formation by category; Changes in inventories; Exports FoB by product).
4. Construction of Supply and Use tables;
5. Compilation of balanced Symmetric Input-Output Table (SIOT);
6. Transformation of SIOT into final unbalanced Social Accounting Matrix.

**Main Assumptions.** We assume an open economy with following institutions: Government (including non-profit institutions serving households (NPISH)), financial and non-financial enterprises, and households. Taking into account the requirement of the ToR of the assignment, the SAM represents 10 different households separated based on their living standards (consumption expenditure deciles). Labor and Capital are presented as the main factors of production. The SAM was constructed for 2018. While the proto macro-Sam is constructed based on the macro data/aggregates, the SIOT and the final SAM are constructed based on the “bottom-up” approach.

**Coverage of industries and products/services.** The final SAM includes 103 industrial sectors (corresponding to NACE-2 classification) and 157 groups of commodities (corresponding to the CPA classification). The lists, group labels and CPA codes of industries and commodities included in the final SAM are attached to this report as an Excel file “Industries and Commodities.xlsx”.

#### Methodological issues.

Construction of the domestic output table:

- Primary approach of populating the domestic output table required merging the information from two separate reporting forms (and, correspondingly, maybe two different databases in NSC) at the level of predetermined industries for manufacturing, mining, utilities and broad categories of services. However, given the gaps present in the data from NSC in the mentioned forms, the Team had developed new methodological line for estimations.

Valuation:

- The source data for SUTs compilation have different valuations. In particular detailed industry output is valued at basic prices, while intermediate consumption and final uses are valued at purchaser’s prices.

In case of exports, we have valuation at FoB, and in case of imports at Cif. prices. The price adjustments were made for compilation.

Trade and transport margins:

- Despite the existence of clear methodological line for compiling trade and transport margins for input-output tables, there is currently no fresh information that can be directly applied. The only structured survey related to these data dates back to 2009, significantly limiting their direct implementation. To this end, trade and transport margins had been updated using producer and purchaser price indexes. The applied approach is presented in the appropriate section of this Report.

Intermediate Consumption:

- The NSC officially provides the volumes of intermediate consumption only for aggregated industries. Compilation of mentioned statistics for industries was intended to comply based on the additional data received from the NSC (annual mandatory financial reports form titled as “1-F annual”, being submitted to NSC by enterprises). Taking into account absence of the data from NSC, the Team have no option other than covering this part of table using mix of official statistics (part of intermediate demand for a list of products can be derived from official statistics), estimation techniques and approximations based on the statistics of other countries (See the appropriate sections).
- Imports and exports:  
Data on the trade of products are publicly available at 10\_digit HS codes. The level of detail covered by the mentioned classification allowed the mapping of the products to the working dimensions of the matrix very accurately.
- Services are available at classification of BoP statistics and are valued at FoB prices. Thus, the Cif.-FoB adjustment to map services into the chosen dimensions of the matrix was done via development of new correspondence table.

Final Consumption Expenditures of Households and the Government:

- The main data source for populating the table on Final Consumption Expenditures of Households is the “Households integrated living condition survey” data. The main issue related to mapping the data from household survey into the matrix was the fact that COICOP-CPA correspondence is not always one-to-one. For this reason, the COICOP-CPA classification mapping was performed by the Team.
- Data source utilized for calculation of final consumption expenditures of the Government is available at the yearly basis in the budget execution reports. Nevertheless, the provision of additional information from the MOF can significantly increase the accuracy of government representation in the matrix. This can cover aspects such that capital formation, intermediate consumption structure and even the final consumption. The additional data from NSC, allowing compilation of gross fixed capital formation at the level of industries (based on the reporting form submitted to NSC by enterprises) were not available to the Team. In these circumstances, the Team decided to apply so-called “commodity flow method” to estimate capital formation (See the appropriate section).

## 6. 2018 proto macro-SAM

The data used to develop the proto macro-SAM is obtained from various sources listed in the section above, including macroeconomic data reported in national accounts, balance of payments, government reports on budget execution, data from household living standard survey, labor-force survey and any other sources containing information on transactions between agents within the economy.

**Table 6-1. Balanced proto macro-SAM 2018 for Armenia, mln. AMD**

	Commodities	Activities	Factors	Enterprises	Households	Government	Investments	Inventories	Taxes	Rest of world	Total
Commodities		3,013,552			4,765,238	727,568	1,007,307	340,494		2,370,284	<b>12,224,442</b>
Activities	8,391,362										<b>8,391,362</b>
Factors		5,300,087								439,458	<b>5,739,545</b>
Households			2,411,259	2,309,773		425,470				355,984	<b>5,502,486</b>
Enterprises			3,264,457							14,329	<b>3,278,786</b>
Government		77,723			644,646		-683,459		1,126,523	126,619	<b>1,292,053</b>
Investments			-784,597	930,634						518,304	<b>664,342</b>
Inventories							340,494				<b>340,494</b>
Taxes	639,225		487,298								<b>1,126,523</b>
Rest of World	3,193,855		361,128	38,378	92,602	139,015					<b>3,824,979</b>
<b>Total</b>	<b>12,224,442</b>	<b>8,391,362</b>	<b>5,739,545</b>	<b>3,278,786</b>	<b>5,502,486</b>	<b>1,292,053</b>	<b>664,342</b>	<b>340,494</b>	<b>1,126,523</b>	<b>3,824,979</b>	

The GDP measured using the expenditure approach in the proto- SAM equals Nu. 6,017,035 million AMD and deviates from the official estimates of GDP in National Accounts by 0.2%. The same deviation is for the GDP estimated by production approach.

<b>Table 6-2. GDP calculations based on the proto-macro SAM, mln. AMD</b>		<b>Expenditure approach</b>	
<b>Production approach</b>			
Total Output At Basic Prices	8,391,362	Private consumption	4,765,238
- Intermediate consumption at purchasers prices	-3,013,552	+Government consumption	727,568
<b>=Gross Value Added At Basic Prices</b>	<b>5,377,810</b>	+ Gross fixed capital formation/ Investments	1,007,307
+Taxes less subsidies on products	639,225	+ Change in inventories	340,494
<b>=GDP</b>	<b>6,017,035</b>	+ Exports	2,370,284
		- Imports	-3,193,855
		<b>=GDP</b>	<b>6,017,036</b>
GDP according to NA 2018	<b>6,005,058</b>		<b>6,005,058</b>



The analysis of the proto-SAM shows, the macroeconomic structure of the economy: the majority (69%) of the value of consumed commodities originates from domestic production, while imports account for 26%. Intermediate inputs comprise 36% of total output value and the average value added share accounts for 63%. The largest part of household expenditure is current expenditure (87%). 25% of commodities are used as intermediate inputs, while 39% and 6% is consumed by households and the Government respectively. 19.4% of commodities is being exported. Households receive the largest share of income directly from factors (43.8%) and enterprises (42%) and 7.7% - from the Government. Transfers from the rest of the world (personal remittances and migrant labor incomes) comprise 6.5% of incomes of households. Tax revenue makes up the largest share of government income (87%), while the government budget's dependency on the rest of the world is not high – 9.8%.

## 7. Supply matrix construction

For construction of Supply and Use tables, compilation of balanced Symmetric Input-Output Table (SIOT) and transformation of SIOT into final SAM using “bottom-up” approach necessary components of SAM were calculated. The underpinning tables (Output at basic prices by industry and by product; Imports Cif. by product; Trade and transport margins by commodity; Taxes and subsidies on products; Intermediate consumption by industry; Private, individual and collective consumption by purpose; Gross fixed capital formation by category; Changes in inventories; Exports FoB by product, as well as the Supply and Use tables) are attached to this report as an Excel file “SAM\_tables”. Here the construction of components related to the Supply matrix are discussed.

The tables underpinning the supply side of the SAM are related to the domestic production/output and imports. The domestic output tables cover agriculture, industries and services. Below, the methodological lines for calculations along with some tables are presented.

### 7.1. Domestic output tables at basic prices.

#### 7.1.1. Agriculture

Based on the available data, the output tables for agricultural industries were calculated using “bottom-up” approach. To that end, the team used two sources of information: the publications of NSC and databases available at FAOSTAT website<sup>16</sup>. Statistics related to the market output, physical quantities were taken from official published data of NSC, and the basic prices from FAOSTAT.

With the combined use of the mentioned sources, it was possible to estimate outputs of main agricultural products as well as to obtain some other important statistics related to the intermediate use for the list of agricultural products.

**Table 7-1. Agricultural Output at basic prices, 2018: crop production**

<i>NACE CODE_6_ digit</i>	NACE_CPA_6_Digit Label	Harvested crop in tons	Price per ton, AMD	Share of market output,%	Output at basic prices, mln. AMD	Market output at basic prices mln. AMD
01.11.11	Durum wheat	187,453	113,347	80%	21,247	16,998
01.11.12	Wheat, except durum wheat	842	70,000	80%	59	47

<sup>16</sup> See the list of publications and databases in the section “ Data sources reviewed for Armenia SAM construction”.



## Constructing an up-to-date Social Accounting Matrix (SAM) for Armenia

NACE CODE_6_digit	NACE_CPA_6_Digit Label	Harvested crop in tons	Price per ton, AMD	Share of market output,%	Output at basic prices, mln. AMD	Market output at basic prices mln. AMD
01.11.20	Maize	7,586	113,347	27%	860	230
01.11.31	Barley	124,167	109,529	27%	13,600	3,645
01.11.33	Oats	4,899	60,000	27%	294	79
01.11.49	Other cereals	9,300	90,000	27%	837	224
01.11.61	Beans, green	17,826	250,000	27%	4,456	1,194
01.11.62	Peas, green	1,155	250,000	27%	289	77
01.11.71	Beans, dry	2,531	1,137,853	27%	2,879	772
01.11.73	Chick peas, dry	127	200,000	27%	25	7
01.11.74	Lentils, dry	217	200,000	27%	43	12
01.11.75	Peas, dry	430	200,000	27%	86	23
01.11.79	Pulses (dried leguminous vegetables) n.e.c.	8	800,000	27%	6	2
01.11.95	Sunflower seed	1,537	100,000	27%	154	41
01.13.12	Cabbages	104,350	85,006	79%	8,870	6,963
01.13.21	Watermelons	126,812	101,918	79%	12,924	10,146
01.13.31	Chilies and peppers, green (only capsicum)	50,139	210,800	79%	10,569	8,297
01.13.32	Cucumbers and gherkins	50,599	176,311	79%	8,921	7,003
01.13.33	Eggplants (aubergines)	51,268	119,167	79%	6,109	4,796
01.13.34	Tomatoes	138,124	161,684	79%	22,332	17,531
01.13.41	Carrots and turnips	16,681	157,951	79%	2,635	2,068
01.13.42	Garlic	10,490	840,537	79%	8,818	6,922
01.13.43	Onions	39,279	863,965	79%	33,935	26,639
01.13.51	Potatoes	415,050	118,241	79%	49,076	38,525
01.13.60	Vegetable seeds, except beet seeds	63	500,000	79%	32	25
01.13.90	Vegetables, fresh, n.e.c.	80,025	250,000	79%	20,006	15,705
01.15.10	Unmanufactured tobacco	914	82,000	99%	75	74
01.19.10	Forage crops	337,016	70,000	50%	23,591	11,796
01.21.12	Other grapes, fresh	179,537	185,103	89%	33,233	29,544
01.22.14	Figs	5,642	317,131	66%	1,789	1,177
01.24.10	Apples	107,584	192,609	66%	20,722	13,635
01.24.21	Pears	16,849	323,440	66%	5,450	3,586
01.24.22	Quinces	1,967	336,029	66%	661	435
01.24.23	Apricots	86,697	318,357	66%	27,601	18,161
01.24.24	Cherries	12,452	429,607	66%	5,349	3,520
01.24.25	Peaches	72,646	265,147	66%	19,262	12,674
01.24.27	Plums	23,845	166,334	66%	3,966	2,610
01.25.13	Strawberries	12,072	654,676	66%	7,903	5,200
01.25.19	Other berries, the fruits of the genus vaccinium n.e.c.	12,072	776,711	66%	9,376	6,170
01.25.35	Walnuts	7,281	1,135,804	66%	8,269	5,441
01.26.90	Other oleaginous fruits	546	100,000	66%	55	36
01.99.99	NC Feed Grass	521,154	20,000	100%	10,423	10,423
<b>TOTAL</b>		<b>2,891,823</b>			<b>406,787</b>	<b>292,453</b>

Note: The Exact shares of Market Outputs were not available at the level of each product. So the adjusted shares had been estimated based on the shares of more aggregated groups.

Source: NSC publications and FAOSTAT databases. Coding and Calculations: Research Team.

**Table 7-2. Agricultural Output at basic prices, 2018: livestock production**

CPA CODE	CPA Label	Production in tons	Price per ton, AMD	Share of market output,%	Output at basic prices, mln. AMD	Market output at basic prices mln. AMD
10.11.11	Meat of bovine animals, fresh or chilled	68,800	2,719,530	82%	185,514	161,397
10.11.12	Meat of swine, fresh or chilled	16,300	2,724,396	82%	44,129	38,392
10.11.13	Meat of sheep, fresh or chilled	10,800	2,770,593	82%	29,750	25,882
10.11.14	Meat of goats, fresh or chilled	47		82%	118	103
10.12.10	Meat of poultry, fresh or chilled	12,300	1,870,279	82%	11,638	10,125
01.41.10	Dairy cattle, live			100%		32,224
01.46.10	Swine, live			100%		22,396
01.45.11	Sheep, live			100%		10,397
01.45.12	Goats, live			100%		69
01.47.11	Chickens, live			100%		3,621
	Other Animals Live			100%		3,435
01.41.20	Raw milk from dairy cattle	645,700	152,452	60%	98,438	58,965
01.45.21	Raw milk from sheep	48,000	198,188	33%	9,513	5,698
01.45.22	Raw milk from goats	4,000	257,644	33%	1,031	617
01.47.21	Hen eggs in shell, fresh	36,340	1,106,708	60%	40,218	13,111
01.47.22	Eggs from other poultry in shell, fresh	10	1,106,708	33%	11	4
01.49.21	Natural honey	2,200	3,471,838	33%	7,638	4,216
10.11.20	Edible offal of bovine animals, swine, sheep, goats, horses and other equines, fresh or chilled	17,962	500,000	55%	8,981	2,928
<i>TOTAL</i>		862,459			436,978	393,579

Data Source: NSC publications and FAOSTAT databases. Coding and Calculations: Research Team.

7.1.2. Production Matrix: Sector of non-financial corporations

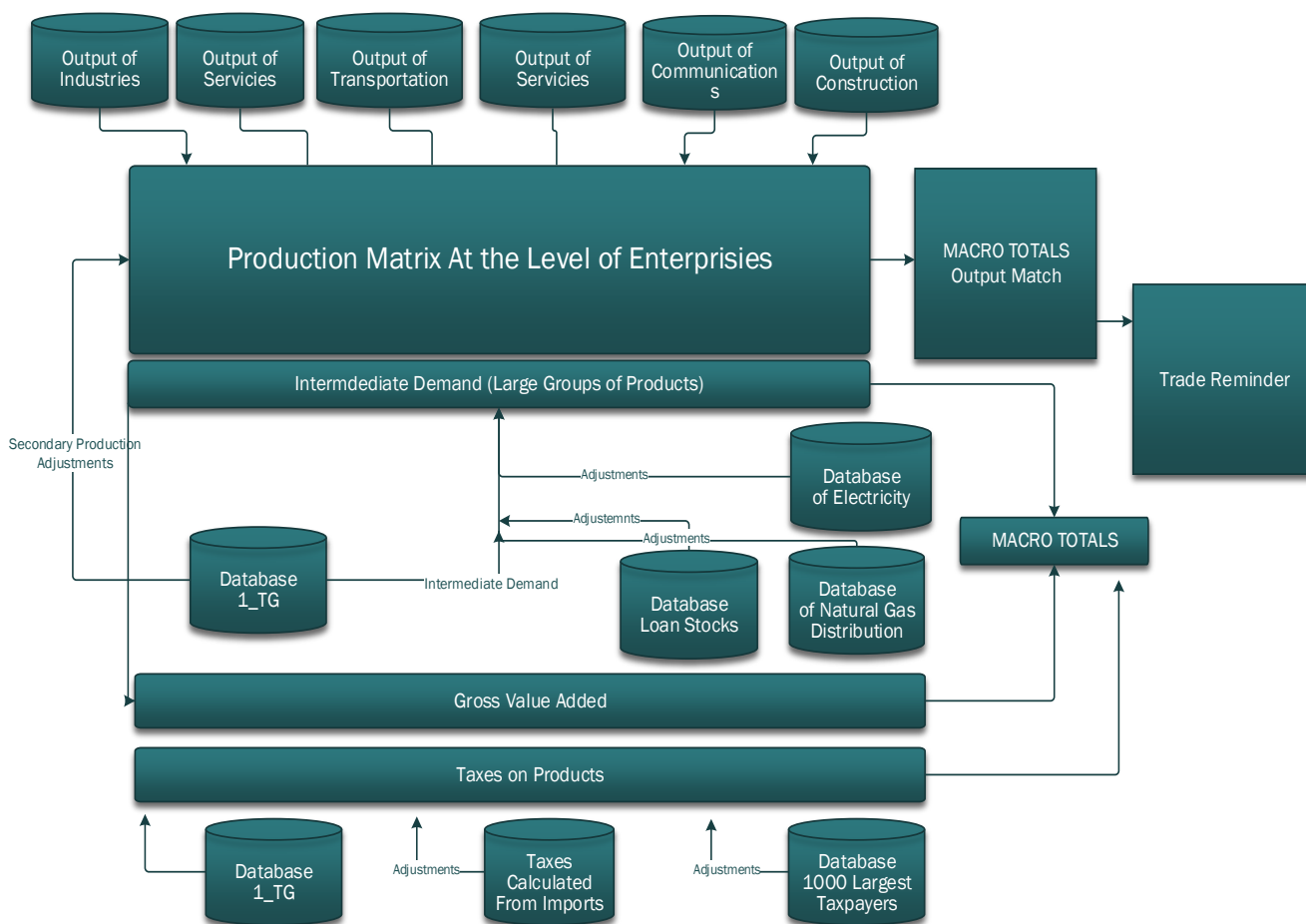
Production Matrix of non-financial corporations at the level of enterprises has been constructed by merging all outputs of following categories reported to the NSC by enterprises through the mandatory forms:

- Industrial (Includes Utilities)
- Services
- Communication
- Transportation
- Construction

The data in the forms 1SQ- annual (1\_TG) were used to calculate value added components and the volumes of secondary production.

At the first step research team has merged all mentioned sets at the level of enterprises. In other words all output levels reported by single enterprise which appeared in any of mentioned datasets had been added up under that enterprise. In this manner research team has arrived to primary form of production matrix for non-financial corporations.

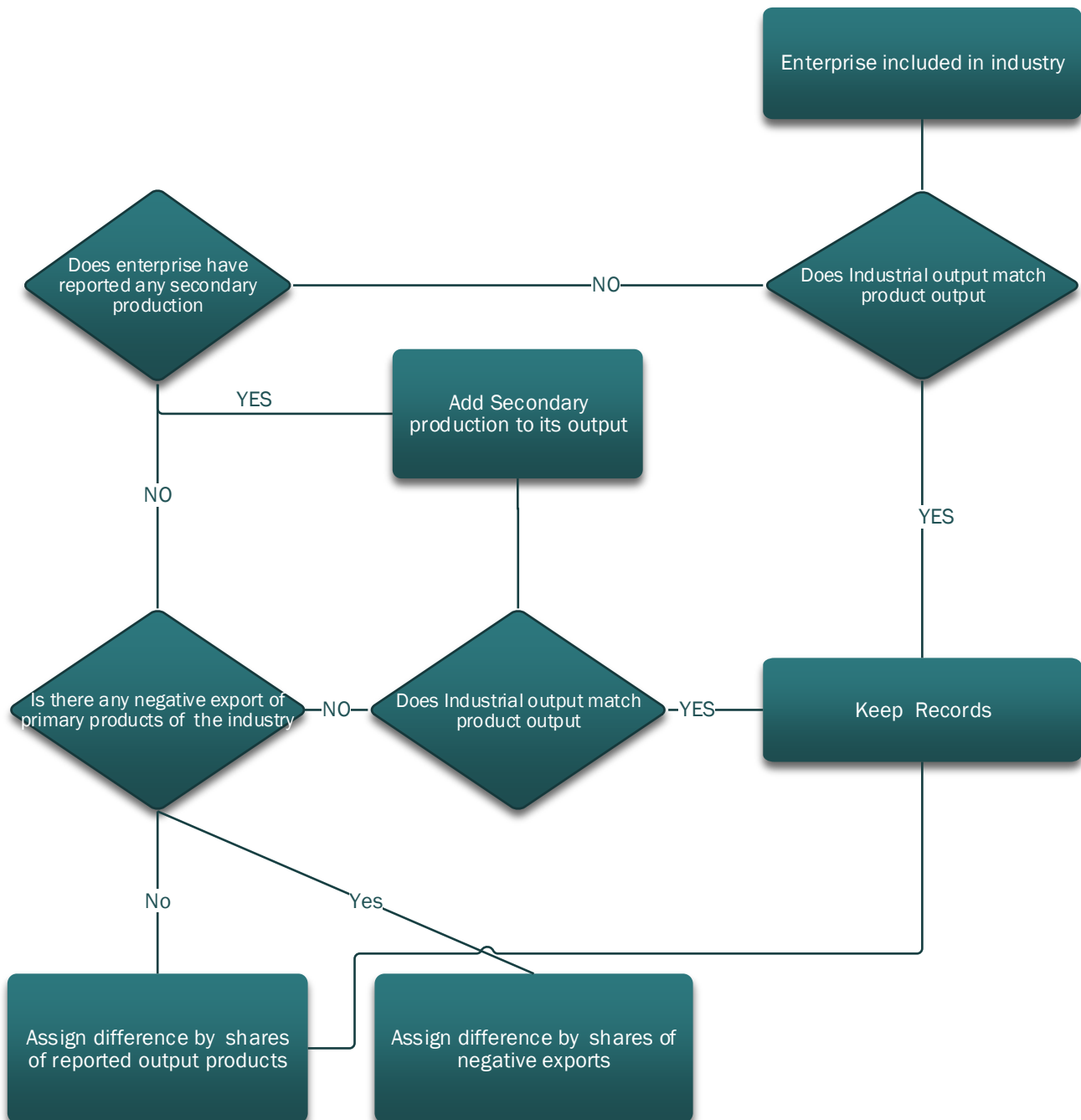
Figure 7-1. Simplified flows of production matrix in a basic SAM



## Constructing an up-to-date Social Accounting Matrix (SAM) for Armenia

At this step research team revealed several problems regarding the data. For example, aggregated output of industries obtained by mentioned procedure was significantly lower than the one reported by official statistics, there were misreported data on the output of enterprises hindering aggregation of the data to further analysis of the results. For these cases the Research Team applied an algorithm to adjust the data.

Figure 7-2. Procedure of Distributing Misreported Output of Enterprises



### 7.1.3. Trade output

The data obtained through the forms 1\_TG covered nearly half of trade output and other related indicators.

In the Macro level trade appears only in two sectors of the economy. Those sectors include non-financial corporations and households.

Trade output in non-financial corporations had been obtained by combining several official data sources and calculated outputs of non-financial corporations. At the first step all the secondary trade output calculated from the production matrix of non-financial corporations had been subtracted from the Macro data trade output. Then all the remainder trade output had been distributed according the three main trade sectors namely

- Wholesale Trade
- Retail Trade
- Trade of motor vehicles

The distribution had been controlled by several data sets.

1. Official trade turnover data
2. Production matrix of non-financial corporations
3. Insurance payments of insurance companies for passenger vehicles
4. Structure of retail trade by products
5. VAT paid by 1000 largest enterprises

Due to the fact that the most information was available for the retail trade sectors estimation had started from that point. The first task was estimation of trade turnover of retail trade by its main subsectors namely.

*Table 3 Retail Trade Sectors*

A471	Retail trade services of fruit, vegetables, meat, fish, bakery and dairy products and eggs
A472	Retail trade services of other food products, beverages and tobacco
A473	Retail trade services of automotive fuels
A474	Retail trade services of construction materials and hardware
A475	Retail trade services of household articles
A476	Retail trade services of cultural and recreational goods
A477	Retail trade services of clothing, pharmaceutical and medical goods, toilet articles, flowers, plants, pet animals and pet food

At the first step total turnover had been calculated and then distributed to this trade sectors by combining total imports and domestic production of commodities and then distributing all those by the map of retail trade. The main aim was to obtain the structure of retail trade published by NSC<sup>17</sup>.

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<sup>17</sup> This procedure is not straightforward due to several reasons: First any sector of retail trade can be involved in the trade of products out of its primary domain. For instance retail trade of food and beverages can also been involved in the trade

With the combination of mentioned data sources it was possible to obtain retail trade structure of economy which was more or less similar to official published data<sup>18</sup>.

Then trade output had of all retail sectors had been calculated based on the information provided in the form 1\_TG. All outputs had been obtained using difference of the cost of products bought and sold.

*Table 4 Other Trade Sectors*

A451	Trade services of cars and light motor vehicles
A452	Maintenance and repair services of motor vehicles
A453	Wholesale trade services of motor vehicle parts and accessories
A461	Wholesale trade services on a fee or contract basis of agricultural raw materials, live animals, textile raw materials and semi-finished goods
A462	Wholesale trade services of grain, unmanufactured tobacco, seeds and animal feeds
A463	Non-specialized wholesale trade services of food, beverages and tobacco
A464	Wholesale trade services of household goods
A465	Wholesale trade services of computers, computer peripheral equipment and software
A466	Wholesale trade services of agricultural machinery, equipment and supplies
A467	Wholesale trade services of solid, liquid and gaseous fuels and related products
A469	Non-specialized wholesale trade services

### 7.1.4. Production Matrix: Government Sector.

Production Matrix for Government had been constructed based on the statistics of budget execution reports published by MOF. First both municipal and central government reports had been coded and adjusted in order to meet the requirements of SAM representation.

The data obtained for government statistics in this approach had some slightly differences with the data provided in Macro tables.

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of construction materials and so on. However team prone to think that those cases are rare and can't significantly distort overall picture of retail trade turnover.

<sup>18</sup>

### 7.1.5. Production matrix of financial corporations;

Production matrix of financial corporations along with all value added components had been directly taken from the official sectoral accounts of financial corporations. Distribution of intermediate demands of financial corporations except categories such that electricity, natural gas, and financial services had been estimated based on intermediate demand shares of government. The latter ones had been calculated directly from other data sources.

### 7.1.6. Production Matrix of Household Sector.

Bulk of households' production matrix is agricultural industries up to (51%) another 40% are covered by manufacturing, construction, and real estate services. Production matrix of agricultural industries had already been covered in section 6.1.1;

The output of the real estate services on its main part is comprises from the volumes of considered apartment rental rate that is attributed to households independent of the fact whether household lives in its own apartments or is renting one so is just added to the household final consumption expenditures.

In terms of manufacturing products produced by households team had assumed that the main part of this volume is produced from the shares of non-market outputs of households and included the following industries

- A107 - Manufacture of bakery and farinaceous products
- A109 - Manufacture of prepared animal feeds
- A1101 – Distilling, rectifying and blending of spirits.

Due to the lack of data on non-agricultural industrial production of households, all non-agricultural industrial production of households was distributed according final consumption expenditures of households.

Special attention in this case takes meat production in economy. From the one hand meat production in economy (according to the data sets provided by NSC) is attributed to the sector of non-financial corporations<sup>19</sup>. From the other hand however other data sources published by NSC points out that meat is mainly produced by household sector<sup>20</sup>.

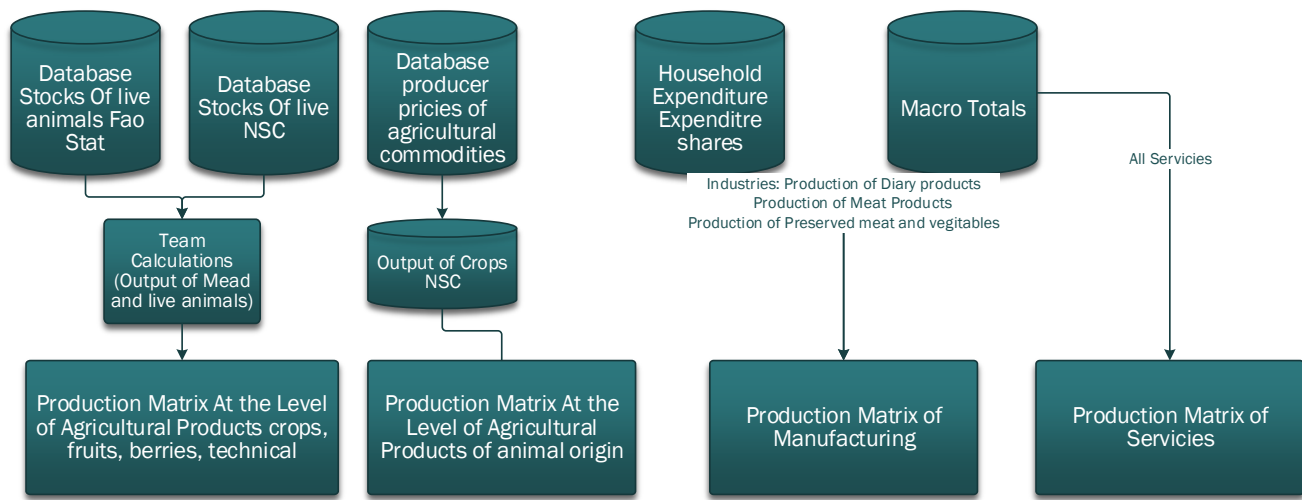
The algorithm of compilation of production matrix of households is presented in the figure below.

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<sup>19</sup> According to the data provided by NSC all the meat in the economy is produced by 2 large enterprises which is either data flow or more probably NSC had aggregated all the data of meat producers in 1 large enterprise and provide data in that form. No other data set provided by NSC contains any information about those enterprises making it impossible further clarify excise output and other value added components of meat production.

<sup>20</sup>Sum Totals of Exhaustive Livestock Census [https://www.armstat.am/file/article/g.\\_kendaniner\\_01\\_2019.kazm.pdf](https://www.armstat.am/file/article/g._kendaniner_01_2019.kazm.pdf),

Figure 7-2; Compilation of production matrix of households:



#### 7.1.7. Intermediate Demand of Enterprises of non-financial corporations

The form 1\_TG is providing information related to the large group of products and services used by industries. The list of large group of products include

1. Row Materials
2. Building Materials
3. Containers
4. Agricultural Materials
5. Fuels
6. Gear Materials
7. Electricity
8. Natural Gas

Group of services is more diverse and includes the following categories:

1. Administrative activities
2. Repair and installation services
3. Transportation services freight
4. Transportation services passenger
5. Other transportation services
6. Communication services
7. Information services
8. Security services
9. Advertising services
10. Professional services



11. Research and development services
12. Educational services
13. Health services
14. Banking services
15. Insurance services
16. Financial leasing services
17. Loan interest payments
18. Other services
19. Construction services
20. Food and accommodation services
21. Construction services
22. Sewerage services

### Construction of the maps

Research team has considered each product at the CPC 6 digit level to attach it to some group of large categories covered by 1\_TG form. Overall procedure is described in the following figure.

#### Adjustments in BEC mapping

Team has carefully reviewed the BEC mapping categories and made appropriate changes in order to adjust them for Armenian Economy. The logic of BEC mapping probably is based on assumption that imported agricultural products hardly can be directed to intermediate consumption. For instance BEC attributes most products of agricultural origin that can be directly consumed by households to final consumption expenditures whereas significant portion of agricultural production in Armenia is used by processing industries. Examples are grapes, berries, fruits and so on. Another example are various types of sugars that again are directed to final consumption whereas again domestic processing industry of bakery products uses them in large quantities.

#### Construction of map linking products into large survey categories

As was mentioned previously the forms of NSC require indication of acquisitions of row and other materials in large groups. In order to map more detailed import categories to those represented in large groups, team has created the map between imported intermediate goods at 6\_digit CPC codes and the codes used by NSC to evaluate intermediated demand of enterprises.

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Figure 7-3. Structure of Intermediate Demand Estimation of industries:

Map 1. The map connecting each product to larger group of products appearing in 1\_TG survey

Map 2 The map connecting each product to some initial sector of industry. Each product is attached at least 5 sectors.

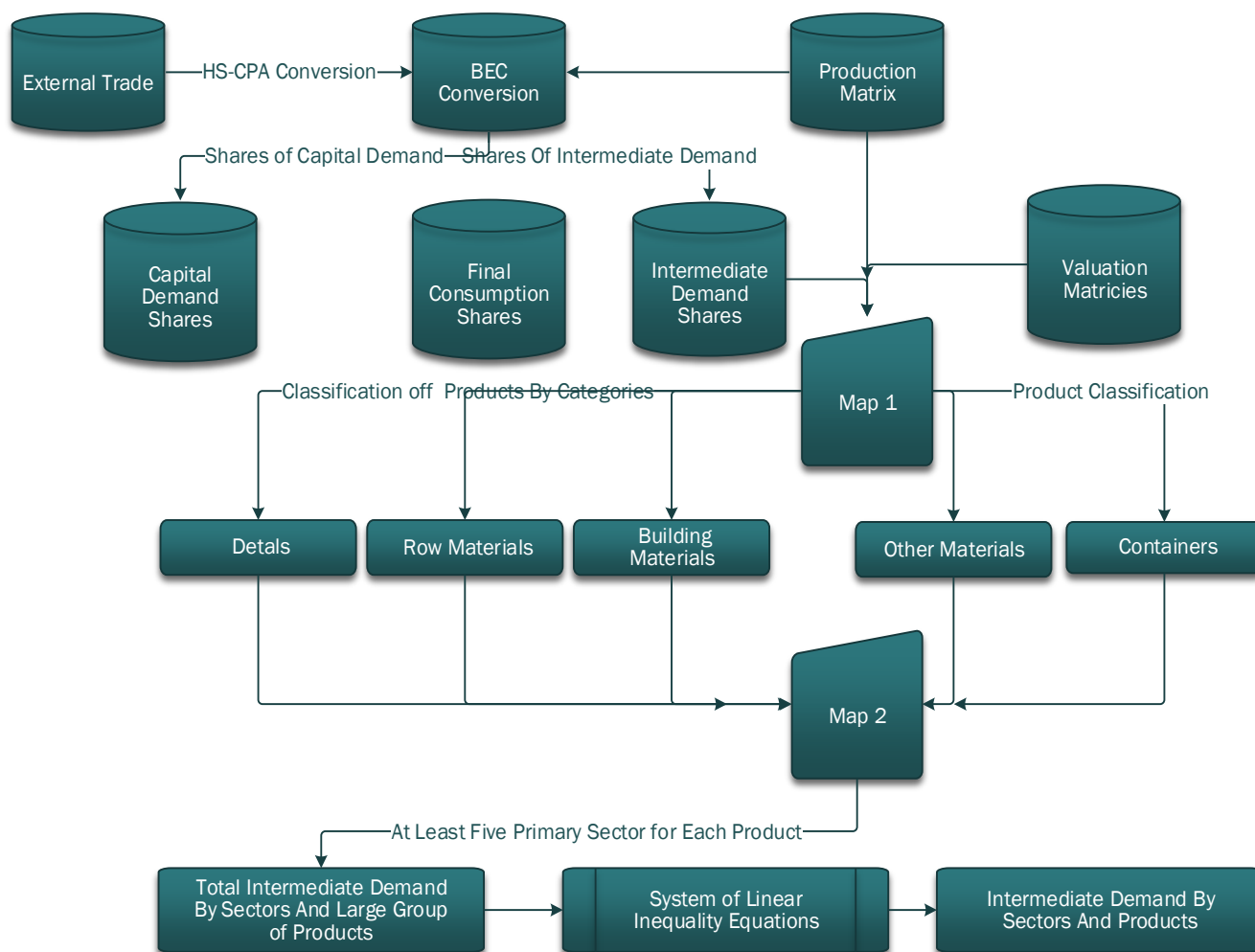


Figure 7-4 Extract from the Map between NSC large Categories and CPA Codes

CPC CODE	LEBEL	NSC LARGE GROUPS
c011111	Wheat, except durum wheat	row materials
c205941	Lubricating preparations	row materials
c239912	Articles of asphalt or of similar material	building materials
c222219	Other plastic packing goods	details
c222313	Reservoirs, tanks, vats and similar containers, capacity > 300 l, of plastics	details
c222314	Doors, windows and frames and thresholds for doors; shutters, blinds and similar articles and parts.	details
c222319	Builders' ware of plastics n.e.c.	details
c231925	Electrical insulators of glass	gear materials
c234310	Electrical insulators of ceramics; insulating fittings, for electrical machines, appliances or equipment,	gear materials

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<b>c252113</b>	Parts for central heating boilers	<b>gear materials</b>
<b>c172115</b>	Box files, letter trays, storage boxes and similar articles of a kind used in offices, shops or the like, of paper	<b>containers</b>
<b>c222211</b>	Sacks and bags (including cones), of polymers of ethylene	<b>containers</b>
<b>c222212</b>	Sacks and bags (including cones), of other plastics than polymers of ethylene	<b>containers</b>
<b>c222213</b>	Boxes, cases, crates and similar articles of plastics	<b>containers</b>
<b>c222214</b>	Carboys, bottles, flasks and similar articles of plastics	<b>containers</b>

### Construction of map linking products into large survey categories

The next map also has been constructed by the team with the purpose to distribute obtained intermediate demand products from imports and domestic production to various industrial sectors. The procedure of obtaining mentioned map was as follows:

First team has considered intermediate demand products with high import volumes<sup>21</sup>. Further it was decided whether the product should be attached to one or can be utilized by several industries. For the later the most probable industries had been identified

The rest of products i.e. those for which it was not possible to identify any particular industry or group of industries had been left free “free” allowing to be consumed by any industry<sup>22</sup>.

It should be mentioned that BEC also offers some map allowing to allocate intermediate products to corresponding sectors of economy. However as can be seen in the following table the map is too aggregated and was used only for comparison.

Figure 7-5 Cross classification of aggregated intermediate categories to industries

Source Aggregated Intermediate Categories coded by Team

End-Use Sector BEC .

Armenian Imports MLN USD

4_Digit Label	Agriculture, forestry, fishing, food, beverages, tobacco	Mining, quarrying, refinery, fuels, chemicals, electricity, water, waste treatment	Construction, wood, glass, stone, basic metals, housing, electrical appliances, furniture	Government, military and other	Health, pharmaceuticals, education, cultural, sport	ICT, media, computers, business and financial services	Textile, apparel, shoes	Transport equipment and services, travel, postal services
building materials details			233,685,493					98,751,905
gear materials	2,536,948	27,002,015	28,949,886	26,660	14,775,464	20,276,317	3,391,621	53,870,062
row materials	745,503	23,220,347	30,391,081	1,772,087	131,607	2,139,028	5,303,532	18,209,061
agr. materials	362,232,171	145,528,112	254,232,165	2,243,142	44,318,706	49,845,296	385,656,874	10,563,923
containers	3,354,602		18,857,420			676,527		20,177,200
<b>Grand Total</b>	<b>369,059,723</b>	<b>195,750,473</b>	<b>566,116,046</b>	<b>4,041,889</b>	<b>59,225,777</b>	<b>72,937,168</b>	<b>394,352,027</b>	

<sup>21</sup> All imported products up to 1 MLN USD shares has been reviewed.

<sup>22</sup> Full map of domestic and imported products mapped to the large groups of intermediate demand categories and to chosen consumption sectors are attached electronically.

### Problems with the Intermediate Demand Estimation

It seems that enterprises are prone to overestimate their intermediate demand nearly in all sectors. For instance consideration of intermediate demand in mining industry reveals that at least loan interest payments by several sectors are overestimated. The most vivid example is mining which

### Value Added Components

Ensuring output match of all disaggregated industries with aggregated macro totals team proceeded to calculation of value added components by industry. The main source of information again was the form 1\_Tg.

Except a few exclusions the following procedure had been applied: For each industry two separate tables had been calculated.

- Table of enterprises which appear in the form 1\_TG
- Table of enterprises which does not appear in the form 1\_TG

For the enterprises which appeared in the form 1\_tg value added components had been calculated directly from the form with recalculated outputs of negative value added enterprises. Further all the enterprises included in the form 1\_TG had been clustered by their sizes with respect to number of employees<sup>23</sup>. In the further steps clustered shares of value added components had been applied to obtain value added components of the industries not included in the form 1\_TG but reporting output levels.

### Labor Compensation:

For manufacturing industries the total volume of labor compensation calculated by the steps described above had not lead macro totals presented by official statistics. For instance if we start from the total number of employed persons in manufacturing industries and simply multiply them by average yearly wage rate then volume obtained is nearly 100 bln less than the one published again with the NSC in macro data for manufacturing industries.

For that reason, and in order to reach macro data we had left mixed income as free variable increasing labor compensation for all enterprises which had relatively lower shares of labor compensations compared with macro totals. In terms of other components of value added application of mentioned procedure had led to very close estimates with macro data. With the similar procedure other components of value added had been adjusted.

### Intermediate Demand of Government sector

In order to obtain detailed level of intermediate demand for government sector purchase plans of government organizations for years 2018, 2019 had been considered<sup>24</sup>. Then the map between 6 digit CPA codes and appropriate codes of purchase plan categories had been created<sup>25</sup>.

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<sup>23</sup> It should be noted that number of employees in the form 1\_TG and in the form of industrial outputs differ significantly.

<sup>24</sup> Purchase plan of government. Data source: <https://www.gnumner.am/>

<sup>25</sup> It should be noted that not for all categories the map had been one-to-one. Moreover, in some cases it is not possible to identify exact product group used by the coding system of purchase plan of government, however about 95-96 percent of categories presented by purchase plan had been mapped to cpa codes

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Table 7-5 Extract from the data of intermediate demand structure of public administration and defence services: Data source gnumner.am, coding and calculations research team.

CPA Code	CPA Label	A84
C421120	Construction works for motorways, roads, streets and other vehicular ...	11,810
C192021	Motor spirit (gasoline), including aviation spirit	8,489
C181219	Other printing services n.e.c.	7,569
C192024	Kerosene	5,480
C212023	Diagnostic reagents and other pharmaceutical preparations	5,415
C611030	Data transmission services over wired telecommunications networks	5,324
C351110	Electricity	5,024
C062010	Natural gas, liquefied or in gaseous state	2,371
C331219	Repair and maintenance services of other general-purpose machinery n.e.c.	2,005
C582931	System software downloads	1,765
C101315	Other prepared and preserved meat, meat offal or blood, except prepared meat...	1,232

Intermediate demand structure of government sector in terms of industries other than public administration and defence services had been generated applying total volume of intermediate demand of appropriate industry and the structure of expencies of non-financial corporations.

The value added structure of government sector industries had been obtained by general structure of industries in public corporations sector.

**Table 7-6. Output at Basic Prices and Sells of Industries, 2018**

(The data are presented in aggregated (2-digit NACE code) form to save space, detailed calculations for industries are available at 5 digit NACE level)

2_digit NACE code	2_digit NACE code label	Output, mln. AMD	Total Sells, mln. AMD	Of which: Sells to non-domestic markets, mln. AMD	Of which: to EEU Countries	to non-EEU Countries
7	Mining of metal ores	287,274	265,636	261,336	0	261,336
8	Other mining and quarrying	10,996	11,147	2,769	2,321	449
9	Mining support service activities	2,476	2,476	0	0	0
10	Manufacture of food products	326,294	322,093	33,756	23,837	9,919
11	Manufacture of beverages	152,569	156,506	93,530	78,520	15,011
12	Manufacture of tobacco products	178,368	175,325	122,564	6,059	116,506
13	Manufacture of textiles	1,148	1,352	32	20	12
14	Manufacture of wearing apparel	22,489	22,980	15,525	7,883	7,643
15	Manufacture of leather and related products	2,005	1,777	359	94	265
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	1,862	1,874	217	77	139

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<b>2_digit NACE code</b>	<b>2_digit NACE code label</b>	<b>Output, mln. AMD</b>	<b>Total Sells, mln. AMD</b>	<b>Of which: Sells to non-domestic markets, mln. AMD</b>	<b>Of which: to EEU Countries</b>	<b>to non-EEU Countries</b>
17	Manufacture of paper and paper products	34,727	33,505	95	57	38
18	Printing and reproduction of recorded media	19,183	19,323	620	418	202
20	Manufacture of chemicals and chemical products	16,603	15,376	1,112	507	605
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	9,548	8,519	4,603	3,178	1,425
22	Manufacture of rubber and plastic products	35,511	36,152	3,285	704	2,581
23	Manufacture of other nonmetallic mineral products	61,564	58,400	7,133	1,898	5,235
24	Manufacture of basic metals	173,752	185,644	148,619	904	147,715
25	Manufacture of fabricated metal products, except machinery and equipment	14,088	13,550	634	622	12
26	Manufacture of computer, electronic and optical products	9,559	9,829	3,956	1,255	2,701
27	Manufacture of electrical equipment	14,782	18,419	1,672	1,534	139
28	Manufacture of machinery and equipment n.e.c.	5,875	5,658	1,460	1,253	207
30	Manufacture of other transport equipment	156	251	249	248	1
31	Manufacture of furniture	5,227	5,128	234	232	2
32	Other manufacturing	53,146	52,948	48,417	36,434	11,983
33	Repair and installation of machinery and equipment	13,822	13,844	369	369	0
35	Electricity, gas, steam and air conditioning supply	258,987	258,987	35,161	0	35,161
36	Water collection, treatment and supply	15,954	15,954	0	0	0
37	Sewerage	2,533	2,533	0	0	0
38	Waste collection, treatment and disposal activities; materials recovery	7,190	7,182	0	0	0
<b>TOTAL</b>		<b>1,737,688</b>	<b>1,722,368</b>	<b>787,707</b>	<b>168,424</b>	<b>619,287</b>

Data source: NSC publications, calculations: Research Team

**Table 7-7. Physical quantities of Domestic production, 2018**

<b>Code</b>	<b>Label</b>	<b>Unit</b>	<b>Sum of Volume</b>
14.31	Knitted and crocheted hosiery	Thsnd. Pieces	23,700
20.4	Soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	Tons	7,941
24.2	Tubes, pipes, hollow profiles and related fittings, of steel	Tons	21,463
27.4	Electric lighting equipment	Thsnd Pieces	23
07.29.11	Copper ores and concentrates	Thsnd Tons	746

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<i>Code</i>	<i>Label</i>	<i>Unit</i>	<i>Sum of Volume</i>
07.29.15	Lead, zinc and tin ores and concentrates	Tons	20,468
07.29.19	Other non-ferrous metal ores and concentrates n.e.c.	Tons	22,071
08.92.1	Peat	Tons	926
10.11.11	Meat of bovine animals, fresh or chilled	Tons	106,138
10.11.12	Meat of swine, fresh or chilled	Tons	25,035
10.11.13	Meat of sheep, fresh or chilled	Tons	17,307
10.12.10	Meat of poultry, fresh or chilled	Tons	23,985
10.13.14	Sausages and similar products of meat, offal or blood	Tons	22,810
10.13.15	Other prepared and preserved meat, meat offal or blood, except prepared meat and offal dishes	Tons	2,062
10.20.13	Fish, frozen	Tons	3,774
10.32.1	Fruit and vegetable juices	Thsnd Liters	23,367
10.32.11	Tomato juice	Thsnd Liters	2,138
10.39.12	Vegetables provisionally preserved	Tons	1,473
10.39.21	Fruit and nuts, uncooked or cooked, frozen	Tons	13,148
10.39.25	Other prepared or preserved fruits	Tons	250
10.41.11	Lard stearin, lard oil, oleostearin, oleo-oil and tallow oil, not emulsified or mixed or otherwise prepared	Tons	1,087
10.41.59	Other oils and their fractions, refined but not chemically modified; fixed vegetable fats and other vegetable oils (except maize oil) and their fractions n.e.c. refined but not chemically modified	Tons	1,834
10.42.10	Margarine and similar edible fats	Tons	90
10.51.11	Processed liquid milk	Mln liters	887
10.51.40	Cheese and curd	Tons	40,389
10.51.52	Yoghurt and other fermented or acidified milk or cream	Tons	1,068
10.51.56	Dairy products n.e.c.	Thsnd Liters	232
10.52.10	Ice cream and other edible ice	Thsnd Liters	21,831
10.61.21	Wheat or maslin flour	Tons	303,814
10.61.32	Cereal groats, meal and pellets n.e.c.	Tons	2,553
10.61.40	Bran, sharps and other residues from the working of cereals	Tons	188,610
10.71.11	Fresh bread	Thsnd Tons	536
10.71.12	Fresh pastry goods and cakes	Tons	43,012
10.73.11	Macaroni, noodles and similar farinaceous products	Tons	8,527
10.81.12	Refined cane or beet sugar and chemically pure sucrose, in solid form, not containing added flavouring or colouring matter	Tons	106,621
10.84.12	Sauces; mixed condiments and mixed seasonings; mustard flour and meal and prepared mustard	Tons	1,184
10.84.30	Food-grade salt	Tons	55,134
10.85.11	Prepared meals and dishes based on meat, meat offal or blood	Tons	799
10.85.12	Prepared meals and dishes based on fish, crustaceans and molluscs	Tons	5,256
10.85.13	Prepared meals and dishes based on vegetables	Tons	23,584
10.85.19	Other prepared dishes and meals (including frozen pizza)	Tons	9
11.01.10.220	Distilled alcoholic beverages	Thsnd Liters	60,763
11.01.10.300	Distilled alcoholic beverages	Thsnd Liters	1,858
11.01.10.810	Distilled alcoholic beverages	Thsnd Liters	112
11.01.10.850	Distilled alcoholic beverages	Thsnd Liters	11,853
11.01.10.899	Distilled alcoholic beverages	Thsnd Liters	397
11.02.11	Sparkling wine of fresh grapes	Thsnd Liters	17,730
11.02.11.300	Sparkling wine of fresh grapes	Thsnd Liters	1,617
11.05.10	Beer, except dregs from brewing	Thsnd Liters	44,033

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<i>Code</i>	<i>Label</i>	<i>Unit</i>	<i>Sum of Volume</i>
11.07.11	Mineral waters and aerated waters, not sweetened nor flavored	Thsnd Liters	82,396
12.00.11	Cigars, cheroots, cigarillos and cigarettes, of tobacco or tobacco substitutes	Mln pieces	60,079
13.20.20	Woven fabrics of cotton	Thsnd Pieces	194
		Tons	9
13.91.1	Knitted or crocheted fabrics	Thsnd Pieces	8,743
13.93.1	Carpets and rugs	Tons	46
14.13.13	Women's or girls' overcoats, car coats, capes, cloaks, anoraks, windcheaters, wind-jackets and similar articles, knitted or crocheted	Thsnd Pieces	1,431
16.10.10	Wood, sawn or chipped lengthwise, sliced or peeled, of a thickness > 6 mm; railway or tramway sleepers of wood not impregnated	Tons	5,555
17.12.12	Handmade paper and paperboard	sq/mtr	2,030
		Tons	10,565
17.21.13	Cartons, boxes and cases, of corrugated board or corrugated paperboard	Tons	4,212
17.21.14	Folding cartons, boxes and cases, of non-corrugated paper or paperboard	Tons	25,074
17.23.13	Registers, account books, binders, forms and other articles of stationery, of paper or paperboard	Tons	1,553
20.12.21	Synthetic organic coloring matter and preparations based thereon; synthetic organic products of a kind used as fluorescent brightening agents or as luminophores; colour lakes and preparations based thereon	Tons	30,391
20.14.74	Unfeatured ethyl alcohol of alcoholic strength by volume of 80%	Thsnd Liters	8,272
20.16.5	Other plastics in primary forms; ion exchangers	Tons	51,141
20.41.3	Soap, washing and cleaning preparations	Tons	1,102
23.13.11	Bottles, jars, phials and other containers, of glass, except ampoules; stoppers, lids and other closures, of glass	Thsnd Pieces	215,044
23.20.13	Refractory cements, mortars, concretes and similar compositions n.e.c.	Thsnd Tons	903
23.52.10	Quicklime, slaked lime and hydraulic lime	Tons	79,616
23.52.20	Plaster	Tons	61,728
23.63.1	Ready-mixed concrete	Thsnd Tons	1,048
23.70.12	Other worked ornamental or building stone and articles thereof; other artificially coloured granules and powder of natural stone; articles of agglomerated slate	Tons	144,984
24.10.12	Ferro-alloys	Tons	13,863
24.42.22	Aluminum bars, rods and profiles	Tons	707
24.42.25	Aluminum foil, of a thickness 0,2 mm	Tons	61,540
25.12.10	Doors, windows and their frames and thresholds for doors, of metal	Piece	95,342
25.92.12	Aluminum casks, drums, cans, boxes and similar containers, for any material (excluding gas), of a capacity 300 l	Thsnd Pieces	44
26.51.63	Gas, liquid or electricity supply or production meters	Pieces	152,040
26.52.14	Clocks with watch movements; alarm clocks and wall clocks; other clocks	Pieces	14,760
27.11.10	Motors of an output 37,5 W; other DC motors; DC generators	Pieces	30
27.11.31	Generating sets with compression-ignition internal combustion piston engines	Pieces	12
27.11.42	Other transformers, having a power handling capacity 16 kVA	Pieces	3,937
27.11.43	Other transformers, having a power handling capacity > 16 kVA	Thsnd Pieces	67
27.12.24	Relays, for a voltage 1 000 V	Thsnd Pieces	919



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<i>Code</i>	<i>Label</i>	<i>Unit</i>	<i>Sum of Volume</i>
27.20.21	Lead-acid accumulators for starting piston engines	Pieces	53,728
27.32.1	Other electronic and electric wires and cables	km	140
27.32.13	Other electric conductors, for a voltage ≤ 1 000 V	Tons	2,008
27.32.14	Other electric conductors, for a voltage > 1 000 V	Tons	43
27.90.3	Electrical soldering, brazing and welding tools, surface tempering and hot spraying machines and apparatus	Pieces	251
28.13.14	Other centrifugal pumps for liquids; other pumps	Pieces	945
35.11.10	Electricity	Mln kwt/hour	15,540

*Data source: NSC publications, calculations: Research Team*

7.1.8. Services

The methodological line for calculation of domestic output of services is the same as for industries. Here the domestic output of services by industries based on NSC publications is presented.

**Table 7-8. Output of Services at Basic Prices, 2018**

<i>NACE Section</i>	<i>NACE code</i>	<i>Label</i>	<i>Output, mln. AMD</i>
<i>I</i>	55.1	Hotels and similar accommodation	31,284.7
<i>I</i>	55.2	Holiday and other short-stay accommodation	3,212.8
<i>I</i>	56.1	Restaurants and mobile food service activities	97,435.2
<i>I</i>	56.2,56.3	Other food service activities	18,969.0
<i>R</i>	90,91	Creative, arts and entertainment activities	3,575.4
<i>R</i>	92.00.1	Gambling and betting activities	74,443.1
<i>R</i>	92.00.2	Gambling and betting activities, Other	52.9
<i>R</i>	92.00.3-92.00.6	Betting in terminals, online n.e.c.	305,941.1
<i>R</i>	93	Sports activities	7,292.4
<i>P</i>	85.1,85.2	Pre-primary and primary education	3,163.7
<i>P</i>	85.3	General secondary education	9,131.3
<i>P</i>	85.4	Post-secondary non-tertiary education	37,171.0
<i>P</i>	85.5	Sports and recreation education	4,867.1
<i>Q</i>	86.1	Hospital activities	48,157.2
<i>Q</i>	86.2	General medical practice activities	14,646.5
<i>Q</i>	86.9	Other human health activities	8,138.2
<i>Q</i>	87.88	Residential care activities	3,113.2
<i>L</i>	68.2	Rental and operating of own or leased real estate	49,562.1
<i>L</i>	68.1-68.3	Buying and selling of own real estate	9,595.3
<i>J</i>	60	Radio broadcasting	9,983.2
<i>J</i>	61	Wired telecommunications activities	136,699.5
<i>J</i>	58.2	Publishing of computer games	122.3
<i>J</i>	62	Computer programming, consultancy and related activities	76,224.1
<i>J</i>	63.1	Data processing, hosting and related activities	11,183.9
<i>J</i>	Other J	Other of Group	11,534.0
<i>H</i>	49	Passenger rail transport, interurban	130,486.8
<i>H</i>	51	Passenger air transport	3,938.7
<i>H</i>	53	Postal activities under universal service obligation	6,610.1
<i>H</i>	52	Warehousing and storage	80,590.9
<i>N</i>	77	Rental and leasing of motor vehicles	10,715.5
<i>N</i>	79	Travel agency and tour operator activities	28,877.5
<i>N</i>	81	Combined facilities support activities	10,706.2
<i>N</i>	82	Office administrative and support activities	25,806.4
<i>N</i>	N n.e.c.	Other of Group	13,488.6

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<i>NACE Section</i>	<i>NACE code</i>	<i>Label</i>	<i>Output, mln. AMD</i>
<i>M</i>	69.1	Legal activities	7,634.6
<i>M</i>	69.2	Accounting, bookkeeping and auditing activities; tax consultancy	10,693.3
<i>M</i>	71	Architectural and engineering activities and related technical consultancy	20,327.2
<i>M</i>	72	Research and experimental development on natural sciences and engineering	3,879.4
<i>M</i>	73	Advertising	22,340.3
<i>M</i>	M n.e.c.	Other of Group	14,905.0
<i>K</i>	64.19.1	Banking Activities	236,326.2
<i>K</i>	65.1	Insurance	22,935.6
<i>K</i>	K n.e.c.	Other of Group	108,058.3
<i>S</i>	96	Other personal service activities	19,323.5
<i>S</i>	S n.e.c.	Other of Group	11,607.9
<i>TOTAL</i>			1,764,751.2

*Data source: NSC publications.*

### 7.2. Imports of goods and services

Imports are part of the supply of goods and services in the economy and will be represented as a column vector in the SAM, in correspondence with the product and services dimensions of the matrix. Final methodological line of general mapping and further distribution of import volumes will be covered in the chapters on the use side of the matrix (See paragraph 7.5.).

Valuation of imported products in the harmonized system of classification is in C.i.f. prices, which are comparable with the basic prices of outputs. Therefore, no additional adjustments for imported products will be required. However, in contrast to imported goods, an issue of service volume valuation will be required which will be based on the information in BOP statistics.

### 7.3. Transformation from basic to purchaser's prices

Valuation matrices are constructed with the aim to bridge valuation at basic prices used mainly in supply side with the valuation of purchasers prices that generally are part of the use table. In our case valuation matrix in the USE table should be a product by industry matrix compiled for trade margins, transport margins and taxes.

In general, transactions taking place in economy are mainly valued at market prices i.e a price which is agreed by the seller and purchaser of the good. In the absence of market transactions, for example Government services, valuation is usually made with the costs incurred or by reference to market prices of similar goods and services.

The purchasers' price is the amount paid by the purchaser, excluding any VAT or similar tax deductible by the purchaser, in order to take delivery of a unit of a good or service at the time and place required by the purchaser. The purchasers' price of a good includes any transport charges paid separately by the purchaser to take delivery at the required time and place (*2008 SNA, paragraph 6.64*)

The source data for SUTs compilation in our case have different valuations. In particular detailed industry output, that is intended to use for disaggregated industries<sup>26</sup> is valued at **basic prices**, while intermediate consumption and final uses are valued at **purchasers prices**. In case of exports we have valuation at **FoB**, and in case of imports at **Cif.** prices.

As can be inferred from above sections, valuation of domestic supply and imports will be carried out at basic prices, whilst for balancing perspective we will need to have a supply of products and services at purchaser's prices. The procedure of supply conversion from basic into the purchaser's prices includes estimation of three set of a full-scale valuation matrices, which are listed below:

- **Matrix for Trade Margins;**
- **Matrix for Transport Margins;**
- **Matrix of Taxes and Subsidies on Products.**

The standard procedure connecting valuation concepts under consideration are as below:

**Basic prices** + Taxes on products excluding invoiced VAT

- Subsidies on products

= **Producers' prices**

+ Wholesalers' trade margins

+ Retailers' trade margins

+ Separately invoiced transport charges

+ VAT not deductible by the purchaser

= **Purchasers' price**

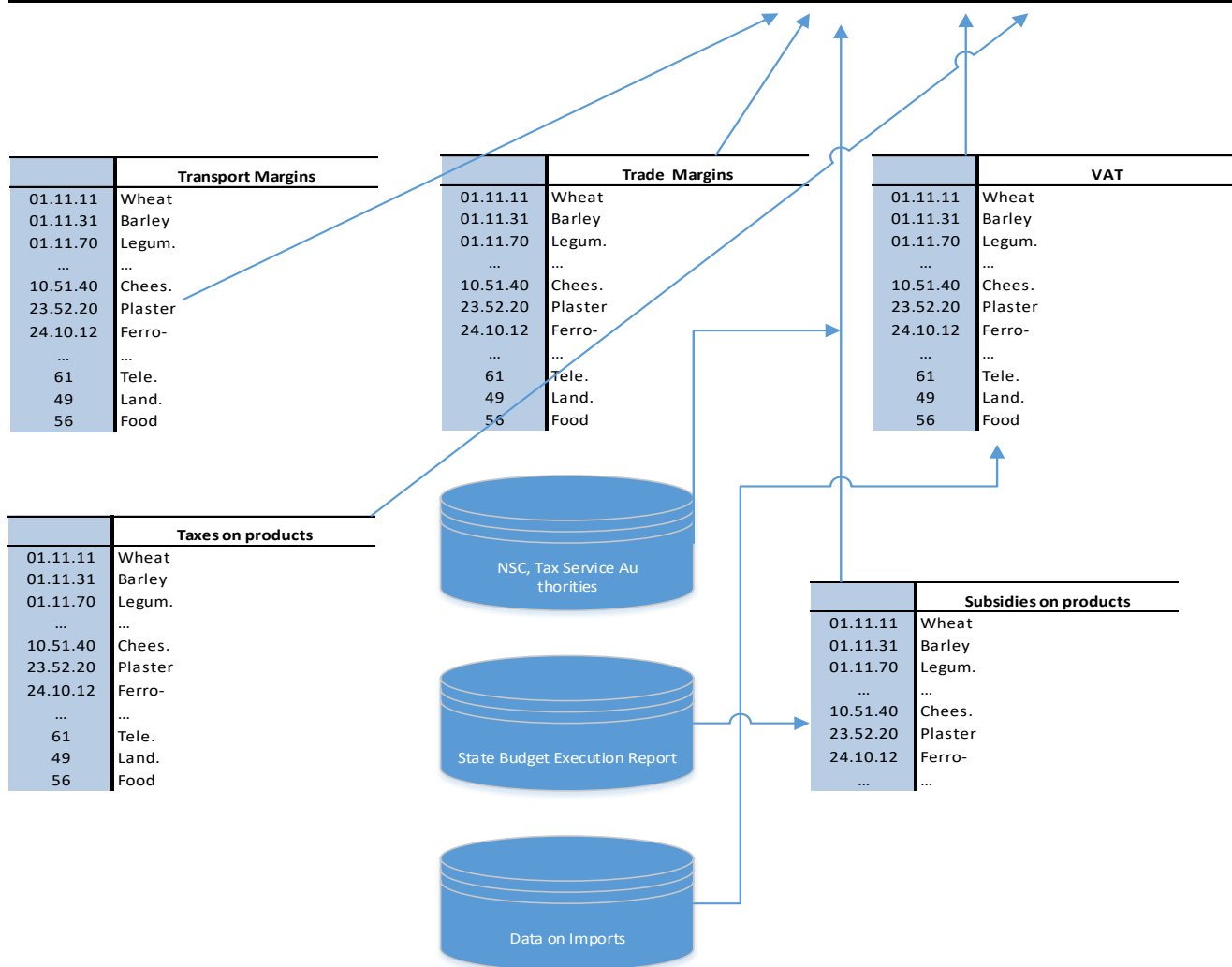
Matrix on taxes and subsidies can be estimated based on information on budget expenditures and tax service statistics.

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<sup>26</sup> Main Indicators of Industrial Organizations by Economic Activities (five-digit code), for January-December:  
<https://www.armstat.am/en/?nid=81&id=2110>

Figure 7-6. Transformation Map from Basic into Purchaser’s Price

		Industries		Output At Basic Prices	Imports	Trade Margins	Transport Margins	VAT	Taxes on products	Total Supply At Purchaser's prices
		01.11	10.12							Σ
Products	01.11.11	Wheat	Domestic Output							
	01.11.31	Barley								
	01.11.70	Legum.								
	...	...								
	10.51.40	Chees.								
	23.52.20	Plaster								
	24.10.12	Ferro-								
...	...									
61	Tele.									
49	Land.									
56	Food									
Total										



Source: Handbook on Supply, Use and Input-Output Tables with Extensions and Applications .New York, UN DESA, 2018.

The reason of mentioned assumption is that after the review of the available data, we were not able to find any raw data source/reporting form of NSC from which the mentioned separation could be compiled. In addition, it also will be impossible to obtain direct data related to separation of margins of traded products within various

industries. For instance, haircut industry can be involved in sales of pharmaceutical production, which by its own can take place via wholesale or retail trade activities.

Therefore, we prone to think that mentioned separation could be done based on experts' estimates or with the usage of some general proportions keeping track with totals previously obtained for trade margins.

In particular, the only dataset that can be exploited in the process of compiling a SAM is contained in a report published by the NSC of the RA in 2009. Given that single "point" in time, trade margins had been derived for subsequent years by the Team, applying indices for producer and purchaser's prices.

The transition from NACE1 into the NACE2 (adopted by NSC in 2010) was done with the following considerations: for the cases when mapping was one-to-one, the procedure was straightforward. In the cases of many-to-one trade margins in NACE1 had been summed up and transferred to the appropriate codes in NACE 2. In the third case where the mapping was one to many or many to many, the transition was compiled by the volume of corresponding shares of recorded output volumes of 2010. After, obtained margins were inflated up to 2018 using the same procedure as for the years 2007-2010.

### 7.3.1. Trade Margins

Treatment of trade as type of economic activity is somewhat different and should be compiled with different approach. The main difference of trade from other economic activities is that acquisitions of goods for further resaling can't be viewed as intermediate consumption of wholesaler and retailers. Even if those goods can be a subject of some minor modifications such as grading, cleaning or packaging. In this respect **SNA 2008 defines a trade margin as:**

*"...trade margin is defined as the difference between the actual or imputed price realized on a good purchased for resale and the price that would have to be paid by the distributor to replace the good at the time it is sold or otherwise disposed of."*

Its plain that concept of trade margin can be applied to any product of statistical unit, trading activities of industries and to the whole economy. As it is claimed by main manuals used for compilations of most of tables in this report Trade margins are obtained as a difference in the price of trading sales and costs of goods purchased for resale.

In practice however research team had calculated trade margins as simple difference between cost of purchase and cost of further resale.

In reality, however, margins of trade could be different for industries engaged in trade as a secondary economic activity. In this respect, we will make two general assumptions:

- Any economic non-trade industry engaged into the trade has been assumed to be engaged in trade of products that are subset of its primary activity. For instance in case of having any trade activity in the food processing industry, the assumption had been made that trade either wholesale or retail in that industry refers only to food processing products.
- Despite the fact that trade industries operating in retail trade can also be included in wholesale trade activities or vice versa team was not able to find any data source for separating those activities inside

trade industries. For that reason general assumption applied was that total volume of trade inside industries involved in trade corresponds to its primary activity. In other words all the trade output for retail trade industries was attributed to retail trade and all the trade in wholesale industries to wholesale trade<sup>27</sup>.

- Only commodities are subject to trade margins. In general this assumption can always

Separation of trade in terms of wholesale and retail as secondary production for industries was not always clear cut and mainly had been decided based on expert estimates: For instance all trade in industries such that mining of concentrates, manufacturing of metal ores or production of non-metallic products had been considered as wholesale trade.

In food processing industries most of the cases it was assumed that trade is equally distributed between wholesale and retail trade categories. And the services mainly had received wholesale trade.

### 7.3.2. Compilation of Trade Margins

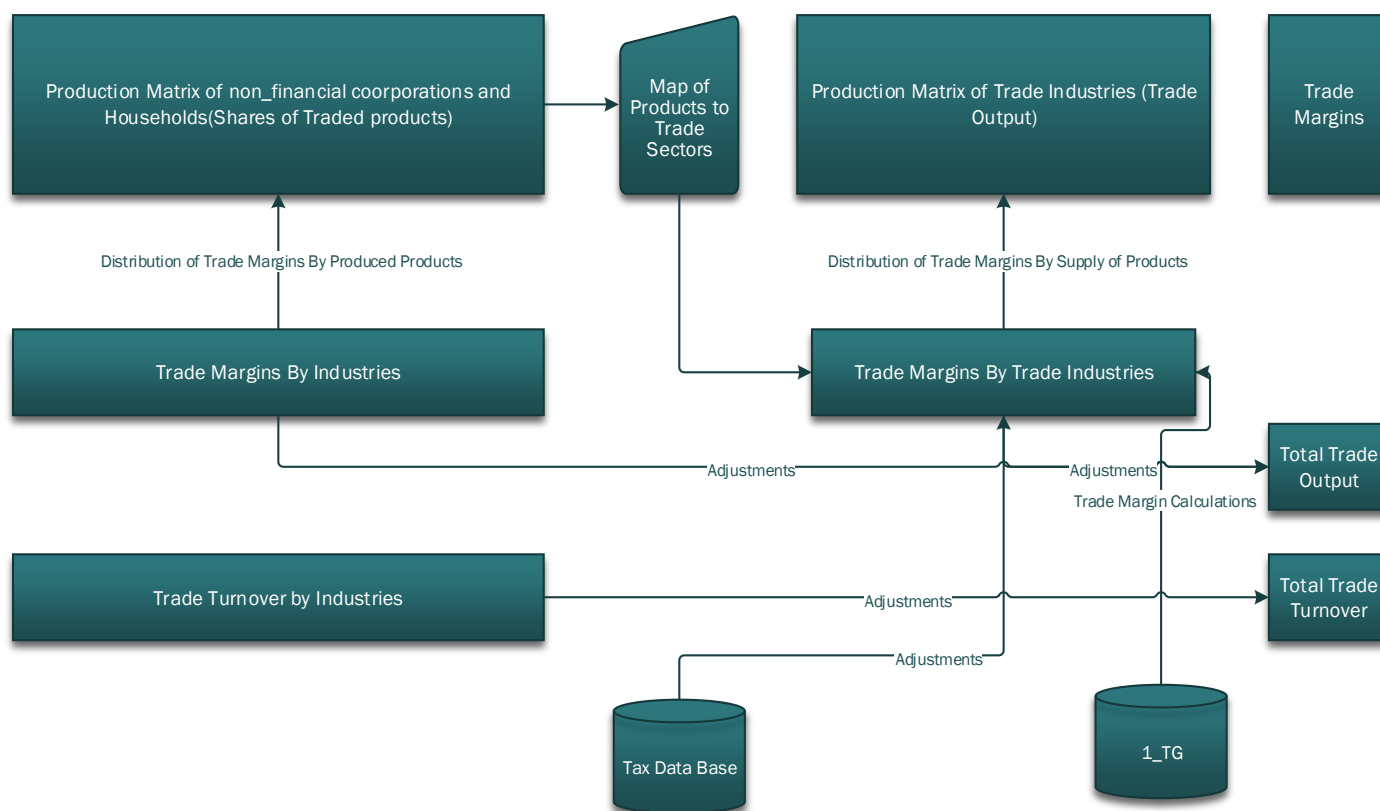
1. First we took volumes of total trade turnover published by NSC which had served as absolute constraint for total trade turnover in economy. Then trade turnover as secondary activity for all non-trade sectors had been calculated based on respective shares of trade output in production matrix (Production matrix without trade).

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<sup>27</sup> Clearly this is the strongest assumption but unfortunately team was not able to find any data source enabling to make reasonable assumptions about the shares of retail trade as secondary activity of wholesale and visa veca.

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Table 7-9 Valuation Matrix Wholesale and Retail Trade Margins Calculation by industry and distribution to products



2. Total turnover of **trade sectors** had been estimated by subtracting secondary trade turnovers from production of **non-trade** sectors.
3. In the third step total turnover had been distributed between wholesale and retail trade sectors by their respective shares in the form of 1\_TG.
4. Having trade turnover for industries we then calculated trade margins by industry again based on the difference of cost of purchased goods and income obtained from the resale.

### MAP of trade distribution

In order to distribute obtained trade margins between traded products the map of commodities to trade sectors has been developed. In particular each commodity had been attached to one or several trade sectors based on description of commodity. In the second phase the supply of imported and domestic commodities has been scaled and mapped to trade sectors.

Table 7-10 Trade Sectors of Economy.

Code	Level
46.1	Wholesale trade services on a fee or contract basis of agricultural raw materials, live animals, textile raw materials and semi-finished goods
46.2	Wholesale trade services of grain, unmanufactured tobacco, seeds and animal feeds
46.3	Wholesale trade services of fruit and vegetables
46.4	Wholesale trade services of textiles
46.5	Wholesale trade services of computers, computer peripheral equipment and software



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46.6	Wholesale trade services of agricultural machinery, equipment and supplies
46.7	Wholesale trade services of solid, liquid and gaseous fuels and related products
47.1	Retail trade services of fruit, vegetables, meat, fish, bakery and dairy products and eggs
47.2	Retail trade services of other food products, beverages and tobacco
47.3	Retail trade services of information and communication equipment
47.4	Retail trade services of construction materials and hardware
47.5	Retail trade services of household articles
47.6	Retail trade services of cultural and recreational goods
47.7	Retail trade services of clothing, pharmaceutical and medical goods, toilet articles, flowers, plants, pet animals and pet food
47.8	Retail trade services of automotive fuel and other new goods n.e.c.
47.9	Retail trade services of second-hand goods

In the final step we had applied the map of products-trade sectors in order to distribute obtained margins to products.

For adjustment purposes several additional databases had been taken into consideration including

- Import of commodities
- 1000 largest taxpayers' information related to VAT

### 7.3.3. Transport Margins

Transport margins are another valuation component representing delivery chain of products from producer to purchaser. Those usually are freight transportation services paid separately by the purchaser to take delivery at particular time and place. Therefore, transport margins are not included in producers' output valuation and should be included in the use of products of at purchaser's prices.

Transport margins in particular include:

- Transport of goods arranged by the manufacturer, the wholesale or the retail trader in such a way that the purchaser has to pay separately for the transport costs even when the transport is done by the manufacturer, wholesale or retail trader himself.
- Transport of goods from the place where it is manufactured or sold to the place where the purchaser takes delivery of it in case the manufacturer or trader pays a third party for the transport, if this amount is invoiced separately to the purchaser.

It should be noted, that the volume of transport margins in general should not be the same as transportation services. The main difference will arise from the fact that any volume, which should be assigned to transport margin, should be paid by the purchaser separately.

In any case, despite the existence of clear methodological line for compiling trade and transport margins for input-output tables, there is currently no fresh information that can be used for compilation.

## **Constructing an up-to-date Social Accounting Matrix (SAM) for Armenia**

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Data sources related to the first two components of above list will require the usage of additional measures and compilation methods. The only structured information-to our knowledge- related to those datasets dates back to 2009, significantly limiting their direct implementation in assignment.

The first step in this procedure should be conversion of both trade and transport margins form NACE 1. Rev. 1 to the product dimension of the matrix. Then, with the involvement of consumers and producer's price indexes, the trade margins will be forwarded up to the date of current matrix, at the level of each product. Similar procedure with application of domestic and import transport price indexes will be applied for the transport margins. Full description of this approach will be covered in further reports of this assignment.

### 7.3.4. Taxes and Subsidies on products

This part of the table is one of the challenging both in terms of variation of information sources.

1. Taxes paid by non-financial corporations: Source 1\_TG form
  - 1.1. Excise Tax
  - 1.2. VAT
  - 1.3. Custom Duties
  
2. Taxes collected from the import: Source Import Calculations Based on rates
  - 2.1.1. Excise Tax
  - 2.1.2. VAT
  - 2.1.3. Custom Duties
  
3. Largest Taxpayers
  - 3.1. Excise Tax
  - 3.2. VAT
  - 3.3. Custom Duties
  
4. Reports of Tax Service on taxes collected

#### **Value Added Tax:**

In general for precise estimation of value added tax paid by products the volume of trade and taxes paid by each trade sector should be available either from NSC or Tax Service authorities. But as was mentioned earlier NSC had claimed that data on trade coverage was poor so no data had been provided in terms of trade. To this end in order to distribute volume of VAT to products research team had applied the following procedure.

For the industries not involved in trade, total vat paid (obtained from the form 1\_TG) had been distributed by production matrix of non-financial corporations according to their primary production. In cases when there was reported VAT but missing VAT subject primary production along with trade volumes all the VAT had been distributed by intermediate demand structure of that industry<sup>28</sup>.

For the estimation of VAT paid by trade Sectors the following procedure had been applied:

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<sup>28</sup> Examples are industries involved in health. Due to fact that provision of Health Services is not subject to VAT the only option for the industry to pay VAT is either it's intermediate demand or capital formation probably formed from the imports. The choice in favor of intermediate consumption was the fact that its estimation procedure is more simple and did not require estimation of capital formation by industries.

## Constructing an up-to-date Social Accounting Matrix (SAM) for Armenia

First we had coded all 1000 largest taxpayers to their respective industries<sup>29</sup>. Then, map<sup>30</sup> of trade described in previous section had been implemented in order to distribute value added tax by products in large groups<sup>31</sup>.

Table 7-11 Distribution of Value Added by products in Retail Trade Services: Source of Data

Product	A471 Retail trade services of fruit, vegetables, meat, fish, bakery and dairy products and eggs	A472 Retail trade services of other food products, beverages and tobacco	A473 Retail trade services of automotive fuels	A474 Retail trade services of construction materials and hardware	A475 Retail trade services of household articles	A476 Retail trade services of cultural and recreational goods	A477 Retail trade services of clothing, pharmaceutical and medical goods, toilet articles, flowers, plants, pet animals and pet food
Bakery Products		1,259					1,259
Chemical Products							3,493
Computer, Electronic Products				162			318
Electronic Motors, Generators					4,117		
Food_group_1	3,745						
Food_group_2		301					
Food_group_3	16,737	84					
Food other		742					
Fuels			1,606				
Furniture					821		
Leather Products							136
Natural gas			2,024				
Non food					3,370	419	
Other non-Metallic Products					5,058		
Paper Products						91	
Pharmaceutical Products							639
Poultry meat		284					
Processed Fruits Veg		2,852					
Rubber Plastic Products							139
Textiles					387		
Tobacco Products		5,252					
Wearing Products							7,780
<b>Grand Total</b>	<b>20,482</b>	<b>10,774</b>	<b>3,630</b>	<b>162</b>	<b>13,754</b>	<b>510</b>	<b>15,734</b>
							<b>65,044</b>

In the next steps large groups of obtained by trade sectors had been distributed to the more detailed groups based on total supply.

Table 7-12 Table 7-13 Distribution of Value Added by products in Wholesale Trade Services: Source of Data

Product	A461 Wholesale trade services on a fee or contract basis of agricultural raw	A462 Wholesale trade services of grain, unmanufactured tobacco, seeds and	A467 Wholesale trade services of solid, liquid and gaseous fuels and related products	A463 Non-specialized wholesale trade services of food, beverage	A464 Wholesale trade services of household goods	A469 Non-specialized wholesale trade services	A465 Wholesale trade services of computers, peripheral equipment	A466 Wholesale trade services of agricultural machinery, equipment
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<sup>29</sup> Some inconsistencies related to industries codes in database of 1000 largest taxpayers (taken from the webpage of TS) and the form 1\_TG (NSC Database) made team to think that coding systems in both sources have some differences.

<sup>30</sup> The map between products and trade sectors actually had been created at 4 digit NACE level.

<sup>31</sup> Examples are food and beverages that can pass through different trade sectors had been attached to different groups

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	material s, live animals, textile raw material s and semi- finished goods	animal feeds		s and tobacco		t and software	nt and supplies
Non_food	2,130		7,664		2,920	2,363	15,077
food_group_1				3,530			3,530
Food_group_2				2,337			2,337
Food_group_3	2,787			5,884			8,671
Fuels			27,230				27,230
Other_non_Metalic_Products	455		3,548		1,569		5,572
Pharmaceutical_Products					10,814		10,814
Tobacco_Products				10,023			10,023
Computer_Electronic_Products					330	9,223	9,554
Distilled_alc				6,342			6,342
Furniture	115				151		265
Food_other				8,457			8,457
Electronic_Motors_Generators					3,189		3,189
Animal_feed		2,132					2,132
Textiles					1,982		1,982
Chemical_Products			1,782		1,023		2,805
Natural_gas			295				295
Wearing_Products					735		735
Paper_products					649		649
Other_Agr		227		401			628
Fish_Products				453			453
Cereals		137					137
iron_ores			153				153
m_vehicles_trailers	205						4,359
Grand Total	5,692	2,496	40,672	37,426	23,361	2,363	9,223
							4,359
							125,592

All other product taxes such that import duties, on products had been distributed in the same manner.

The volume of taxes and subsidies at this point has been covered based on information of 1,000 largest taxpayers and at the budget execution reports respectively.

The main challenge of mapping those volumes into the corresponding industries is the fact that those volumes does not accurately represent the distribution of the tax collections through various industries.

The problem comes from the construction of the data set under consideration. In particular, matching collected tax volumes to the appropriate industry was completed based on business register of RA. The shortage here is the fact that there are many cases when being involved in several industries the company indicates only it's primary activity which can distort overall picture. For that reason those data should not be considered as final and can significantly be modified after import tax calculations will be computed based on tax rates of imports.

**Table 7-14. Volume of main taxes based on 1,000 largest taxpayers' reports, mln. AMD, 2018.**

NACE code	Label	Profit Tax	Income Tax	VAT	Excise Tax
01	Agriculture	16.32	326.03	644.96	-
02	Forestry and logging	73.27	318.52	307.81	-
03	Fishing and aquaculture	7.63	33.38	514.22	-
07	Mining of metal ores	10,943.05	10,046.09	2,819.03	95.59

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08	Other mining and quarrying	639.99	351.52	839.71	0.16
09	Mining support service activities	1,030.10	2,553.68	1,020.14	1.53
10	Manufacture of food products	2,154.49	4,199.49	15,269.79	188.57
11	Manufacture of beverages	6,545.24	4,039.46	10,305.57	6,092.06
12	Manufacture of tobacco products	11,509.62	2,145.74	11,394.58	31,932.19
13	Manufacture of textiles	-	130.51	341.85	-
14	Manufacture of wearing apparel	320.98	1,231.22	1,026.30	1.51
17	Manufacture of paper and paper products	81.56	247.05	894.18	-
18	Printing and reproduction of recorded media	605.53	316.83	2,531.76	0.99
20	Manufacture of chemicals and chemical products	83.85	43.61	730.02	0.27
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	262.01	292.44	382.77	-
22	Manufacture of rubber and plastic products	309.95	392.97	2,520.75	0.39
23	Manufacture of other non-metallic mineral products	435.79	1,495.03	3,435.41	11.51
24	Manufacture of basic metals	8,548.24	4,143.85	7,900.68	99.83
25	Manufacture of fabricated metal products, except machinery and equipment	617.58	1,120.23	2,737.30	27.90
26	Manufacture of computer, electronic and optical products	103.88	17.22	151.12	-
27	Manufacture of electrical equipment	1,153.07	225.07	1,778.79	0.76
28	Manufacture of machinery and equipment n.e.c.	15.30	53.28	99.50	-
31	Manufacture of furniture	22.36	79.75	248.11	0.01
32	Other manufacturing	100.10	428.79	871.06	-
33	Repair and installation of machinery and equipment	490.56	409.33	929.37	0.02
35	Electricity, gas, steam and air conditioning supply	9,890.76	14,281.77	46,844.89	471.08
36	Water collection, treatment and supply	120.97	1,768.33	2,246.30	0.66
38	Waste collection, treatment and disposal activities; materials recovery	-	181.01	73.58	-
41	Construction of buildings	3,589.10	2,615.83	7,014.36	13.45
42	Civil engineering	3,075.85	3,201.72	7,018.68	5.45
43	Specialized construction activities	2,501.69	1,426.87	5,018.51	118.07
45	Wholesale and retail trade and repair of motor vehicles and motorcycles	1,066.56	693.00	12,673.71	1,034.75
46	Wholesale trade, except of motor vehicles and motorcycles	15,574.23	12,095.17	125,647.20	42,892.75
47	Retail trade, except of motor vehicles and motorcycles	12,160.70	7,470.11	65,697.95	6,185.32
49	Land transport and transport via pipelines	1,525.71	4,104.06	10,120.40	115.86
51	Air transport	81.89	153.30	0.90	0.32
52	Warehousing and support activities for transportation	7,828.93	2,465.19	6,199.72	1.69
55	Accommodation	1,194.18	1,173.33	1,996.77	0.86
56	Food and beverage service activities	254.81	1,340.12	758.28	-
58	Publishing activities	99.73	346.40	34.49	-
60	Programming and broadcasting activities	149.23	750.30	80.80	-
61	Telecommunications	4,516.26	5,122.28	11,237.39	-

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62	Computer programming, consultancy and related activities	2,086.84	10,084.83	778.38	-
63	Information service activities	68.31	622.43	306.00	-
64	Financial service activities, except insurance and pension funding	27,628.49	28,110.75	3,178.51	1.70
65	Insurance, reinsurance and pension funding, except compulsory social security	662.57	1,393.02	15.80	-
66	Activities auxiliary to financial services and insurance activities	170.77	253.67	135.74	-
68	Real estate activities	1,747.37	1,079.86	2,061.44	-
69	Legal and accounting activities	141.75	787.14	482.14	-
70	Activities of head offices; management consultancy activities	861.70	607.25	1,401.91	-
71	Architectural and engineering activities; technical testing and analysis	343.07	965.19	3,143.91	-
72	Scientific research and development	38.97	315.05	135.78	-
73	Advertising and market research	411.50	638.10	959.65	-
74	Other professional, scientific and technical activities	143.02	56.56	280.53	36.48
75	Veterinary activities	6.08	238.49	771.33	-
77	Rental and leasing activities	115.33	43.95	423.95	-
79	Travel agency, tour operator and other reservation service and related activities	67.68	105.76	7.35	-
80	Security and investigation activities	195.22	1,191.47	1,304.75	7.07
81	Services to buildings and landscape activities	104.76	288.46	240.83	-
82	Office administrative, office support and other business support activities	280.41	204.10	416.72	-
84	Public administration and defense; compulsory social security	0.11	381.68	108.24	-
85	Education	1,397.75	10,854.70	588.13	-
86	Human health activities	1,708.64	8,468.20	345.28	0.02
88	Social work activities without accommodation	8.07	543.51	-	-
90	Creative, arts and entertainment activities	78.14	525.80	38.45	-
92	Gambling and betting activities	22.58	1,698.78	106.35	-
93	Sports activities and amusement and recreation activities	31.09	406.33	112.38	-
95	Repair of computers and personal and household goods	123.56	21.82	255.63	-
96	Other personal service activities	282.37	693.50	1,537.14	67.88
99	Activities of extraterritorial organizations and bodies	0.08	686.52	0.72	-

Source of raw data: Tax Service; Mapping and calculations: Research team

### 8. Use Side Matrix: Technical approach and Tables

“The Use table represents the flows of goods and services by products that are utilized as intermediate consumption for industries, final consumption by various agents, gross capital formation and exports”<sup>32</sup>. It also covers main components of gross value added, such as compensation of employees, consumption of fixed capital, taxes and subsidies on production and mixed incomes. In the following section, we will give short description of the mentioned components of the Use table and then proceed to actual compilation method that we intend to utilize for populating this part of the table.

#### 8.1. Intermediate Consumption

Under standard assumption of columns representing industries and rows used for products, interpretation of any entry of intermediate consumption table is twofold. First, any entry in the column vector can serve as a proxy for the cost structure of given industry whilst row vector indicates the volumes of particular commodity or service utilized among various industries and consumers for production or consumption purposes respectively.

Dependent on data sources and specifics of statistics, there are several methods of filling intermediate consumption table. In our case it was intended allocate the total intermediate consumption for industries, based on the forms received from NSC and then - relying on available information of intermediate use of products and services in each industry, further populate rows keeping track with both row and column totals.

Taking into account the absence of the data mentioned earlier in this report, development of intermediate consumption table is a complicated issue. In the following 3 paragraphs we will give an overview of main statistical sources by broad economic categories pointing out existing shortages and complications that can be faced during actual compilation phase.

#### 8.2. Agriculture

As was mentioned earlier the main part of agricultural production in Armenia is supplied by Households units. Therefore, the loss of information sources that we intended to obtain from the NSC for enterprises engaged in agricultural industries will have a minor effect on the quality of the result. In terms of intermediate consumption of the agricultural industries, the team has distinguished several important input categories on which primary calculation had been completed.

First, in terms of seeds and animal feed, all the inputs had been obtained from the information contained in the publications of NSC and FAOSTAT databases. In particular, from the information in food balance, it was possible to allocate all the seed inputs at the level of products. The same source also contains information about stocks, production, and utilization of Animal feed crops in physical terms.

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<sup>32</sup> Eurostat Manual of Supply, Use and Input-Output Tables. Luxembourg: Office for Official Publications of the European Communities, 2008



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In addition, the volumes of feed collected from natural grasslands also had been calculated and distributed to the industries producing live animals by the weight of existing animals and their type. For this team had used mainly expert estimates.

The main source of fertilizer inputs was the import data. All types of fertilizers had been identified by 10-digit HS classification and mapped to the appropriate agricultural industries. Distribution of both pesticides and fertilizers to each product and production had been conducted based on sown area under each product, proportions of a survey conducted by AVAG Solution and expert estimates.

**Table 8-1. Estimates of the main inputs (fertilizers and pesticides) in agriculture, 2018**

<i>CPA 6_Digit Code</i>	<i>HS Label</i>	<i>Value of Imports (USD)</i>	<i>Volume of Imports, tons</i>
08.91.12	Sulphur of all kinds; other than sublimed, precipitated and colloidal sulphur	11,326	17
08.91.19	Barium sulphate (barytes); natural	1,600	2
08.91.19	Fluorspar; containing by weight 97% or less of calcium fluoride	134,918	345
08.91.19	Mineral substances; n.e.c. in chapter 25	28,998	34
20.15.10	Ammonia; anhydrous	17,264	21
20.15.10	Ammonia; in aqueous solution	11,203	13
20.15.10	Nitric acid; sulphonitric acids	189,994	436
20.15.20	Chlorides; of ammonium	3,010	5
20.15.20	Nitrites	5,678	4
20.15.31	Fertilizers, min/chem; nitrogenous, urea, whether or not in aqueous solution	1,820,295	6,035
20.15.32	Fertilizers, min/chem; nitrogenous, ammonium sulphate	2,815	2
20.15.33	Fertilizers, min/chem; nitrogenous, ammonium nitrate, whether or not in aqueous solution	19,384,534	78,475
20.15.34	Fertilizers, min/chem; nitrogenous, double salts and mixtures of calcium nitrate and ammonium nitrate	603,866	1,596
20.15.39	Fertilizers, min/chem; nitrogenous, other kinds including mixtures...	16,072	20
20.15.39	Fertilizers, min/chem; nitrogenous, other than ammonium sulphate	4,370	23
20.15.49	Fertilizers, min/chem; phosphatic, n.e.c. in heading no. 3103	1,992	1
20.15.51	Fertilizers, min/chem; potassic, potassium chloride	8,870	4
20.15.52	Fertilizers, min/chem; potassic, potassium sulphate	100,501	170
20.15.71	Fertilizers, min/chem; containing the three fertilizing elements nitrogen, phosphorus and potassium	1,239,851	1,613
20.15.72	Fertilizers, min/chem; ammonium hydrogen orthophosphate (ammonium phosphate)	24,877	20
20.15.73	Fertilizers, min/chem; ammonium dihydrogen orthophosphate	21,702	72
20.15.74	Fertilizers, min/chem; containing the two fertilizing elements nitrogen and phosphorus...	170,937	567
20.15.75	Fertilizers, min/chem; containing the two fertilizing elements phosphorus and potassium	577,538	421
20.15.76	Nitrates; of potassium	540,257	592
20.15.79	Fertilizers, min/chem; in tablets or similar forms...	162,815	485
20.15.79	Fertilizers, min/chem; n.e.c. in heading no. 3105	608,893	623
20.15.80	Fertilizers, animal or vegetable; whether or not mixed together or chemically treated; fertilizers, produced by the mixing or chemical treatment of animal or vegetable products	105,059	169

*Mapping of data: Research Team; data source: NSC foreign trade data in 10 digit HS codes*

### 8.3. Industry and Services

The fact that main statistics compiled by NSC relies on the data sources of enterprises indicates that the total volume of intermediate consumption by industries should be available in NSC. Moreover, it was assumed that it would be possible to distribute main part of services as an inputs in industries. The missing part was material input structure. For overcoming that shortage -i.e. populating material parts of the intermediate consumption

for industries- was intended to use material input structure of other country with more or less similar economic structure.

In other words, after allocation of all known input statistics (natural gas, electricity, water etc.) for each industry, the reminder would be scaled by the material input structure of the same industry taken from similar economy (See Table below).

Table 8-2. Compilation of Missing Part of the Use Table\*

		Intermediate Use Industries		Other Country Coefficients
Intermediate USE Products		...	10.12	10.12
		<b>Products</b>	14.25	57%
	01.11.11	Wheat	6.75	27%
	01.11.31	Barley	0	
	01.11.70	Leguminous crops	0	
	...	...	0	
	10.51.40	Cheese and curd	0	
	23.52.20	Plaster	4	16%
	24.10.12	Ferro-alloys		
	<b>Total for Materials</b>	...	<b>25</b>	<b>100%</b>
	61	Telecomm..	10	
	49	Land trans.	10	
	56	Food and bev. ...		
		<i>Total Intermediate Consumption by Industries</i>	<b>45</b>	

\*A hypothetical example. In green: values obtained from official statistics, in red: volumes estimated based on coefficients of other countries.

Source: Elaborated by the Research Team

The procedure of completing intermediate consumption table in prior and current version of methodologies differs significantly. It should be admitted that structure of intermediate consumption at the level of industries should be estimated as in terms of services as well as in terms of material inputs for each industry.

From the published statistical sources (CB, PRRC), it was possible to map several crucial inputs such that natural gas, electricity and financial services. Another part of inputs in particular for those of agricultural origin also was possible to map directly to industries. For instance, grapes as intermediaries generally serve for winery and cognac production, the destination of apples and other fruits as intermediaries is food production, wheat is for bakery and so on.

In all cases where the description of the products of intermediate consumption allowed mapping them to particular industry was also carried out manually. For instance part of medicaments classified as intermediaries will be mapped to health industry and so on. This process of mapping is currently going and we will present

obtained statistics in the next report of this series<sup>33</sup>. Meanwhile in the process of this manual mapping team will keep track with the subtotals listed in **Error! Reference source not found.**. The latter is the only source of the published information available at the moment of writing this report.

**Table 8-3. Structure of Intermediate Consumption of Industries (%), 2018.**

<i>NACE Label</i>	<i>Fuel</i>	<i>Energy</i>	<i>Other expenses</i>	<i>Raw materials</i>
<i>Accommodation and food service activities</i>	0.5	4.2	17.7	41.5
<i>Administrative and support service activities</i>	2.8	5.4	45.6	8.8
<i>Agriculture, forestry and fishing</i>	1.6	2.9	17.2	56.3
<i>Arts, entertainment and recreation</i>	0	0.2	94.3	0.5
<i>Construction</i>	5.8	0.7	25.2	51.3
<i>Education</i>	0.3	1.7	12.6	4.7
<i>Electricity, gas, steam and air conditioning supply</i>	0.5	5.6	31.5	25.3
<i>Financial and insurance activities</i>	0	0.5	37.5	2.8
<i>Human health and social work activities</i>	0.5	2	8.6	27.7
<i>Information and communication</i>	0.5	2.5	32.7	7.4
<i>Manufacturing</i>	0.8	3.3	11.8	64.6
<i>Mining and quarrying</i>	5.6	10.2	22	21.5
<i>Other service activities</i>	18.9	0.3	26.4	21.2
<i>Professional, scientific and technical activities</i>	3.6	0.7	33.2	11.7
<i>Public administration and defense; compulsory social security</i>	0	0	67.8	0
<i>Real estate activities</i>	0.8	4.6	32.3	25.2
<i>Transportation and storage</i>	9.2	3.4	30.8	8.6
<i>Water supply; sewerage, waste management and remediation activities</i>	3.4	9.4	31	2.5
<i>Wholesale and retail trade; repair of motor vehicles and motorcycles</i>	2.1	4.2	40.8	22.9

Source: NSC publications.

<sup>33</sup> It should be mentioned, that according to primary calculations of imports about 40% of total intermediate consumption of the economy comes from the imported products.

### 8.4. Intermediate Consumption of the Government

Intermediate consumption of the Government is yet another separate column of intermediate use table compilation, which considerably differs from those, applied to the other industries. The difference is that additional sources of information are publicly available in this case. In contrast to other industries represented in the matrix, the data on Government intermediate consumption can be populated using annual budget execution reports published by Ministry of Finance (MOF).

Despite NSC provides total intermediate consumption expenditures of the Government, further mapping of those totals into the previously chosen dimensions of the matrix will require additional effort and should be compiled in two stages.

At the first stage, based on the economic and functional classifications of the budget, intermediate consumption expenditures of the budget will be split according methodological guidance provided by Government Finance Statistics (GFS). Then, at the second stage, after allocation of known volumes of product groups into the CPA classification, the remaining part will be left for further consideration.

In terms of the remaining part of the intermediate consumption of Government (which will not be possible to allocate through GFS), the Research Team expects to obtain some information from the MOF. We assume that the data on the structure of material expenses of the Government should be available in MOF. Another option under consideration at this point is conduction of a survey with the aim to reveal the structure of material expenses of the Government. If none of the above approaches works, the Research Team will develop expert estimates for unknown cells of the table.

Another issue of the data on Government intermediate consumption is the distribution of any cell of the table between imported and domestically produced use. For the groups of products that are only imported or only domestically produced, the approach will be straightforward. For the groups that are both imported and at the same time have significant level of domestic output, we will consider applying some general proportions based on import volumes and domestic production. All the activities and information related to the intermediate consumption of government are covered in the “Final Consumption” Part of this Report.

### 8.5. Import Use Table

The import part of the Use table is one of the important parts of the final matrix and enlarges the analytical value of the latter, especially, for Armenian economy.

Import Use table represents the volume of imported products and services (by product groups). As in case of domestic production, imported products and services also can be utilized in several ways. In particular, by end-purpose category any product or service can be directed to final consumption, intermediate consumption, capital formation or some mix of the mentioned categories.

Standart data of imported products and services come from two data sources with different valuations. For the products the quite detailed harmonized system classification valued at Cif. prices and covered by 10-digit standard codes is available. Therefore, from the point of view of products, the challenge is to map the imports

of products represented by the harmonized system of classification into the NACE based table. This could be done by standard correspondence table.

Services are available at classification of Balance of Payment (BoP) statistics and are valued at Free on Board (Fob) prices. Thus, the Cif.-FoB adjustments issue related to mapping of services into the chosen dimensions of the matrix will arise. This could be compiled via development of new correspondence table in the actual compilation phase. In this stage of the research, the Team couldn't find any available map, that could be utilized for overcoming this issue.

The next issue is linked to the classification of products by the end purpose. In general, Eurostat Manual of Supply, Use and Input-Output Tables (EMSUIOT) offers two different approaches for this task. The first one relies on available business and trade surveys, while the second one offers an approximation technique. The latter suggests to distribute imported products between intermediate consumption and final use - based on existing general proportions in the whole economy.

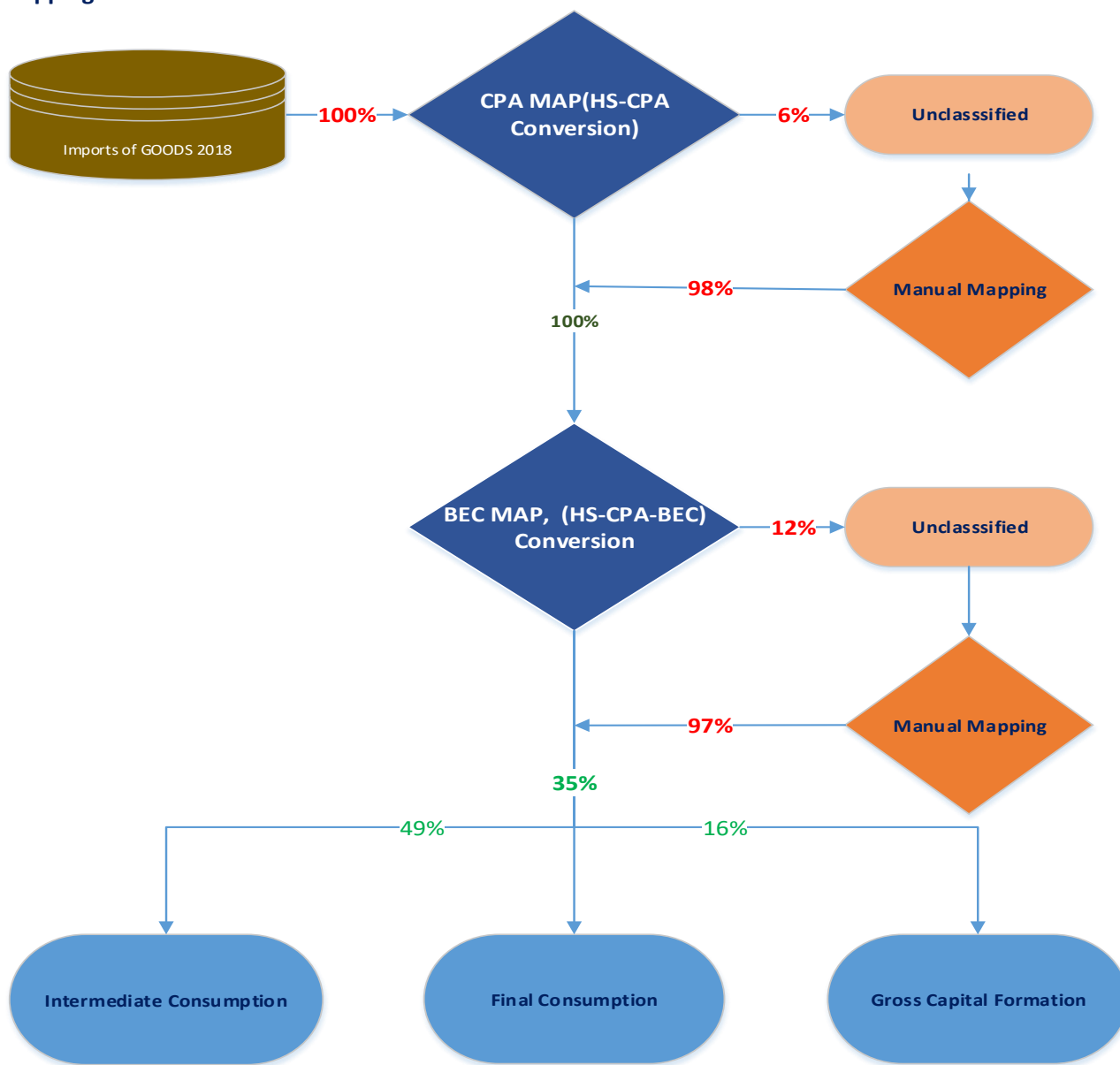
In this terms, however team adopted different approach. At the first stage all the imports from the standart HS classification had transferred into the NACE based CPA format. Then based on general proportions offered by BEC, the end purpose type of each products had been identified. (intermediate consumption, final consumption expenditures, captial goods). As can be inferred from the above description team had already calculated the total volumes of intermediate, final and capital consumption shares in economy coming from the imports at the level of products.

In terms of import use table, part of the products of intermediate consumption (in cases of obvious correspondence) had already been mapped to the industries. The team had more than 500 adjustments both in terms of share calculation as well as in terms of refinement of products by their end purpose categories<sup>34</sup>. All these refinements will be continued by the end of the project. Therefore any shares represented in the current report can be a subject of modification emanating from mentioned adjustments.

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<sup>34</sup> BEC offers 6\_digit HS code mapping, whereas the imported product is available at a 10 digit level.

Figure 8-1. Results of import mapping into the main aggregate groups of end purpose. Overall rate of mapping 98%.



Source: Elaborated by the Research Team

Table 8-4 presents the results of conversion from HS into the CPA classification as well as further distribution by End-Purpose categories at the level of products covered by 2 digit NACE codes. Note that the Team has calculated those volumes at the level of 6-digit NACE codes.

In terms of classification of End-Purpose, shares offered by the BEC had not been directly applied to Armenian economy. The Research Team had reviewed and changed the shares of about 300 products. In each case, the change had been justified by the specifics of Armenian economy.

For instance, BEC at its current version offers to allocate more than 90% from total imported volume of natural gas to intermediate consumption. In NSC however, natural gas is not treated as intermediate consumption for gas streaming industry (at least fully). In case of Armenia however, practical absence of stream generation and

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distribution industry would cause enormous bias. Thus, the End Purpose distribution of natural Gas had been compiled based on the reports of PSRC where one can find distribution of natural gas consumption by more detailed end use categories.

**Table 8-4. Converted table of imports by end purpose categories, mln. USD, 2018**

	<i>Label</i>	<i>Total Imports</i>	<i>of which:</i>		
			<i>Intermediate Demand</i>	<i>Final Consumption</i>	<i>Capital Formation</i>
01	Products of agriculture, hunting and related services	261,117	202,492	58,113	512
02	Products of forestry, logging and related services	75	75	0	0
03	Fish and other fishing products;	2	2	0	0
05	Coal and lignite	318	318	0	0
06	Crude petroleum and natural gas	368,434	152,392	216,042	0
07	Metal ores	2,169	2,169	0	0
08	Other mining and quarrying products	68,289	53,835	14,454	0
10	Food products	428,690	130,177	298,513	0
11	Beverages	42,171	2,138	40,033	0
12	Tobacco products	51,633	4,858	46,775	0
13	Textiles	128,371	112,962	15,309	100
14	Wearing apparel	190,733	4,170	186,562	0
15	Leather and related products	69,996	2,924	67,072	0
16	Wood and of products of wood and cork, except furniture; ....	100,285	99,854	431	0
17	Paper and paper products	89,317	79,607	9,710	0
18	Printing and recording services	851	851	0	0
19	Coke and refined petroleum products	300,486	184,161	116,324	0
20	Chemicals and chemical products	310,889	192,071	105,589	13,229
21	Basic pharmaceutical products and pharmaceutical preparations	151,782	77,070	74,711	0
22	Rubber and plastic products	125,336	108,394	16,943	0
23	Other non-metallic mineral products	121,234	106,404	14,764	66
24	Basic metals	328,105	328,105	0	0
25	Fabricated metal products, except machinery and equipment	122,196	87,142	6,300	28,754
26	Computer, electronic and optical products	316,561	30,619	109,825	176,117
27	Electrical equipment	219,096	89,822	59,631	69,643
28	Machinery and equipment n.e.c.	437,384	93,949	8,492	334,943
29	Motor vehicles, trailers and semi-trailers	167,276	26,740	44,755	95,781
30	Other transport equipment	23,564	1,885	3,859	17,820
31	Furniture	37,295	3,343	23,972	9,980
32	Other manufactured goods	230,112	116,459	76,953	36,700
35	Electricity, gas, steam and air conditioning	8,386	4,183	4,203	0
38	Waste collection, treatment and disposal services; materials ...	119	119	0	0
58	Publishing services	14,316	11,878	2,438	0
59	Motion picture, video and television programmed production ...	1	0	1	0
71	Architectural and engineering services; technical testing and ...	9	9	0	0
74	Other professional, scientific and technical services	7	7	0	0
90	Creative, arts and entertainment services	58	0	58	0
91	Library, archive, museum and other cultural services	2	0	2	0
	Not Classified	93,273	55,129	27,207	8,843

### 8.6. General Value Added

The next step after compilation of Intermediate Consumption Table should stand the compilation of totals of value added by chosen industries. This could be done by subtracting intermediate consumption in purchaser's prices from the output compiled yet in Supply Table. General Value Added is subdivided into the following categories:

Gross value added:

- Compensation of employees
- Other taxes on production
- Other subsidies on production.

Gross operating surplus:

- Consumption of fixed capital on gross operating surplus
- Net operating surplus
- Gross mixed income
- Consumption of fixed capital on mixed income
- Net mixed income.

**Agriculture.** As mentioned earlier, there is no available form of statistics allowing directly compute components of value-added in agricultural industries. This is mainly because from the analytical perspective interpretation of categories such as compensation of employees may not coincide with the one compiled for accounting purposes. There was a need to understand the exact methodology by which NSC compiles those components for agriculture, and then based on that complete it with a more disaggregated level.

However, the reluctance of NSC to provide any data in this respect leaves no option other than to complete the table based on existing published information. In reality, given the nature of agricultural production in Armenia, it is very difficult to distinguish the compensation of employees from other components of value-added. (no accounting records even for the enterprises involved in agricultural production in published forms are available.)

Thus, the total value added in terms of aggregate groups such that (Crops, Animals, Other Products of Agriculture) had been calculated in proportions of output levels (see output for agriculture).

Then, based on the distribution of employment between those groups taken from the general census of agriculture, compensation of employees had been distributed. (Census had listed households by the land and animals). Further distribution inside the aggregated groups will be compiled based on the sown area for different crops, and the number of live animals. Taxes and Subsidies on products are covered in relevant parts of this report.

In terms of Gross Operating Surplus NSC publishes information about total gross operating surplus of Agriculture. At this point team have no option other than to distribute this volumes proportionally based on reminders obtained from described activities.

**Industry.** For all of the components of value added in industries the Team considered to use the raw data contained in the reporting form labeled as "1-F", which supposedly would be provided by NSC. Therefore, at



least for Industry and Services we envisaged no obstacles for compiling all the components of value added at the most extended level. The whole procedure had been discussed in the previous report submitted to the client. However, due to the absence of this information the Team reconsidered the approach of construction.

In terms of industries, there are several sources of information that can be employed to obtain general value-added. First, NSC publishes information on value-added by the most aggregated levels of industries (Mining, Manufacturing, Utilities). Another source of information of the NSC is on the outputs at basic prices covered at 5 digit level of NACE classification. This publication allows obtaining employment by the same level of detail. Along with published information related to the average wage in industries, the volume of compensation of employees was estimated at the level of each industry. Adding up other taxes on industries estimated by the elaboration from the large taxpayers and scaling up with the official data provided by a large group of industries, the distribution of value-added by its components will be obtained.

**Table 8-5. Elements of the table on Compensation of Employees, 2018.**

		Average Wage	Employment
NACE_CODE	NACE LABEL	AMD	Person
07	Mining of metal ores	396,592	7793
08	Other mining and quarrying	116,340	845
10	Manufacture of food products	115,076	14035
11	Manufacture of beverages	214,223	5934
12	Manufacture of tobacco products	191,345	3483
13	Manufacture of textiles	116,487	240
14	Manufacture of wearing apparel	102,489	4821
15	Manufacture of leather and related products	110,990	410
16	Manufacture of wood and of products of wood and cork, except furniture;	80,839	759
17	Manufacture of paper and paper products	119,570	1069
18	Printing and reproduction of recorded media	153,457	1103
20	Manufacture of chemicals and chemical products	127,831	843
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	202,908	704
22	Manufacture of rubber and plastic products	129,896	2259
23	Manufacture of other non-metallic mineral products	143,374	4418
24	Manufacture of basic metals	344,658	3613
25	Manufacture of fabricated metal products, except machinery and equipment	140,453	884
26	Manufacture of computer, electronic and optical products	155,149	1066
27	Manufacture of electrical equipment	133,579	1015
28	Manufacture of machinery and equipment n.e.c.	145,212	791
30	Manufacture of other transport equipment	131,735	46
31	Manufacture of furniture	113,549	707
32	Other manufacturing	127,867	1034
33	Repair and installation of machinery and equipment	161,045	565
35	Electricity, gas, steam and air conditioning supply	255,453	18566
36	Water collection, treatment and supply	176,640	2343
37	Sewerage	124,503	486
38	Waste collection, treatment and disposal activities; materials recovery	117,707	2194

Source: NCS publications; Calculations: Research Team

**Services.** The coverage of Services will at the level of aggregated groups to the extent to which published official statistics will allow. Volume of taxes on services at the most level of detailed had been already completed. See section of taxes.

### 8.7. Final Consumption Expenditures of Households

Final consumption expenditures of households is the other part of Use table, which shows the actual expenses of households on the products and services. Mapping those volumes on production matrix, i.e. finding out the part of final demand of households in the total demand could be carried out with the usage of CPA-COICOP<sup>35</sup>.

In general, COICOP-CPA correspondence is “one to many”, covered by 6-digit level of CPA classification. As it can be inferred from the dimensions chosen for products and services, several categories of products are represented in 6-digit level of CPA classification, whilst there are many others that are covered in more aggregate groups.

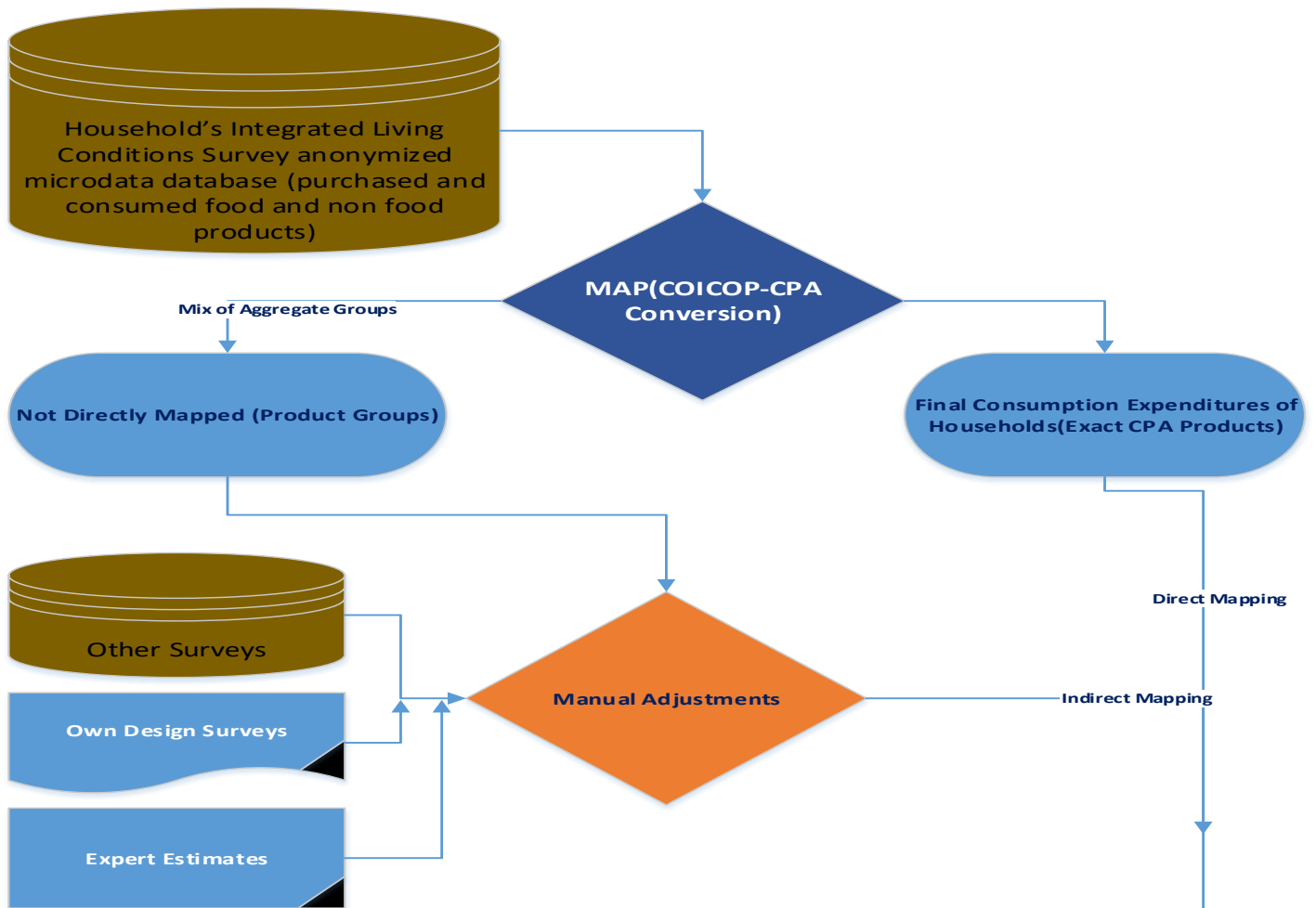
As a main data source for populating the table on Final Consumption Expenditures of Households, the “Households integrated living condition survey” data will be considered. Other sets of surveys for further disaggregation of consumption may be employed dependent on the coverage of COICOP categories. The main issue for mapping the data from household survey into the matrix is the fact that COICOP-CPA correspondence is not always one-to-one. This implies that in many cases we will face the challenge of further disaggregation of COICOP product groups into the chosen dimensions of the matrix.

For instance, the COICOP covers the “fruits” or “meat” as a one large group, whereas primary chosen dimensions of the matrix at this point contain several categories of fruits and meats. In all such cases, the Research Team will rely on the results of other surveys or on expert estimates. Further clarification on this issue will be given after actual compilation phase. The Figure 6 presents the vision of the Research Team for mapping final consumption expenditures of households to the dimensions of the use table, based on available data.

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<sup>35</sup> See: [https://ec.europa.eu/eurostat/ramon/relation/index.cfm?TargetUrl=LST\\_REL&StrLanguageCode=EN&IntCurrentPage=4](https://ec.europa.eu/eurostat/ramon/relation/index.cfm?TargetUrl=LST_REL&StrLanguageCode=EN&IntCurrentPage=4)

Figure 8-2. Mapping Final Consumption Expenditures of Households to the Use Table.



		Imported Intermediate Use Industries	Totals	Individual Final Consumption Expenditures	Gross Capital Formati
Intermediate Use		01.11 ... 10.1			
		<b>Products</b>			
	01.11.11	Wheat			
	01.11.31	Barley			
	01.11.70	Leguminous crops			
	...	...			
	10.51.40	Cheese and curd			
	23.52.20	Plaster			
	24.10.12	Ferro-alloys			
	...	...			
61	Telecomm..				
49	Land trans.				
56	Food and bev. ...				

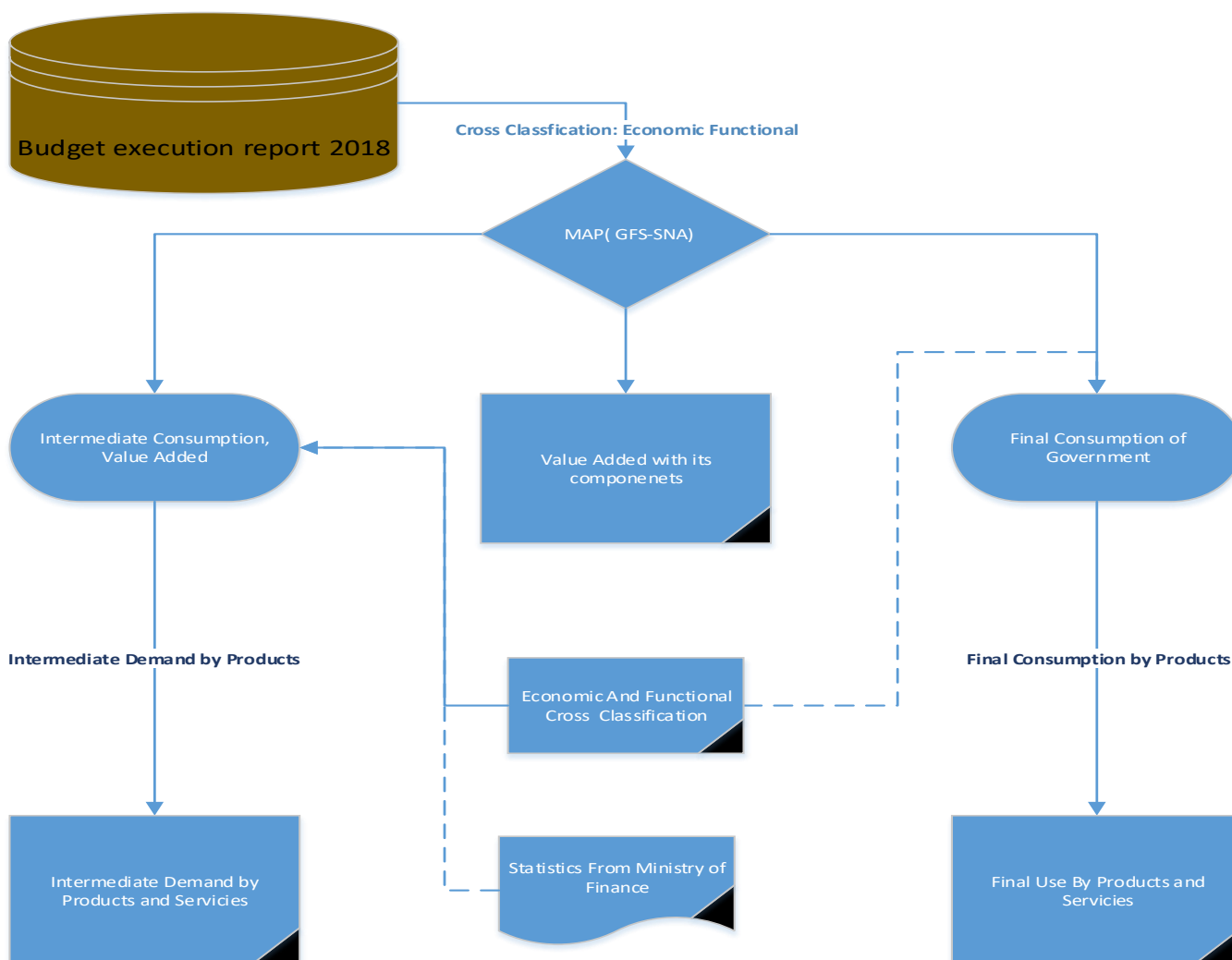
Source: Elaborated by the Research Team

### 8.8. Final Consumption Expenditures of Government

Final Consumption expenditures of Government is the next integral part of the USE table, which indicates the volume of consumption of products and services by the Government. According to SNA 2008, expenditures of Government can be classified in the following ways:

- a. According to whether the goods or services have been produced by market or non-market producers;
- b. According to whether the expenditures are on collective services or individual goods or services;
- c. By function or purpose, according to the classification of the functions of Government; or
- d. By the type of good or service, according to the CPA.

**Figure 8-3. Incorporation of State Budget Data into the Use Table**



According to the *SNA 2008*, most output of Government is of non-market origin, which is estimated by the cost incurred for its production. Further, independent of the type of delivery (Collective, Individual) the costs of delivery are always recorded as final consumption expenditures. Government is involved in purchases of goods and services, which are further transferred to households as final consumption in the form of social transfers in kind. Because the Government is not involved in any processing or transformation of mentioned goods and services, those are also recorded as final consumption expenditures.

Cross-classification of the budget by economic, functional and in some cases by program categories, allowed to separate Government's activities in the basis of individual and collective consumption expenditures. *Table 8-6* covers mentioned distribution.

In particular, mentioned distinction had been done according to the general recommendations of the manual *SNA -2008*. Detailed volumes of those expenditures by the Classification of the Functions of Government (COFOG) groups are presented in the *Table 8-6*. The volumes had been calculated based on the database of the budget execution report of 2018. Again, as in the case of intermediate demand, the volumes of both final consumption expenditures of government as well as in terms of actual final consumption expenditures some differences exist between volumes calculated by the Team and the one represented in official statistics. This issue will be finalized and resolved in the expected meeting with the representatives of NSC.

**Table 8-6. Draft Table of Final Consumption Expenditures of Government by Groups of COFOG (MLN AMD).**

<i>Group</i>	<i>Group Label</i>	<i>Collective Consumption Expenditures</i>	<i>Individual Consumption Expenditures</i>
101	Legislative and executive bodies, public administration, financial and fiscal relations, foreign affairs	21,155	
103	General services	1,035	
104	General research services	10,276	
105	Research and development in the line of general public services	1,373	
106	General public services (not belonging to other classes)	2,155	
107	Operations in the line of public debt	139,015	
108	Transfers of different nature executed between different level of the governance	48,942	
201	Military defense	140,556	
203	External military assistance	107	
204	Research and development in defense sphere	2,231	
205	Defense (not belonging to other classes)	7,177	
301	Public order and security	3,445	
302	Rescue service	164	
303	Judicial work and legal protection	728	
304	Prosecutor's office	39	
305	Places of detention	129	
307	Public order and security (not belonging to other classes)	169	
401	General economic, trade and labor relations	2,404	

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<i>Group</i>	<i>Group Label</i>	<i>Collective Consumption Expenditures</i>	<i>Individual Consumption Expenditures</i>
402	Agriculture, forestry, fishery and hunting	14,611	
403	Fuel and energy	1,244	
404	Mineral resources, industry and construction	17	
405	Transport	23,822	
406	Communication	290	
407	Other spheres	262	
408	Research and development in the line of economic relations	39	
409	Economic relations (not belonging to other classes)	2,306	
501	Waste removal	236	
504	Biodiversity and nature protection	1,125	
506	Environmental protection (not belonging to other classes)	914	
601	House-building	458	
603	Water-supply	1,492	
604	Street lighting	2,286	
606	House-building and utilities (not belonging to other classes)	119	
701	Medical goods, devices and equipment		79
702	Outpatient services		111
704	Public healthcare services		1,874
706	Healthcare (not belonging to other classes)	1,725	
801	Recreation and sport services		1,755
802	Cultural services		12,434
803	Radio and TV programs broadcasting and publishing services	7,992	
804	Religious and other public services		1,067
806	Recreation, culture and religion (not belonging to other classes)	7	
901	Pre-school and general elementary education		28,893
902	General secondary education		53,223
903	Primary vocational and secondary vocational education		9,953
904	Higher education		10,578
905	Education not classified by levels		5,143
906	Auxiliary services provided to education		4,588
908	Education (not belonging to other classes)	4	
1001	Ill health and disability		242
1003	Persons who lost relatives		4,602
1004	Family members and children		60,322
1005	Unemployment		425
1006	Habitation securing		425
1007	Special social privileges (not belonging to other classes)		12,471
1009	Social security (not belonging to other classes)	19,404	
1101	Reserve fund of the Government and communities of RA		28,093

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In terms of Government's intermediate consumption, the full map of separation is not yet complete and requires some additional discussions with the representatives of NSC. The reason is the fact that according to our calculations total volume of intermediate consumption is slightly less than the one published officially. The situation has not changed even after we dig deep to understand source of this bias at the level of programs. This issue will be discussed with the representatives of NSC in order to find out the source of mentioned bias. **Table 8-7** illustrates structure of governments' intermediate consumption by some aggregate groups of inputs. The distribution of those groups in more detailed codes of the matrix will be carried out at the final stage of construction. The point is that we still expect to obtain some information about more detailed structure of government inputs. In any case, it should be noticed that in case of no additional information structure of inputs covered in the table below would be sufficient for further redistribution of expenditures into more detailed groups of the matrix.

**Table 8-7. Draft of the Intermediate Demand of Government Distributed by Economic and Functional Classifications of the Budget Execution Report (MLN AMD), 2018.**

Label	General public services	Defense	Public order, security and judicial work	Economic relations	Environmental protection	House-building and public utilities	Healthcare	Recreation, culture and religion	Education	Social security
Administrative costs	46		140	7				0	6	
Agricultural goods	5	2	27	17						
Communication services	868	14	1,983	47	9	10	13	22	13	1,780
Computer services	1,359		283	25	1	8	60	6	2	74
Costs in the line of foreign business trips	2,017	167	514	89			5	9	225	1
Domestic business trips	206		520	30	50	5	8	10	69	64
Energy costs	1,058	3,038	2,868	113	22	15	31	11	11	90
Healthcare and laboratory materials	1	4	1	432			4,492			
Information services	151	28	84	23	1	2	20	114	2	36
Insurance costs	27	98	112	23	2	1	3	1	4	2
Managerial services	583		77	32		8	8		4	
Office materials and cloths	292	2,419	2,835	42	6	5	4	88	8	32
Operational and bank services costs	17			1						87
Other special purpose materials	72	1,077	1,772	13	2	0		0	5	0
Other transportation costs			28							
Out-departmental costs	91		69							

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Label	General public services	Defense	Public order, security and judicial work	Economic relations	Environmental protection	House-building and public utilities	Healthcare	Recreation, culture and religion	Education	Social security
Personal and catering materials	45	8,525	957	12	1	2	2	1	1	1
Personal and catering services	7	90	5	0		0				
Professional services	368	15	124	153		0		0		997
Property and equipment renting	400	25	133	65	9	4	15	4		70
Public utilities	56	667	295	3	2	0	2	0	0	2
Representative costs	1,903	165	147	21	3	2	1	3	2	1
Retraining and training materials (staff development)		4		0					135	
Staff professional development services	6	134		4					0	0
Transport materials	683	10,281	3,742	102	33	13	20	19	15	40

Source of the data: MOF; data preparation and calculations: Research Team.

Primary analysis of the State Budget expenditures allowed also initial allocation of the state budget by end-purpose categories. Of course, the initial distribution does not allow exact and final allocation of intermediate demand of the government by products and services of the matrix. However, some aggregate groups are automatically mapped to broader categories of the matrix. Some uncertainty remains related to the actual volume of the intermediate consumption calculated by the Team and the one published officially by NSC. The reason of this difference can be attributed to the COFOG category labeled as defense for which the most of expenses are covered as “other costs”. In case of no additional information that can presumably be obtained from the NSC, the shares of intermediate demand of the government will be upgraded by the total volume of officially published intermediate consumption of the government.

The issue of further disaggregation of COFOG groups into the more detailed matrix categories will be carried by keeping track of the volume of mentioned groups. For instance, the volume of the group labeled as “energy costs” will be splitted to include natural gas and electricity, etc.

Other parts of SNA statistics, which can be inferred from the Budget execution reports such that output at basic prices, value added and its components, also had been calculated separately and compared with the official statistics. In all of these cases, the calculated volumes and officially published statistics are in line.



### 8.9. Gross Capital Formation

Gross fixed capital formation is a measure of total value of producer’s acquisitions less disposals of fixed assets during accounting period plus certain specified expenditure on services that adds to the value of non-produced assets . Gross Capital Formation is measured by the total value of the Gross fixed capital formation, changes in inventories and acquisitions less disposals of valuables. (2008 SNA, paragraph 10.31).

In practice, Gross Capital Formation consists of three main components as listed in the following table. The first and most important one is the gross fixed capital formation.

**Table 8-8. Gross Capital Formation: an Illustration**

Gross Capital Formation				
		Gross Fixed Capital Formation	Changes in Inventories	Acquisitions less disposals of valuables
07.2	Mining of non-ferrous metal ores			
08.1	Quarrying of stone, sand and clay			
08.9	Mining and quarrying n.e.c.			
...	...			
10.4	Vegetable and animal oils and fats			
35.1	Electric power.			
35.2	Gas; distribution			
42.2	Construction of utility projects			
...	...			
55.1	Hotels and similar accommodation			
63.9	Other information service activities			
71.2	Technical testing and analysis			
78.3	Other human resources provision			

Source: Elaborated by the Research Team

The first approach of populating this part of the matrix is so-called demand-based approach, which requires the detailed survey data at the level of products used for capital formation. Despite this option is considered as the most reliable, however, we were not able to find any source that could be employed for compilation of this task. The second option, applied in case of absence of appropriate information, is so-called product/commodity flow approach, assuming linkage of output of products to the capital formation by end purpose separation. In other words, the task is in linking the products of capital formation to the industries, which are the utilizers of those products in the form of capital formation. At this point, the Research Team considers this method as the most optimal, taking into account the absence of appropriate information in terms of capital formation at the level of products. The procedure will follow the listed steps.

- Two different matrices of industries, cross-classified by general product types will be constructed. The first will be used for imported capital goods and the second will be employed for domestically produced capital goods.
- Identification of goods by end-purpose will be compiled with the usage of HS-CPA-BEC-mapping separately for domestically produced and imported goods.

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- The sum of totals in both tables will result in total capital formation in the economy. Then based on the nature of capital goods this totals will be further redistributed according to larger commodity groups (dwellings other buildings, transport equipment NEC).
- In case of no fresh source of information, further distribution of large groups into the dimensions of products in the matrix will be compiled based on some general shares. (Output shares).
- In terms of the distribution of those commodities into the producing industries, the following procedure will be employed. First, from the description of the list of imported capital products it was possible to attribute them to some industries. For instance, tractors had been attributed to agriculture, health equipment to the health industry, some food processing machinery to food processing sectors, general furniture to all sectors e.c.t. In other words from the description of imported capital products, it was possible to map them to some industries manually (map will be attached in digital form). The volume of imported capital goods had covered about 40% of total fixed capital formation.
- As for the volumes of domestically produced capital goods, they will be distributed based on expert estimations.

Up to the point of writing this report, team was able to map more than 68% of imported intermediate goods to their corresponding sectors. The work had been carried out manually based on the description of imported capital products up to the 10-digit level of harmonized HS classification (More than 900 products had been reviewed manually).

**Table 8-9. Extract from the Table of Imported Fixed Capital Formation, (Initial distributions) USD, 2018.**

*(Rows Stand For Industries and Columns Stand For Products)*

Industry	Products of agriculture, hunting and related services	Chemicals and chemical products	Other non-metallic mineral products	Fabricated metal products, except machinery and equipment	Computer, electronic and optical products	Electrical equipment	Machinery and equipment n.e.c.	Motor vehicles, trailers and semi-trailers	Other transport equipment	Furniture
<b>To All</b>			65,722	24,206	35,962,668	4,182,311	20,468,461	159,859	76,089	3,341,026
<b>1</b>	558,731						6,020,324	14,400,382		
<b>7</b>							25,297,199			
<b>8</b>							9,122,934			
<b>10</b>							43,013,010			
<b>11</b>							52,371			
<b>12</b>							22,788,255			
<b>14</b>							2,252,060			
<b>17</b>							6,970,206			
<b>28</b>							13,269,202			
<b>31</b>										6,638,977
<b>33</b>							126,727			
<b>35</b>		13,229,340				12,823,999	861,500			
<b>41</b>						23,006,907	11,943,817			
<b>42</b>							19,726,013			

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Industry	Products of agriculture, hunting and related services	Chemicals and chemical products	Other non-metallic mineral products	Fabricated metal products, except machinery and equipment	Computer, electronic and optical products	Electrical equipment	Machinery and equipment n.e.c.	Motor vehicles, trailers and semi-trailers	Other transport equipment	Furniture
47							7,735,458			
49							22,509,462	31,147,568		
52							1,156,744			
58							3,807,819			
59					1,208,003					
61					85,794,763					
82							3,234,649			
84							397,500			
86					21,950,573					
26							850,852			
41							2,735,453			
Not Classified				18,076,086	32,215,276	26,238,026	115,693,857	40,356,291	14,588,694	

Data source: NSC publications; calculations and mapping: Research Team