# *Ethiopia*


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## *1. Introduction*

The Ethiopian input-output (I-O) table in the GTAP 7 Data Base was derived from a Social Accounting Matrix (SAM) recently compiled by the Ethiopian Development Research Institute (EDRI) in collaboration with the Institute of Development Studies at the University of Sussex (IDS). The time period covered by the SAM is from mid-2001 to mid-2002 and corresponds to the Ethiopian Fiscal Year (EFY) 1994 in local calendar time which starts in early July.

This chapter outlines the construction of the Ethopian input-output table for the GTAP 7 Data Base. Both the development of the underlying SAM and its transformation into GTAP format have been undertaken as part of the 2005-2008 EDRI-IDS project "Data Systems and Economy-wide Modeling to Support Policy Analysis in Ethiopia" funded by the UNDP-coordinated Donor Assistance Group for Ethiopia.

The source SAM supports a 39 sector aggregation of the standard 57 GTAP sectors. In line with GTAP requirements as outlined in Huff, McDougall, and Walmsley (2000), the data for Ethiopia obey all mandatory splits and are provided in the unified format consisting of six arrays:

- UF: Use matrices for domestic products, imports and factors, commodity taxes excluded (dimension 78+3, 39+5)
- UP: Use matrices for domestic products, imports and factors, commodity taxes inclusive (dimension 78+3, 39+5)
- OP: output (dimension 39,1)
- MF: Imports, import duties excluded (dimension 39,1)
- SSET: Sector names (dimension 39,1)
- SMAP: Map from standard GTAP sectors (dimension 39,2)

Section 1 describes the main features of the source SAM and its underlying data sources. Section 2 outlines the transformation of the SAM into the GTAP input-output format. Section 3 discusses the results of diagnostic checks and section 4 comments briefly on the potential availability of future updates. The Appendix reports the mapping from the SAM activities and commodities to GTAP sectors as well as the sectoral structure of production, value added and trade for Ethiopia in the reference year.

# *2. Source Data*

The 2001/02 SAM for Ethiopia developed at EDRI in collaboration with IDS distinguishes 42 production activities, 61 commodity groups, 5 primary factors, 2 household groups, 17 tax accounts as well as aggregate accounts for trade margins, transport margins, government, investment, and the rest of the world.

The EDRI SAM Team was led by Hashim Ahmed (preparation of international trade data) and included Ayanaw Amogne (large and medium, small scale and cottage industry data), Birouke Teferra (labour data), Gashaw Bekele (household and livestock data), Gashaw Deriba (agriculture data) and Tewodros "Teddy" Tebekew (household and international trade data). Sherman Robinson and Dirk Willenbockel from IDS collaborated closely with the EDRI Team on all aspects of the data compilation process and took the lead in the assembly and balancing of the complete SAM. Scott McDonald (Oxford Brookes University) provided crucial preparatory data work during the initial work stages. The work also benefited from consultations with Mezgebu Amha (Ministry of Finance and Economic Development – MOFED) who provided access to internal government revenue and expenditure files, and with Elias Fisseha (MOFED) who clarified various critical features of the national accounts data estimation process.

Table 1 exhibits the basic bloc structure of the 2001/02 SAM for Ethiopia, while Table 2 shows the bloc totals in mill. Ethiopian Birr. The entries for the macro aggregates consumer demand (market + home consumption), government consumption, investment demand, exports, imports and indirect tax revenue are consistent with the corresponding MOFED (2006) national accounts data, and hence the values for GDP at factor cost as well as GDP at market prices implied by the SAM data are consistent with the corresponding national accounts estimates. Appendix Tables 1A and 2A provide a detailed listing of the activity and commodity accounts along with a mapping of activities to ISIC Rev.3.1 4-digit codes and a mapping of commodities to activities.[1]

The main data sources for the SAM include national accounts statistics (MOFED, 2006), supply and use tables (MOFED, 2007), industry survey data (CSA, 2003a,b,c), agricultural census data (Central Agricultural Census Commission, 2003), labour force survey data (CSA, 2006), balance of payments statistics (CSA, 2004), household survey data (CSA, 2001) as well as internal government revenue, government expenditure and customs data files.

It should be noted that the value added bloc of the source SAM does not identify land as a separate factor of production, i.e. returns to land are included in the capital cost account. The labor cost accounts include include imputed values for self-employment and unpaid family workers based on labour force survey data as well as imputed values of home production for home consumption. The investment account bloc of the source SAM does not include a separate account for stock changes.

[1] While some activities produce multiple commodities, no commodity in the SAM is produced by more than one activity.

The SAM entries assembled from these data sources provide the initial priors for the estimation of a balanced SAM using a revised version of the cross-entropy method developed by Robinson, Cattaneo and El-Said (2001). A detailed description of the SAM construction process is given in Willenbockel et al (2008).

**Table 1. Structure of the Source Social Accounting Matrix for Ethiopia**

| | Activities | Commodities | Margins | Factors | Households | Government | Indirect Taxes | Direct Taxes | Investment | Rest of World | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Activities** | | Make matrix | | | Home production for home consumption | | | | | | Domestic output bp |
| **Commodities** | Intermediate input demand | | Demand for trade and transport margin services | | Consumer demand (market) | Government consumption | | | Investment demand | Exports | Total market demand pp |
| **Margins** | | Trade and transport margins | | | | | | | | | Total margins |
| **Factors** | Factor Costs | | | | | | | | | Factor income from RoW | Factor account total |
| **Households** | | | | Factor income | | Government transfers to households | | | | Transfers to Households from RoW (net) | Total household income |
| **Government** | | | | | | | Indirect tax revenue | Direct taxrevenue | | Transfers to government from RoW (net) | Government account total |
| **Indirect Taxes** | | Taxes on commodities | | | | | | | | | Indirect tax revenue |
| **Direct Taxes** | | | | | Direct taxes | | | | | | Direct tax revenue |
| **Investment** | | | | | Household savings | Government savings | | | | Foreign savings (net) | Total savings |
| **Rest of World** | | Imports cif | | Factor income to RoW | | | | | | | RoW account total |
| **Total** | Domestic output bp | Total market supply pp | Total margins | Factor account total | Total household income | Government account total | Indirect tax revenue | Direct tax revenue | Total investment | RoW account total | |

**Table 2. The Macro SAM for Ethiopia 2001/2002**

| *in mill birr* | **Activities** | **Commodities** | **Margins** | **Factors** | **Households** | **Government** | **Indirect Taxes** | **Direct Taxes** | **Investment** | **Rest of World** | **Total** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Activities** | | 90,110 | | | 6,072 | | | | | | 96,182 |
| **Commodities** | 37,257 | | 18,099 | | 42,989 | 10,393 | | | 14,247 | 8,027 | 131,013 |
| **Margins** | | 18,099 | | | | | | | | | 18,099 |
| **Factors** | 58,924 | | | | | | | | | 103 | 59,027 |
| **Households** | | | | 58,693 | | 1,625 | | | | 2,906 | 63,225 |
| **Government** | | | | | | | 5,095 | 2,831 | | 3,729 | 11,655 |
| **Indirect Taxes** | | 5,095 | | | | | | | | | 5,095 |
| **Direct Taxes** | | | | | 2,831 | | | | | | 2,831 |
| **Investment** | | | | | 11,333 | -363 | | | | 3,277 | 14,247 |
| **Rest of World** | | 17,709 | | 334 | | | | | | | 18,044 |
| **Total** | 96,182 | 131,013 | 18,099 | 59,027 | 63,225 | 11,655 | 5,095 | 2,831 | 14,247 | 18,044 | 419,416 |

# 3. Transforming the Source Data to GTAP Format

## 3.1 Mapping from SAM Activities to GTAP Sectors

In a first step, the 57 GTAP sectors have been mapped into the 42 SAM activities using the concordances from the GTAP sectoral classification to GSC2 and ISIC Rev.3 in Huff, McDougall, and Walmsley (2000) in combination with the concordance between the Ethiopia SAM activities and ISIC Rev.3.1 in Table 1A. For 26 GTAP sectors there is a straightforward one-to-one mapping, and in these cases the GTAP codes are adopted for the Ethiopia data set in GTAP format. This count includes four GTAP sectors without domestic production in Ethiopia, namely coal, oil, gas, and petroleum, coal products. For three GTAP sectors, the Ethiopia SAM activities are more disaggregated than in the GTAP classification and have been aggregated accordingly. In particular, the GTAP cereal grains nec sector (gro) includes the original SAM activities maize (amaiz), barley (bar), teff (atef) and other crops (acrop); beverages and tobacco products (b_t) is the composite of abev and atob; and osg includes apadmin and aeduhea. On the other hand, in a number of cases, the original SAM data do not support the disaggregation level of the GTAP standard classification and thus eleven of the 39 sectors distinguished in the submitted Ethiopia GTAP data set are composites of several GTAP sectors as shown in Table 3A. The resulting 39 sector classification obeys all mandatory splits for GTAP I-O tables and is listed in Table 4A.

## 3.2 Converting the SAM into I-O Table Format

In a second step, the activity and commodity accounts of the original SAM are aggregated into the 39-activity and corresponding 39-commodity sector classification while the eight indirect tax accounts are aggregated into two tax accounts for indirect taxes on domestically produced commodities and on imports respectively. The consumer expenditure vectors for rural and urban households are merged and the labor cost vectors for the four occupational distinguished in the original SAM are added up.

The resulting new SAM is characterized by a purely diagonal make matrix. Hence at this stage the distinction between activities and commodities can be dropped and it is now straightforward to collapse the activity and commodity account blocs of the SAM into a consistent standard input-output table format, in which the entries in the intermediate input and final demand blocs represent the sums of domestic plus import purchases at purchaser prices.

In the course of the extraction of this symmetric 39-sector input-output table from the SAM, the domestic trade and transport margins by commodity are moved to the intermediate input bloc by adding trade margins to intermediate purchases of trd services and transport margins to intermediate purchases of trnscom services. Home production for home consumption, which is recorded as direct purchases by households from activities in the original SAM, is added to the consumer expenditure vector.

## 3.3 Constructing the UP and UF Tables

In a third step, the UP and UF tables - i.e. the use table inclusive and exclusive of indirect taxes – are constructed from the import-inclusive input-output table in purchaser prices obtained in the second stage. This step involves the decomposition of the use flows into their domestically

produced and imported components and the separation of indirect taxes for each of these components.

This decomposition is achieved by first calculating for each industry the ratio of

- imports (cif) to the value of supply net of exports and home consumption (r1);

- indirect taxes on domestic products to the value of supply net of exports and home consumption (r2);

- indirect taxes on imports to the value of supply net of exports and home consumption (r3).

Given these ratios,

- the domestic array of the UP table is obtained by multiplying the intermediate and final demand blocs (except exports and home consumption) of the input-output table horizontally with the vector (1-r1-r3);

- the import array of the UP table is obtained by multiplying the intermediate and final demand blocs (except exports and home consumption) of the input-output table horizontally with the vector (r1+r3);

- the domestic array of the UF table is obtained by multiplying the intermediate and final demand blocs (except exports and home consumption) of the input-output table horizontally with the vector (1-r1-r2-r3);

- the import array of the UP table is obtained by multiplying the intermediate and final demand blocs (except exports and home consumption) of the input-output table horizontally with the vector (r1).

For consumer expenditure, these operations are only applied to market consumption (i.e. total consumption net of home production for home consumption), since home consumption is by definition non-traded and not subject to indirect taxation. Thus, the consumer expenditure vectors for domestic products in the UP and UF tables are derived by adding home consumption *after* performing the described multiplicative operations on market consumption.

The value added blocs of the UF and UP arrays as well as the OP vector of output values and the MF vector of import values that complete the Ethiopia data set in the GTAP unified format are directly taken from the 39-sector input-output table.

Note that none of the transformative steps described above disturb the initial sectoral supply-demand balances and correspondingly no resort to a mechanical rebalancing algorithm was taken at any stage.

# *4. Diagnostics*

Prior to submission of the Ethiopia data to GTAP we conducted the consistency checks outlined in Huff, McDougall and Walmsley (2000) by verifying that the data set obeys the sectoral balance

conditions and the pre-tax values of all flows are non-negative. The post-submission diagnostic checks by GTAP (Lakatos, 2008) have confirmed the validity of

- the mapping to the 57 GTAP sectors

- the mandatory splits

- the order of final demand categories and primary factors

- the sign conditions

- the balance conditions.

- the treatment of government final demand

- the "no ridiculous tax rates" test.

The GTAP review of the Ethiopia I-O data set has flagged up a number of significant deviations in intermediate input shares from those of a "representative" table. However, a majority of these deviations appear to reflect genuine specific characteristics of the Ethiopian economy.

In particular, 17 of the top 30 "unusual" intermediate use shares refer to high intermediate trade and transport costs. These cost shares reflect the domestic trade and transport margins in the source SAM (see table 2). In the source SAM, trade and transport margins are based on the corresponding margin rates of the 1999/00 Supply and Use Table for Ethiopia (MOFED, 2007) supplemented with survey data on tax-adjusted differences between wholesale and retail prices for a sub-set of commodity groups. Both data sources suggest indeed far higher margins than in the representative table. The high transport margins are a reflection of the poorly developed transport infrastructure and the special topography of the country.

Another set of apparent anomalies in intermediate input coefficients arises from the absence of any genuine domestic production in a number of sectors in combination with the presence of significant *domestic* transport and trade margins on imports. E.g., the oil input share in p_c production is zero for the plain reason that there is no oil refining taking place in Ethiopia. By construction, the domestic p_c sector in the I-O table only buys trade and transport services to deliver p_c imports from the point of entry to the point of use. Similarly, the gas input coefficient for gdt is zero due to the absence of a gas distribution network in Ethiopia. In the tables gdt is only carried as a separate sector with zero entries everywhere to show explicitly that gdt has not been lumped together with electricity or any other sector.

The input share of lvst in meatfv is very low because meatfv includes fruit and vegetable oils and fats (vol) and in Ethiopia, most meat consumption is direct home production for home consumption and is treated as direct lvst consumption by households in the source SAM, i.e. home slaughtering is not recorded as production of the meat processing sector.

The share of own intermediate consumption in the sgr sector is low because sugar processing in Ethiopia is primarily processing of sugar cane and beets (c_b, which is part of the cash crops sector in the Ethiopia tables) into sugar with little further processing of refined sugar into sugar products.

The recorded share of own intermediate consumption in the ele sector is zero since domestic Ethiopian electronic equipment production in 2001/02 consists exclusively of basic battery manufacturing which requires inputs of chemicals but no ele input.

The large share of cash crop inputs in Ethiopia's textile production reflects plant-based fibre (pfb, included in cash crops) use in domestic textile production, which consists primarily of spinning, weaving and manufacture of cordage, rope and twine with little further processing. This may also help to explain the low own input share of tex compared to the "representative" table.

Finally, the low own intermediate input share of lea may be explained by the fact that the sector includes all footwear including non-leather shoes and Ethiopian footwear production consists predominantly of non-leather shoes.

# *5. Future Updates*

The SAM Team at EDRI in collaboration with IDS is currently working on a new Social Accounting Matrix for the financial year 2005/06. This new matrix is scheduled to become available in 2009 and may serve as the basis for future updates of the Ethiopia I-O Tables for the GTAP Data Base.

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# *Appendix*

**Table 1A. SAM Activities and Concordance with ISIC Rev.3.1**

| Code | Activity Description | ISIC |
|---|---|---|
| atef | Growing of Teff | in 011 |
| abar | Growing of Barley | in 011 |
| awhea | Growing of Wheat | in 011 |
| amaiz | Growing of Maize | in 011 |
| apul | Growing of Pulses | in 011 |
| avegfr | Growing of Vegetables and Fruits nec | in 011 |
| aoils | Growing of oil seeds | in 011 |
| acash | Growing of cash crops nec: Sugar cane and beet, tea, chatt, plant-based fibres, cotton | in 011 |
| acrop | Growing of crops nec | in 011 |
| acoff | Growing of coffee | in 011 |
| alivst | Livestock farming, dairy farming, production of animal products | 0121,0122 |
| afisfor | Forestry and fishing | 0200,0500 |
| amining | Mining and quarrying | 1010-1429 |
| ameatfv | Production, processing and preserving of meat and meat products | 1511 |
| | Production and preserving of fish and fish products | 1512 |
| | Processing and preserving of fruit and vegetables | 1513 |
| | Manufacture of vegetables and animal oils and fats | 1514 |
| adairy | Manufacture of dairy products | 1520 |
| agmill | Manufacture of grain mill products | 1531 |
| | Manufacture of starches and starch products | 1532 |
| asug | Manufacture of sugar | 1542 |
| | Manufacture of cocoa, chocolate and sugar confectionery | 1543 |
| aofood | Manufacture of prepared animal feeds | 1533 |
| | Manufacture of bakery products | 1541 |
| | Manufacture of macaroni, noodles, couscous and similar farinaceous products | 1544 |
| | Manufacture of other food products n.e.c. | 1549 |
| abev | Distilling, rectifying and blending of spirits; ethyl alc production from fermented materials | 1551 |
| | Manufacture of wines | 1552 |
| | Manufacture of malt liquors and malt | 1553 |
| | Manufacture of soft drinks; production of mineral waters | 1554 |
| atob | Manufacture of tobacco products | 1600 |
| atext | Preparation and spinning of textile fibres; weaving of textiles | 1711 |
| | Finishing of textiles | 1712 |
| | Manufacture of made-up textile articles, except apparel | 1721 |
| | Manufacture of carpets and rugs | 1722 |
| | Manufacture of cordage, rope, twine and netting | 1723 |
| | Manufacture of other textiles n.e.c. | 1729 |
| | Manufacture of knitted and crocheted fabrics and articles | 1730 |
| aapar | Manufacture of wearing apparel except fur apparel | 1810 |
| aleath | Tanning and dressing of leather | 1911 |
| | Manufacture of luggage handbags and the like, saddlery and harness | 1912 |
| | Manufacture of footwear | 1920 |
| awood | Wood and wood products | 20 |
| apaperp | Manufacture of paper and paper products; publishing; printing | 21,22 |

**Table 1A. SAM Activities and Concordance with ISIC Rev.3.1**

| Code | Activity Description | ISIC |
|---|---|---|
| achem | Manufacture of chemicals, rubber and plastic products | 24, 25 |
| aminprod | Manufacture of mineral products | 26 |
| aferr | Manufacture of basic iron and steel | 2710 |
| amprod | Manufacture of metal products | 28 |
| amach | Manufacture of ovens, furnaces and furnace burners | 2914 |
| | Manufacture of machinery for food, beverage and tobacco processing | 2925 |
| aelecq | Manufacture of accumulators, primary cells and primary batteries | 3140 |
| aveh | Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers | 3420 |
| | Manufacture of parts and accessories for motor vehicles and their engines | 3430 |
| aomanu | Manufacture of furniture | 3610 |
| | Manufacture of jewellery and related articles | 3691 |
| aelect | Electricity | 4010 |
| awater | Water | 4100 |
| acons | Construction | 45 |
| atrad | Wholesale and retail trade; repairs | 5010-5262 |
| atrncom | Transport and communication | 60-64 |
| afserv | Financial intermediation | 66,67 |
| apadmin | Public administration | 75 |
| aeduhea | Education, health and social work | 80,85 |
| aoserv | Real Estate, Renting and Business Activities | 70,71 |
| | Other Community, Social and Personal Services | 90-95 |
| | Private Households with Employed Persons | |
| | Hotels and Restaurants | 5510-5262 |

**Table 2A. SAM Commodities and Mapping to Activities**

| Code | Commodity Description | Activity |
|---|---|---|
| ctef | Teff | atef |
| cbar | Barley | abar |
| cwhea | Wheat | awhea |
| cmaiz | Maize | amaiz |
| cpul | Pulses | apul |
| cveg | Vegetables nec | avegfr |
| coils | Oil seeds | aoils |
| ccane | Sugar cane sugar beet | acash |
| cfruit | Fruit Crops | avegfr |
| ctea | Tea | acash |
| cchat | Chat | acash |
| ccoff | Coffee | acoff |
| ccrop | Cereal grains and other crops nec | acrop |
| cfibre | Plant-based fibers | acash |
| ccatt | Cattle | alivst |
| cpoul | Poultry; Other small livestock | alivst |
| cmilk | Raw milk | alivst |
| ccott | Raw cotton, Wool, silk-worm cocoons | acash |
| caprod | Animal products nec | alivst |
| cfors | Forestry | afisfor |
| cfish | Fishing | afisfor |
| ccoal | Coal | no domestic production |
| cngas | Gas | no domestic production |
| cmin | Minerals nec | amining |
| cmeat | Meat products | ameatfv |
| cvprod | Vegetable products; animal oils and fats | ameatfv |
| cdairy | Dairy products | adairy |
| csug | Sugar and sugar confectionary | asug |
| cgmill | Grain mill products | agmill |
| cfood | Food products nec; animal feeds | aofood |
| cbev | Beverages | cbev |
| ctob | Tobacco Products | ctob |
| ctext | Textiles | atext |
| capar | Wearing apparel | aapar |
| cleath | Leather products | aleath |
| cwood | Wood products | awood |
| cpaper | Paper products publishing | apaperp |
| coilptrl | Petroleum coal products | no domestic production |
| cfert | Fertilisers | no domestic production |
| cchem | Chemicals, rubber and plastic products | achem |
| cminprod | Mineral products nec | aminprod |
| cferr | Ferrous metals | aferr |
| cmetal | Metals nec | no domestic production |
| cmprod | Metal products | amprod |
| cveh | Motor vehicles and parts; other transport equipment | aveh |
| coilptrl | Petroleum coal products | no domestic production |

**Table 2A. SAM Commodities and Mapping to Activities**

| Code | Commodity Description | Activity |
|---|---|---|
| cfert | Fertilisers | no domestic production |
| cchem | Chemicals, rubber and plastic products | achem |
| cminprod | Mineral products nec | aminprod |
| cferr | Ferrous metals | aferr |
| cmetal | Metals nec | no domestic production |
| cmprod | Metal products | amprod |
| cveh | Motor vehicles and parts; other transport equipment | aveh |
| celecq | Electronic equipment | aelecq |
| cmach | Machinery and equipment nec | amach |
| comanu | Manufactures nec | aomanu |
| celect | Electricity | aelect |
| cwater | Water | awater |
| ccons | Construction | acons |
| ctrad | Trade and repair services | atrad |
| chotel | Hotels and restaurants | aoserv |
| ctrans | Transport services | atrncom |
| ccomm | Communication | atrncom |
| cfserv | Financial services | afserv |
| cpadmin | Public administration and defence | apadmin |
| ceduc | Education | aeduhea |
| cheal | Health | aeduhea |
| coserv | Recreation and other services | aoserv |
| crest | Real estate and renting services | aoserv |

**Table 3A. Mapping from 57 GTAP Sectors to 39 Ethiopia I-O Sectors to SAM Codes**

| No. | GTAP Code | Ethiopia IO Code | SAM Code | No. | GTAP Code | Ethiopia IO Code | SAM Code |
|---|---|---|---|---|---|---|---|
| 1 | pdr | gropdr | acrop | 39 | otn | mvhotn | aveh |
| 2 | wht | wht | awhea | 40 | ele | ele | aelecq |
| 3 | gro | gropdr | atef<br>abar<br>amaiz<br>acrop | 41 | ome | ome | amach |
| 4 | v_f | v_f | avegfr | 42 | omf | omf | aomanu |
| 5 | osd | osd | aoils | 43 | ely | ely | aelect |
| 6 | c_b | cash | acash | 44 | gdt | gdt | aelect |
| 7 | pfb | cash | acash | 45 | wtr | wtr | awater |
| 8 | ocr | cash | acash | 46 | cns | cns | acons |
| 9 | ctl | lvst | alivst | 47 | trd | trd | atrad |
| 10 | oap | lvst | alivst | 48 | otp | trncom | atrncom |
| 11 | rmk | lvst | alivst | 49 | wtp | trncom | atrncom |
| 12 | wol | cash | acash | 50 | atp | trncom | atrncom |
| 13 | for | fisfor | afisfor | 51 | cmn | trncom | atrncom |
| 14 | fsh | fisfor | afisfor | 52 | ofi | finsrv | afserv |
| 15 | col | col | *- | 53 | isr | finsrv | afserv |
| 16 | oil | oil | * | 54 | obs | oserv | aoserv |
| 17 | gas | gas | * | 55 | ros | oserv | aoserv |
| 18 | omn | omn | amining | 56 | osg | osg | apadmin<br>aeduhea |
| 19 | cmt | meatfv | ameatfv | 57 | dwe | oserv | aoserv |
| 20 | omt | meatfv | ameatfv | | | | |
| 21 | vol | meatfv | ameatfv | | | | |
| 22 | mil | mil | adairy | | | | |
| 23 | pcr | ofood | aofood | | | | |
| 24 | sgr | sgr | asug | | | | |
| 25 | ofd | ofood | aofood | | | | |
| 26 | b_t | b_t | abev<br>atob | | | | |
| 27 | tex | tex | atext | | | | |
| 28 | wap | wap | aapar | | | | |
| 29 | lea | lea | aleath | | | | |
| 30 | lum | lum | awood | | | | |
| 31 | ppp | ppp | apaperp | | | | |
| 32 | p_c | p_c | * | | | | |
| 33 | crp | crp | achem | | | | |
| 34 | nmm | nmm | aminprod | | | | |
| 35 | i_s | i_s | aferr | | | | |
| 36 | nfm | nfmmp | * | | | | |
| 37 | fmp | nfmmp | amprod | | | | |
| 38 | mvh | mvhotn | aveh | | | | |

**Table 4A. GTAP Ethiopia I-O Table Sectors and Output, Value Added and Trade Shares (%)**

| Code | Description | Gross Output | Value Added | Exports | Imports |
|---|---|---|---|---|---|
| gropdr | Cereal grains nec and Paddy rice | 5.86 | 8.58 | 0.40 | 1.34 |
| wht | Wheat | 1.33 | 1.95 | 6.79 | 0.00 |
| v_f | Vegetables fruit nuts | 6.72 | 11.73 | 0.04 | 4.93 |
| osd | Oil seeds | 0.53 | 0.70 | 0.06 | 4.09 |
| cash | Cash crops | 4.17 | 6.78 | 0.14 | 22.57 |
| lvst | Livestock, Animal products and Raw milk | 4.12 | 6.97 | 0.02 | 0.18 |
| fisfor | Forestry and Fishing | 3.20 | 5.55 | 0.01 | 0.03 |
| omn | Minerals nec | 0.66 | 0.74 | 0.05 | 4.41 |
| col | Coal | 0.00 | 0.00 | 0.02 | 0.00 |
| roil | Oil | 0.00 | 0.00 | 0.00 | 0.00 |
| gas | Gas | 0.00 | 0.00 | 0.03 | 0.00 |
| meatfv | Meat, fruit and vegetable products | 0.78 | 0.11 | 1.21 | 0.58 |
| mil | Dairy products | 0.13 | 0.02 | 0.12 | 0.00 |
| sgr | Sugar | 0.62 | 0.72 | 0.15 | 1.73 |
| ofd | Food products nec | 3.65 | 1.19 | 2.62 | 0.47 |
| b_t | Beverages and tobacco products | 1.27 | 1.08 | 0.47 | 0.02 |
| tex | Textiles | 0.80 | 0.57 | 4.24 | 0.34 |
| wap | Wearing apparel | 1.89 | 0.09 | 3.28 | 0.00 |
| lea | Leather products | 1.41 | 0.29 | 0.11 | 6.17 |
| lum | Wood products | 0.22 | 0.08 | 0.44 | 0.01 |
| ppp | Paper products publishing | 0.37 | 0.26 | 2.14 | 0.00 |
| p_c | Petroleum coal products | 2.25 | 0.00 | 13.46 | 0.00 |
| ccrp | Chemical rubber plastic prods | 1.04 | 0.43 | 13.76 | 0.04 |
| nmm | Mineral products nec | 1.08 | 0.45 | 0.75 | 0.00 |
| i_s | Ferrous metals | 0.41 | 0.12 | 3.10 | 0.00 |
| nfmmp | Metals nec and Metal products | 1.80 | 0.17 | 4.19 | 0.16 |
| mvhotn | Motor vehicles and parts, Other transport equipment | 1.04 | 0.09 | 8.69 | 0.27 |
| ele | Electronic equipment | 0.20 | 0.00 | 5.73 | 0.01 |
| ome | Machinery and equipment nec | 1.09 | 0.00 | 10.90 | 0.03 |
| omf | Manufactures nec | 1.32 | 0.24 | 1.19 | 0.06 |
| ely | Electricity | 0.74 | 1.29 | 0.00 | 0.00 |
| wtr | Water | 0.94 | 1.36 | 0.00 | 0.00 |
| gdt | Gas manufacture distribution | 0.00 | 0.00 | 0.00 | 0.00 |
| cns | Construction | 9.70 | 5.30 | 0.48 | 0.00 |
| trd | Trade | 10.35 | 12.38 | 0.00 | 0.00 |
| trnscom | Transport and Communication | 9.39 | 6.19 | 9.82 | 26.41 |
| finsrv | Financial services | 0.88 | 1.52 | 0.63 | 1.52 |
| oserv | Business services, Recreation, Dwellings and Other Services | 9.67 | 11.57 | 4.97 | 15.98 |
| osg | Public administration and defense, education, health | 10.36 | 11.46 | 0.00 | 8.65 |
| Sum | | 100.00 | 100.00 | 100.00 | 100.00 |