

Chapter 15

Disaggregating agricultural and food sectors

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One of the main features of the GTAP version 4 data base is the detailed sectoral classification of agricultural and food products. GTAP 4 distinguishes twelve sectors within agriculture, and eight within the area of food, beverages, and tobacco (see table 15.1 for a concordance between version 3 and version 4 sectors). This however creates a problem in data collection, since few countries' Input-Output (I/O) statistics provide such fine sectoral detail.

Two approaches have been taken to address this problem. For some countries, the I/O data contributors undertook the agricultural disaggregation themselves. This was done for Australia, Denmark, the European Union, Indonesia, the United Kingdom, Uruguay, and the USA (see further chapter 14). For the remaining countries, the disaggregation was undertaken centrally. To support this centralized disaggregation process, the present author created a new multi country agriculture and food products data set. This chapter documents that data set.

In its first implementation, the agriculture and food products data set covers the twenty-four GTAP 4 primary regions that lack full sectoral detail in agriculture and food processing. Of these regions, fifteen were included in GTAP 3: Argentina, Brazil, Canada, the Central European Associates, Chile, China, the former Soviet Union, Hong Kong, Japan, Korea, Malaysia, Mexico, Philippines, Singapore, and Thailand. These data sets provide a complete I/O structure covering production, trade, and use. A further nine regions are new to GTAP 4: Finland, Germany, Morocco, South Africa, Sri Lanka, Sweden, Taiwan, Turkey, and Vietnam. Here the data set provides production and trade data only. The new multi country agriculture and food products data

documented in this chapter are based on the I/O tables supplied for the pre-release of the GTAP data base version 4. Data reported in this chapter therefore do not reflect changes in some I/O tables between the pre-release and final release of the version 4 data base. On the other hand, some I/O tables such as the Danish and the Australian were revised prior to the final release on the basis of the findings in this chapter.

15.1 Data utilized

In the absence of an I/O table available at the GTAP version 4 level of aggregation, a supplemental food and agricultural data base are needed to provide guidance on how to disaggregate the existing version 3 commodities into the newly defined version 4 commodities. The supplemental data base should contain certain key information, such as the value of production, consumption, trade, and key intermediate sales shares (i.e., sales of vegetables, fruits, and nuts; oilseeds; sugar cane and beets; plant-based fibers; and crops, n.e.c. to the food processing industries), for all GTAP version 4 food and agricultural commodities. Because this type of information is needed across many regions, a global data base with consistent commodity definition across regions is preferred to obtaining data for individual countries. A global data base that meets these criteria is the supply utilization data base of the Food and Agricultural Organization (FAO) of the United Nations.

The FAO supply utilization data base provides information on the quantity of a commodity produced, imported, exported, and utilized in different uses, such as processing, for a given country. Because these data are more disaggregated than the GTAP version 4 commodity definitions, a concordance between the FAO commodities and the GTAP version 4 commodities is required. Table 15.2 provides this concordance. Dollar values are then determined by multiplying the FAO quantity data by an estimated world price, in U.S. Dollars, for that commodity. Due to a lack of world price data for all commodities included in the supply utilization data, particularly for the fruits and vegetables, implicit U.S. prices are used (U.S. value of production divided by quantity produced) to supplement the world price estimates.¹ Tables 15.3 and 15.4 provide the specific prices used and the source of the data.

Table 15.5 lists the estimated values of production, imports, exports, total availability, and feed usage for the new GTAP version 4 crops, by country or region, based on the FAO supply utilization data base. Table 15.6 lists the estimated values of production, imports, exports, and total availability for the new GTAP version 4 livestock's commodities, by region, based on the FAO data base. As mentioned above, data are available on the quantities going to processing use and food

¹ In computing the dollar values of production, trade, etc., for the new GTAP commodities, having price estimates for each region would have been preferable to using the same price for all regions. Given time constraints, collecting price data for each country/region was impossible. However, the FAO has a new producer price series for selected commodities by country, which may be useful in future GTAP data bases.

consumption in the FAO data base. However, the food consumption data includes not only the quantity of direct consumption of the agricultural commodity, but also the quantities of all the processed products based on the raw agricultural commodity. For example, several regions in the FAO data base had large quantities of raw sugar going to food consumption. This likely reflects the use of processed sugar in a variety of food products rather than direct consumption of raw sugar. Since it is useful to be able to identify direct consumption of the raw commodity from consumption of its processed forms, the consumption utilization data was not used.

Because the FAO data provides greater coverage of agricultural commodities than processed food products, determining a value for the GTAP version 4 “food products, n.e.c.” commodity is problematic. For regions that have an existing I/O table at the GTAP version 3 level of aggregation, food products, n.e.c. is treated as a residual. First the values of production and trade, of vegetable oils and fats and refined sugar, based on the FAO data and estimated world prices, are determined. Then those values are subtracted from the row/column totals and trade cells in the version 3 I/O table to obtain production and trade values of food products, n.e.c. For those regions without an I/O table at the GTAP version 3 level of aggregation, the value of food products, n.e.c. is left undetermined in the agriculture and food products data set, to be resolved later, in the course of disaggregating the contributed I/O tables for those regions.

15.2 Disaggregation procedure for regions with existing version 3 I/O tables

For countries/regions that have I/O tables available at the GTAP version 3 level of aggregation, but not at the GTAP version 4 level of aggregation,² the disaggregation of the food and agricultural sectors is accomplished by “splitting” the appropriate rows and columns in the version 3 I/O table. In this context, the term splitting refers to the allocation of all sales and input costs of the existing GTAP version 3 commodities among the new GTAP version 4 commodities. For example, sales and input costs of the GTAP version 3 commodity “non grain crops” is allocated to the new GTAP version 4 commodities: vegetables fruits, and nuts; oilseeds; sugar cane and sugar beets; plant-based fibers; and crops, n.e.c. The disaggregation process described below first allocates sales and then allocates input costs.

² These countries/regions are Argentina, Brazil, Canada, Chile, China, Former Soviet Union, Hong Kong, Japan, Korea, Malaysia, Mexico, Philippines, Singapore, and Thailand.

15.2.1 Identification of key sales linkages

In allocating the sales of an existing GTAP version 3 commodity to the new GTAP version 4 commodities, it is crucial that key sales linkages are maintained. For example, the GTAP version 3 “non-grain crop” sales to version 3 “other food” is decomposed into sales of “vegetables, fruits, and nuts”, “oilseeds”, “sugar cane and sugar beets”, “plant-based fibers” and “crops, n.e.c.” to “vegetable oils and fats”, “sugar”, and “food products, n.e.c.” (In this case, one is taking a single cell in the GTAP version 3 I/O table and expanding it into a 5x3 sub-matrix.) It is likely that the relative sales shares of the agricultural commodities to these processing industries will vary. For example, the bulk of sugar cane and sugar beet sales are likely to be made to sugar processors, while relatively little of plant-based fiber sales would go to food processors. Also, there may be some zero entries within the new sub-matrix. Unfortunately, the FAO supply utilization data does not provide detailed information on the sales for intermediate usage of agricultural or processed food products. Therefore, allocating sales merely on the basis of production shares is likely to be quite unsatisfactory, indicating the need for additional information on intermediate uses.

Another key sales linkage is the amount of an agricultural or food commodity that is directly purchased by consumers. For example, in developing countries, a larger amount of agricultural commodities may be consumed in an unprocessed form, while in developed countries, most of the food products consumed have been processed. Unfortunately, the consumption information in the FAO supply utilization data appears to include not only the quantity of direct consumption of the agricultural commodity, but also the quantities of all the processed products that use the raw agricultural commodity as an input (the sugar example given above). Thus, in order to capture the differences in direct consumption between commodities and regions, data to supplement the FAO supply utilization data base is required.

Because of the lack of available data on intermediate usage and direct consumption for agricultural and food commodities across regions, a systematic approach to estimating these key sales linkages for all GTAP regions, based on existing information in the FAO data base and existing GTAP version 4 I/O tables, is developed. There are several potential approaches to estimating the key sales linkages. To illustrate these alternative approaches, consider the allocation of the sales of vegetables, fruits, and nuts; oilseeds; sugar cane and sugar beets; plant-based fibers; and crops, n.e.c. to vegetable oils and fats; sugar; and food products, n.e.c.. One possible approach would be to use sales data in the existing GTAP version 4 I/O tables to compute a set of “representative” sales shares of the five agricultural commodities to the three processed food industries. In other words, compute the sales shares within the 5x3 sub-matrix of the existing GTAP version 4 I/O tables and apply those estimated sales shares to allocating the sales of the agricultural commodities to the processed food industries in other GTAP regions. The problem with this approach is in developing an appropriate mapping between the regions with a version 4 I/O table and those without. A similar approach

would be to use the average sales shares within the 5x3 sub-matrix in the existing version 4 I/O tables. While not totally satisfying, this approach may be less ad hoc than the representative share approach. (Of course, the magnitudes of the key shares remain constant across regions under both of these approaches.)

A third approach is to identify possible relationships between the sales and other information available in the GTAP version 4 I/O tables and the FAO data base. For example, there may be a relationship between direct consumption and production of vegetables, fruits, and nuts; oilseeds; sugar cane and sugar beets; plant-based fibers; and crops, n.e.c. in the existing version 4 I/O tables. This potential relationship may be estimated econometrically using the data in the existing version 4 I/O tables. Then, one may use the estimated coefficients to forecast sales allocations in other regions using the production information in the FAO data base. Of course, with only a limited number of GTAP version 4 I/O tables available, a drawback of this third approach is the limited number of observations. However, this third approach can capture variation in the key sales shares between regions and may be applied to any GTAP region. Because of this virtue, this approach is used to identify the key intermediate and consumption sales linkages. Specific details on how the key sales linkages were identified for the GTAP version 3 commodities of non-grain crops, other livestock, meat products, and other food are provided in the following sections.

Non-grain crops

Nine key sales linkages are identified in order to allocate sales of the GTAP version 3 non-grain crops to the new GTAP version 4 commodities of vegetables, fruits, and nuts; oilseeds; sugar cane and sugar beets; plant-based fibers; and crops, n.e.c. These linkages are sales to other livestock, sales to other foods, sales to beverages and tobacco, sales to textiles, own-use, sales to consumers, exports, total production, and all-else (see table 15.7). These key sales linkages reflect a set of prior beliefs on how non-grain crop sales should be allocated to the new version 4 commodities. Sales to other livestock are assumed to represent feed sales and are allocated based on feed usage of each GTAP version 4 commodity from the FAO supply utilization data base for each country/region and estimated world prices. Because the magnitude of an industry using its own output as an input will depend on the overall level of production, own-use is allocated based on the FAO production data for each region and estimated world prices. Sales from non-grain crops to textiles are likely to comprise mainly cotton or other natural fibers, and therefore all sales are allocated to plant-based fibers. A residual category entitled “all else” is used to allocate sales to all other industries and other components of final demand (i.e., government purchases, inventory, etc.). Using a residual category reflects a lack of prior knowledge about how non-grain sales to various manufacturing industries, such as chemicals, rubber, and plastics, should be allocated. Sales to the “all else” category are allocated based on the quantity availability (production less feed usage) for each GTAP version 4 commodity and estimated world prices.

The sales allocation for three key linkages, sales to other food, sales to beverages and tobacco, and sales to consumers, cannot be determined from the FAO supply utilization data alone. Sales in these categories are determined from econometrically estimated relationships between sales and production data in the existing GTAP version 4 I/O tables. These estimated relationships are then used to forecast the sales allocation for the three key categories using FAO production data for each region and estimated world prices. These estimated relationships are discussed in more detail below.

Sales to other food: The majority of sales from vegetables, fruits, and nuts; oilseeds; sugar cane and sugar beets; plant-based fibers and crops, n.e.c. to vegetable oils and fats, sugar, and food products, n.e.c. in the existing GTAP version 4 I/O tables is accounted for by the sales of oilseeds to vegetable oils and fats, sales of sugar cane and sugar beets to sugar, and sales of vegetable, fruits, nuts to food products n.e.c. (see table 15.8).³ Therefore, sales are only allocated to these three sources (i.e., all other entries in the 5x3 sub-matrix are set equal to zero).

Given this overall sales structure, the magnitude of the individual sales entries needs to be determined. Again, the idea is to look for relationships within the data available in the existing version 4 I/O tables that may be applied using the FAO data base. The last column of table 15.8 gives the ratio of sales share to a production share for the three sales sources (unless the value is zero.) For example, for vegetables, fruits, and nuts in Denmark, the sales share to a production share ratio is $0.1145 = 0.0624/0.5448$. Except for Australia, there is a definite pattern of the sale share to a production share ratio across the regions. Because of a lack of econometric evidence, the average sales share to a production share ratio is multiplied by the production shares for each region that are based on FAO production data and estimated world prices.⁴

Consider the following example. The average sales to production share ratios are 0.375 for “vegetables, fruits, and nuts”, 2.591 for “oilseeds”, and 3.912 for “sugar cane and sugar beets”. Using Argentina as a representative region, the initial sales share estimates would be as follows:

- vegetable sales to food products n.e.c.: $0.375 \times 0.4007 = 0.1503$,
- oilseed sales to vegetable oils: $2.591 \times 0.3965 = 1.0273$, and
- sugar cane and beet sales to sugar: $3.912 \times 0.0593 = 0.2320$.

But since these initial shares sum to 1.4096, each share is decreased proportionally by dividing each by 1.4096. (See table 15.9 for predicted sales shares for the Argentina example.)

Sales to beverages and tobacco: One would expect that vegetable, fruits, and nuts, and crops, n.e.c. (e.g., tobacco) sales would dominate sales to beverages and tobacco. With the exception of Australia and the UK with sales from oilseeds and sugar cane and sugar beets to beverages and

³ The exceptions are the UK with large sales share of crops n.e.c. and oilseeds to food products n.e.c., Denmark with large sales shares of plant-based fibers to oilseeds, and Australia with sales of commodities other than sugar cane and sugar beets to sugar.

⁴ By using averages, one misses a lot of the potential variation among regions. A linear regression of production share to sales share was estimated, but the relationship was statistically weak. Undoubtedly, more observations may have improved the econometric model's fit.

tobacco, this expectation is supported by the sales data in the existing version 4 I/O tables.⁵ Therefore, all sales to beverages and tobacco are allocated to vegetables, fruits, and nuts, and crops, n.e.c. To determine the magnitude of the sales shares, the following relationship is estimated:

$$\frac{\text{sales of vegetables to beverages and tobacco}}{\text{sales of crops, n.e.c. to beverage and tobacco}} = \beta_0 + \beta_1 \frac{\text{production of vegetables, fruits, and nuts}}{\text{production of CROPS, n.e.c.}} + \epsilon, \quad (1)$$

where β_0 and β_1 are the unknown parameters and ϵ is the error term. The observation for Denmark is dropped because of a zero production share for crops, n.e.c., and plant-based fibers sales in Indonesia are applied to crops, n.e.c. This model specification is chosen because the value of production can be calculated from the quantity data in the FAO data base for each region and estimated world prices. The estimates for equation (1) are as follow:

Parameter	Estimated value	Standard error
β_0	-0.987	
β_1	0.831	0.224
R^2	0.775	

Because the sales shares of vegetables, fruits, and nuts, and crops, n.e.c. to beverages and tobacco must sum to one, the individual sales shares can be obtained from the predicted ratio. If the predicted sales ratio is equal to **A**, then the sales share for vegetables, fruits, and nuts to beverages and tobacco is equal to $\mathbf{A}/(1+\mathbf{A})$. Using Argentina as an example, (see table 15.9) the estimated production share for vegetables, fruits, and nuts is equal to 0.4007 and the estimated production share for crops, n.e.c. is equal to 0.1006. Thus, the predicted sales shares are 0.6988 for vegetables, fruits, and nuts, and 0.3012 for crops, n.e.c. respectively.

Sales to consumers: Intuitively, one would expect that there would be no direct consumption of sugar cane and sugar beets and plant-based fibers. In general, this observation holds in the GTAP version 4 I/O tables. Therefore, all sales to consumers are allocated to vegetables, fruits, and nuts; oilseeds; and crops, n.e.c. The magnitude of sales allocated to each of these commodities is determined by an estimated linear relationship between each commodity's consumption and production shares in the existing GTAP version 4 I/O tables. Formally, this relationship is specified as:

$$\text{consumption share of crops, n.e.c.} = \beta_0 + \beta_1 \text{production share of crops, n.e.c.} + \epsilon. \quad (2)$$

⁵ The large share of plant-based fiber sales to beverages and tobacco in Denmark and Indonesia may indicate that tobacco has been classified as a fiber in those tables.

The model results for equation (2) are:

Parameter	Estimated value	Standard error
β_0	0.009	0.089
β_1	1.045	
R^2	0.972	

Unfortunately, there is no statistical relationship between vegetable, fruits, and nut consumption and production shares, and likewise for oilseeds consumption and production shares. To estimate direct sales to consumers for vegetables, fruits, and nuts, and oilseeds, the average ratio of consumption to a production share in the existing GTAP version 4 I/O tables is used. For vegetables, fruits, and nuts, the average ratio is 1.383, and for oilseeds, the average ratio is 0.234. Using a production share calculated from the FAO quantity data and world price estimates this allows the prediction of direct sales to consumers.

Again, Argentina is used to illustrate this procedure (see table 15.9). The estimated consumption shares are obtained by multiplying the production shares for Argentina, based on the FAO quantity data and estimated world prices, with either the average consumption to production share ratios or the econometric estimates. Thus, the estimated consumption shares are: 0.114 ($0.009 + 1.045 \cdot 0.101$) for crops, n.e.c., 0.554 ($1.383 \cdot .401$) for vegetable, fruits, and nuts, and 0.093 ($0.234 \cdot 0.397$) for oilseeds. But since the estimated shares do not sum to one, the consumption shares for vegetables, fruits, and nuts, and oilseeds are increased proportionally to 0.7588 and 0.1272, respectively. This is done because the empirical relationship between crops, n.e.c. consumption and production shares is much stronger, so any proportional adjustment needed is placed on vegetables, fruits, and nuts and oilseeds.

Other livestock

The following key assumptions are made to guide the allocation of sales of the GTAP version 3 other livestock's commodity to the GTAP version 4 commodities of bovine cattle, sheep and goats; animal products, n.e.c.; and raw milk (see table 15.10). First, all sales from dairy farms are assumed to be composed of raw milk only. All sales of cull livestock are accredited to the bovine cattle, sheep and goat industry. Second, all sales to the dairy (processing) industries are allocated to raw milk. This is consistent with the information in the existing GTAP version 4 I/O tables. Third, there is a one-to-one mapping between the bovine cattle, sheep and goats, and bovine cattle, sheep and goat meat, and between animal products n.e.c. and meat products n.e.c. Again, the structure of the existing GTAP version 4 I/O tables supports this treatment. Finally, in the GTAP version 4 I/O tables, the majority of sales from "bovine cattle, sheep and goats", "animal products, n.e.c." and "raw milk to other food processors" goes to "food products, n.e.c." The two exceptions are "bovine cattle", "sheep and goat" sales to "vegetable oils and fats" in the US, and bovine cattle, sheep and goat sales to sugar in Australia. In addition, except for Australia, sales from animal products n.e.c. to food products, n.e.c.

account for the largest share of these sales. Thus, all other livestock sales to other food are allocated to animal products n.e.c. sales to food products, n.e.c.

Sales to consumers: In many countries, on-farm consumption of raw milk and on-farm slaughtering of livestock is an important component of total demand for livestock's commodities. In addition, the level of on-farm consumption is likely to vary across countries. Thus, it is important to try and capture these differences in the GTAP version 4 data base. Again, a lack of consumption information in the FAO supply utilization data base requires the direct sales to consumers be determined as follows. First, start with raw milk, in which the following equation is utilized:

$$\text{consumption share of raw milk} = \beta_0 + \beta_1 \text{ production share of raw milk} + \epsilon \quad (3)$$

Using the sales production data in the existing GTAP version 4 I/O tables, the estimated parameters for equation (3) are:

Parameter	Estimated value	Standard error
β_0	0.032	
β_1	0.858	0.227
R^2	0.782	

However, similar models for bovine cattle, sheep, and goats and animal products, n.e.c. did not statistically fit the data in the GTAP version 4 I/O tables. Alternative models for bovine cattle, sheep, and goats and animal products, n.e.c. was posited that utilizes a linear relationship between their relative consumption and production shares.

$$\frac{\text{Animal Products, n.e.c. Consumption Share}}{\text{Raw Milk Consumption Share}} = \beta_0 + \beta_1 \frac{\text{Animal Products, n.e.c. Production Share}}{\text{Raw Milk Production Share}} + \epsilon \quad (4)$$

$$\frac{\text{Bovine Cattle Consumption Share}}{\text{Animal Products, n.e.c. Consumption Share}} = \beta_0 + \beta_1 \frac{\text{Bovine Cattle Production Share}}{\text{Animal Products, n.e.c. Production Share}} + \epsilon \quad (5)$$

The results for these two models are:

Model	Intercept	Slope ^a	R ²
Animal products, n.e.c. to raw milk	-1.169	3.340 (1.102)	0.821
Bovine livestock to animal products, n.e.c.	-0.878	1.077 (0.264)	0.847

^a Standard errors are given in parentheses.

The magnitude of direct sales of livestock products to consumers is determined using a multi-step procedure. First, the consumption share for raw milk is predicted using the results from

equation (3) and the estimated production shares based on the FAO data base. Next, the relative consumption share of animal products, n.e.c. to raw milk is predicted using the estimated relative production shares from equation (4). The magnitude of the animal products, n.e.c. sales to consumers can be obtained by multiplying this predicted ratio by the predicted raw milk consumption share. Sales of bovine cattle, sheep and goats to consumers are treated as a residual because the consumption shares must sum to one. Again, using Argentina as an example:

- predicted raw milk consumption share = $-0.032 + 0.858 \cdot 0.2652 = 0.195$,
- predicted animal products, n.e.c. consumption share = $(-1.169 + 3.340 \cdot (0.149/0.265)) \cdot 0.195 = 0.139$, and
- predicted bovine livestock consumption share = $1 - 0.195 - 0.139 = 0.666$.

For some regions, the estimate value of production of raw milk is relatively too large, leading to a negative residual share for bovine cattle, sheep, and goats. In those cases, the predicted raw milk consumption share is decreased proportionally until all consumption shares are positive.

Other food

Four key sales linkages for vegetable fats and oil, sugar, and food products, n.e.c. are identified (see table 15.11): sales to bovine cattle, sheep, and goats, animal products, n.e.c., and raw milk (to capture prepared feed sales that is included in food products, n.e.c.); sales within other food industries; sales to beverages and tobacco; and sales to consumers. All other sales are allocated using the estimated production shares from the FAO data base and estimated world prices.

Sales to other livestock: Because the prepared feeds industry is included in food products, n.e.c., one would expect to see the majority of the sales to the livestock industries originating in food products, n.e.c. Sales data in the existing GTAP version I/O tables support this hypothesis. With the exception of Denmark and Australia, sales from food products, n.e.c. account for over 90 percent of the total sales to the livestock industries. Even for Australia, nearly three-quarters of all sales originate from food products, n.e.c. Thus, all sales to the livestock industries are allocated to food products, n.e.c.

The allocation of food products, n.e.c. sales among bovine cattle, sheep, and goats, animal products, n.e.c., and raw milk are postulated to be related to the relative intensity of livestock production in each region.

$$\text{sales share of food products, n.e.c.} = \beta_0 + \beta_1 \text{ livestock production share} + \epsilon \quad (6)$$

This linear model fit well for animal products, n.e.c. but not for bovine cattle, sheep and goats, or raw milk. The model results for animal products, n.e.c. are as follow:

Parameter	Estimated value	Standard error
Intercept	0.2793	
Slope	0.7899	0.1075
R ²	0.9152	

To determine the sales shares of food products, n.e.c. to raw milk, the following linear relationship is estimated.

$$\frac{\text{sales of food products, n.e.c. to raw milk}}{\text{sales of food products, n.e.c. to animal products, n.e.c.}} = \beta_0 + \beta_1 \frac{\text{production share of raw milk}}{\text{production share of animal products, n.e.c.}} + \epsilon \quad (7)$$

Using the data in the GTAP version 4 I/O tables, the estimates for equation (7) are:

Parameter	Estimated value	Standard error
Intercept	-0.5371	
Slope	1.2248	0.3738
R ²	0.6823	

By using the predicted sales of food products, n.e.c. to animal products, n.e.c. from equation (6) and the predicted ratio from equation (7), one can determine the predicted sales share of food products, n.e.c. to raw milk. The sales share to bovine cattle, sheep, and goats is treated as a residual.

Continuing with the Argentina example, the predicted sales share of food products, n.e.c. to animal products, n.e.c. is equal to $0.2793 + 0.7899 \times 0.1492 = 0.3972$. The predicted sales share of food products, n.e.c. to raw milk is computed as $(-0.5371 + 1.2248 \times (0.2652/0.1492)) \times 0.3972 = 0.6514$. Note, that the sum of these two sales shares is greater than one, so the predicted sales share of food products, n.e.c. to animal products, n.e.c. must be decreased until the sales share of food products, n.e.c. to bovine cattle, sheep, and goats is positive.

Sales to other food: The majority of sales within the other food sector in the GTAP version 4 I/O tables are for own-use, sales of vegetable oils and fats to food products, n.e.c. , and sugar sales to food products, n.e.c. The own-use sales are predicted using the following linear model:

$$\text{own - use sales share} = \beta_0 + \beta_1 \text{production share} + \epsilon, \quad (8)$$

and the data in the GTAP version 4 I/O tables. The estimated parameters for each of the three other food industries are as follow:

Parameter	Vegetable oils and fats own-use	Sugar own-use	Food products, n.e.c. own-use
Intercept	0.0227	0.0841	0.0979
Slope ^a	0.6491 (0.1706)	-0.5243 (-0.2391)	0.6830 (0.2981)
R ²	0.7432	0.4902	0.5675

^a The estimated standard errors are given in parentheses.

The predicted sales of vegetable oils and fats to food products, n.e.c. are determined using the following relationship:

$$\frac{\text{sales of vegetable oils to food, n.e.c.}}{\text{own - use of food, n.e.c.}} = \beta_0 + \beta_1 \frac{\text{vegetable oil production}}{\text{food, n.e.c. production}} + \epsilon. \quad (9)$$

This estimated parameters in equation (9) are:

Parameter	Estimated value	Standard error
Intercept	0.0551	
Slope	0.4478	0.1409
R ²	0.7165	

One can obtain a predicted value for the vegetable oil and fats sales to food products, n.e.c. by multiplying this predicted ratio by predicted own-use of food products, n.e.c.. Then the sale share of sugar to food products, n.e.c. is derived as a residual (i.e., subtract all other predicted sale shares from one).

Using the case of Argentina to illustrate the above procedure, the own-use shares for the other food commodities are computed as follows:

- vegetable fats and oils own-use: $0.0227 + 0.6491 \cdot 0.1304 = 0.1073$,
- sugar own-use: $0.0841 - 0.5243 \cdot 0.018 = 0.0747$, and
- food products, n.e.c. own-use: $0.0979 + 0.683 \cdot 0.8516 = 0.6796$.

The predicted sales share of vegetables oils and fats to food products, n.e.c. is computed as $(0.0551 + 0.4478 \cdot (0.1073/0.8516)) \cdot 0.6796 = 0.1237$. Finally, the predicted sales share of sugar to food products, n.e.c. is equal to 0.0148, which ensures that all of the sales shares within this category sum to one.

Sales to beverage and tobacco: Sales from sugar and food products, n.e.c. comprise the vast majority of the sales to beverages and tobacco in the GTAP version 4 I/O tables. Thus, all of the other food sales will be allocated to those two GTAP version 4 commodities using the following linear model:

$$\frac{\text{sugar sales to beverages \& tobacco}}{\text{food, n.e.c. sales to beverages \& tobacco}} = \beta_0 + \beta_1 \frac{\text{sugar production}}{\text{food, n.e.c. production}} + \epsilon. \quad (10)$$

The estimated parameter values in equation (10) are:

Parameter	Estimated value	Standard error
Intercept	-0.3817	
Slope	13.7644	3.4111
R ²	0.7651	

Because the sum of sugar and food products, n.e.c. sales shares to beverages and tobacco must equal one, the individual sales shares are derived as follows. If the predicted sales ratio is equal to **A**, then the sales share of sugar to beverages and tobacco is equal to **A/(1+A)**. Continuing the Argentina illustration, the predicted sales share of sugar to beverages and tobacco is: $(-0.3817 + 13.7664 \cdot (0.018/0.8516)) / (1 - 0.3817 + 13.7664 \cdot (0.018/0.8516)) = -0.1002$. In this case, sugar production is very small relative to the food products, n.e.c. production. So, to ensure a positive sales share, this ratio is increased proportionally. In the Argentina case, it is increased until the resulting sales share of food products, n.e.c. to beverages is close to its production share.

Sales to Consumers: The sales of the other food commodities to consumers are estimated using the following relationships:

$$\begin{aligned} \text{vegetable oil consumption share} &= \beta_0 + \beta_1 \text{vegetable oil production share} + \epsilon, \text{ and} \\ \text{food products, n.e.c. consumption share} &= \alpha_0 + \alpha_1 \text{food products, n.e.c. production share} + v. \end{aligned} \quad (11)$$

Using the observed consumption shares and production shares in the GTAP version 4 I/O table, the following estimates of the parameters in equation (11) are obtained:

Parameter	Vegetable oils and fats	Food products, n.e.c.
Intercept	-0.0157	-0.0221
Slope ^a	0.8586	1.0928
	(0.1638)	(0.1528)
R ²	0.8461	0.9109

^a The estimated standard errors are given in parentheses.

The consumption share for sugar is a residual. In the case of Argentina, the predicted consumption shares are:

- vegetable oils and fats: $-0.0157 + 0.8586 \cdot 0.1304 = 0.0963$,
- food products, n.e.c.: $-0.0221 + 1.0928 \cdot 0.8516 = 0.8631$, and
- sugar: $1 - 0.0963 - 0.8631 = 0.0406$.

Meat products

Four key sales linkages are identified for meat products: own-use, consumption, exports, and all-else. Production, trade, and availability shares, based on the FAO supply utilization data and world price estimates are used to allocate sales for own-use, exports, and all other categories except for sales to consumers. Again, because the FAO data base does not provide a good quantity measure of the consumption of processed food products, the consumption shares are estimated using the following linear model:

$$\text{meat consumption share} = \beta_0 + \beta_1 \text{meat production share} + \epsilon, \quad (12)$$

and the consumption and production data in the GTAP version 4 I/O tables. Since there are two meat products and the meat consumption shares must sum to one, only one equation needs to be estimated. Due to a better statistical fit, the equation for meat products, n.e.c. consumption share is utilized.

The estimated linear model results are as follow:

Parameter	Estimated value	Standard error
Intercept	0.0237	
Slope	0.9591	0.0698
R ²	0.9742	

Using the example of Argentina, the predicted consumption share of meat products, n.e.c. is equal $0.0237 + 0.9591 \cdot 0.8829 = 0.8704$. The consumption share for bovine cattle, sheep, and goat meat is derived by subtracting the predicted meat products, n.e.c. consumption share from one.

Allocating sales

Once all of the key sales shares have been determined, sales for the version 3 commodities may now be allocated to the new version 4 commodities. There are two different approaches that may be used in performing the sales allocation. First, after applying all of the sales shares determined above, one can sum across all columns in the row to obtain the value of total production for the new version 4 commodities. However, it is unlikely that the computed production shares under this approach would equal the estimated production shares based on the FAO data and estimated world prices. A second approach would be to compute a set of production target values, based on the estimated production shares, applying all of the estimated sales shares, and then performing a RAS procedure to ensure that the row sums equal the production target values. A drawback to this approach is that some (or all) of the sales shares may need to be adjusted in order to meet the row target values. The approach that one chooses will depend on whether one is more confident about the production shares

or the sales shares. While there is a great deal of uncertainty about both in this case, more confidence is placed on the production shares, given the very small sample sizes used to determine some of the key sales shares. The procedure used to adjust the sales values was to start with cells with the largest magnitude of sales in order to limit the scope of adjustment necessary for bringing the total sales to equal the target sales level.

Allocating costs

In order to maintain balanced I/O tables at the GTAP version 4 level of aggregation, total costs (column totals) for the new version 4 commodities must equal total sales (row totals). However, with the exception of imports and the cell values obtained during the sales RAS procedure, very little prior information exists to help in the allocation of costs. Thus, the costs of all inputs not included in the sales RAS procedure are initially allocated based on the estimated production shares. Again, since it is unlikely that the target column total will equal the column sum, a RAS procedure is used to adjust the cost shares. The sales values identified earlier are not included in the RAS procedure. While allocating intermediate inputs in this manner may be acceptable, it forces all new GTAP version 4 commodities to have the same labor-capital, labor-land, and intermediate input-value added ratios.

15.3 Disaggregation procedure for regions without version 3 I/O tables

The I/O tables available for some of the new GTAP version 4 regions (Germany, Finland, Morocco, South Africa, Sri Lanka, Sweden, Taiwan, Turkey, and Vietnam) were more highly aggregated than the GTAP version 4 agricultural and food commodities. In these cases, the estimated values of production, imports, and exports were computed using the FAO supply utilization data base and estimated world prices for all the version 4 agricultural and food commodities, except for food products, n.e.c. The estimates were extended to cover this commodity in a separate process, undertaken as part of the disaggregation of the contributed tables, described in chapter 16.

References

United Nations, Food and Agricultural Organization. "1992 FAO Production Yearbook," FAO Statistical Series No. 112, Rome, 1993.

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United Nations, Food and Agricultural Organization. "Commodity Balances, Crops and Livestock Primary Equivalents" URL <http://apps.fao.org/cgi-bin/nph-db.pl>

US Department of Agriculture, National Statistics Service. "Agricultural Statistics 1994," Washington, D.C.: US Government Printing office, 1994.

Table 15.1 Concordance between GTAP version 3 and GTAP version 4 commodities

GTAP version 3 commodity	GTAP version 4 commodities
Non-grain crops	Vegetables, fruit, nuts Oilseeds Sugar cane, sugar beet Plant-based fibers Crops, n.e.c.
OtherLivestock	Bovine cattle, sheep & goats, horses Animal products, n.e.c. Raw milk
Meat products	Cattle, sheep & goat, horse meat Meat products, n.e.c.
Other food products	Vegetable oils and fats Sugar Food products, n.e.c.

Table 15.2 Concordance between FAO and GTAP version 4 commodities

GTAP commodity	FAO commodity
Vegetables, fruits, nuts	Apples
	Banana
	Dry Beans
	Citrus Fruit
	Dates
	Fruit, Other
	Grapefruit
	Grapes - ex. Wine
	Potatoes
	Groundnuts (shelled)
	Lemons
	Olives
	Onions, Dry
	Oranges, Tangerines
	Peas, Dry
	Pineapples
	Plantains
	Pulses
	Roots and Tubers, Dry
	Roots and Tubers, Other
	Sweet Potatoes
	Tomatoes
	Vegetables, Other
	Yams
	Nuts
Oilseeds	Cottonseed
	Oil crops, Other
	Palm kernels
	Rape, Mustard Seed
	Sesame seed
	Soybeans
	Sunflower seed
Sugar cane, sugar beet	Sugar Beets
	Sugar Cane
Plant-based fibers	Abaca
	Cotton, Lint
	Fibers, Jute-like
	JuteCrops, n.e.c.
	Sisal
Crops, n.e.c.	Cassava
	Cloves
	Cocoa Beans
	Coconuts

contd

Table 15.2 Concordance between FAO and GTAP version 4 commodities (continued)

GTAP commodity	FAO commodity
	Coffee
	Fibers, Hard Other
	Fibers, Soft other
	Natural Rubber
	Pepper
	Pimento
	Spices, Other
	Tea
	Tobacco
Cattle, sheep & goat, horse meat ^a	Meat, Bovine
	Meat, sheep-goat
Meat products, n.e.c. ^a	Eggs
	Meat, other animal
	Meat, pig
	Meat, poultry
Raw milk	Milk, whole
Vegetable oils & fats	Copra, cake
	Copra, oil
	Cottonseed, cake
	Cottonseed, oil
	Groundnut, cake
	Groundnut, oil
	Maize, germ oil
	Olive & Residue, oil
	Other oilseeds, cake
	Other oil crops, oil
	Palm kernel, cake
	Palm kernel, oil
	Palm, oil
	Rape & Mustard, cake
	Rape & Mustard, oil
	Rice, Bran oil

contd

Table 15.2 Concordance between FAO and GTAP version 4 commodities (continued)

GTAP commodity	FAO commodity
Vegetable oils & fats	Sesame seed, cake Sesame seed, oil Soyabean, cake Soyabean, oil Sunflower seed, cake Sunflower seed, oil Lard
Sugar	Animal Fats, raw Sugar-Refined Equivalent Sugar, Non-centrifugal Other Sweeteners Molasses
Non-species Specific Processed Livestock Products ^b	Meat & Blood Meal Hides & Skins Offals, Edible Tallow
Paddy rice	Rice (Paddy Equivalent)
Wheat	Wheat
Cereal grains, n.e.c.	Barley Maize Rye Oats Millet Sorghum Other Cereals
Wool, silk worms	Silk Wool
Dairy products	Milk, whole ^c Butter, Ghee Cream Whey Cheese
Processed rice	Rice (Milled Equivalent)

^a FAO quantity data are based on wholesale, dressed weights. Because of a lack of data on a live weight (or farm-level) basis, the corresponding livestock values are computed using the same quantity data, multiplied by a farm-level rather than wholesale price.

^b Non-species specific products are allocated using the quantity shares of the specie specific meat products.

^c The amount of fluid milk sold by dairy processors is assumed to be equal to the quantity of whole milk available less the quantity sold for processing purposes.

Table 15.3 Prices utilized and their source

	Price \$/MT	FAO production yearbook \$/MT	USDA agricultural statistics \$/MT	FAO commodity review \$/MT	USDA/ERS estimates \$/MT
Abaca	1300	1318		965.00	
Apples	300		298.31		
Banana	490	489	903.85	492.80	
Dry Beans	450	454	445.74		
Cassava	185	183		183.00	137.00
Citrus Fruit, n.e.s	225		0.00	805.00	
Cloves	1000				
Cocoa Beans	1050	1000		1100.00	
Coconuts & Copra	150				380.00
Coffee	1170	1177	3747.65	1168.00	
Copra Cake	200				130.00
Copra Oil	625	576	687.80	576.00	450.00
Cotton, Lint	1500	1852	1161.87	1340.00	
Cottonseed	110		107.65		110.00
Cottonseed Cake	175		178.56		155.00
Cottonseed Oil	550		551.13		690.00
Dates	1000		1168.39		
Other Hard Fibers	300			270.00	
Jute-Like Fibers	360	364		364.00	
Other Soft Fibers	300			364.00	
Other Fruit	560		0.00		
Grapefruit	150	898	133.67	534.70	
Grapes (Excl. Wine)	350		336.70		
Groundnut Cake	410				160.00
Groundnut Oil	610	609		609.00	675.00
Groundnuts, Shelled	650		661.37		960.00
Jute	360	359		356.00	
Lemons & Limes	325	952	0.00	919.50	
Maize Germ Oil	525		529.08		
Molasses	300				
Natural Rubber	910	912		827.00	
Nuts	1200		0.00		
Other Oil crops, Oil	300				
Other Oil crops	285		0.00		
Other Oilseed,	200				
Olive & Residue oil	500				
Olives	600		604.97		
Dry Onions	250		253.36		
Oranges, Tangerines	250	826	0.00	713.50	
Palm Kernel Oil	375				390.00
Palm Oil	425	394	478.38	394.00	390.00
Palm Kernel Cake	200				
Palm Kernels	125				
Dry Peas,	300	301	263.18	350.00	

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Table 15.3 Prices utilized and their source (continued)

	Price \$/MT	FAO production yearbook \$/MT	USDA agricultural statistics \$/MT	FAO commodity review \$/MT	USDA/ERS estimates \$/MT
Pepper	1250	1554		1200.00	
Pimento	1000				
Pineapples	200		204.62		
Plantains	450				
Potatoes	120	116	121.09		
Other Pulses	300				
Rape & Mustard, Cake	225				160.00
Rape & Mustard, Oil	450	420	1675.42	421.00	440.00
Rape Seed & Mustard	220	210	0.00		235.00
Milled Rice				325.00	
Paddy Rice			129.73		
Rice, Bran Oil	275				
Other Roots & Tubers	250		959.12		
Sesame seed	125				
Sesame seed Cake	200				
Sesame seed Oil	400				
Sisal	450	452		400.00	
Soyabean Cake	210	205	213.56		210.00
Soyabean Oil	450	430	471.76	430.00	455.00
Soybeans	235	236	204.10		245.00
Other Spices	1000				
Refined Sugar	200			200.00	
Sugar Beets	45		45.63		
Sugar Cane	30		30.94		
Sugar, Non-centrifugal	75				
Sunflower seed	215		215.51		275.00
Sunflower seed Oil	475	450	504.83	450.00	490.00
Sweet Potatoes	270		269.02		
Other Sweeteners	300				
Tea	2000	1995		1970.00	
Tobacco	3900	3902	3917.19		
Tomatoes	200		195.85		
Other Vegetables	270		270.94		
Yams	250				
Animal Fats, Raw	500				
Tallow	600				
Lard	200				
Paddy Rice	130	130			
Wheat	151	151			
Barley	94	94			
Maize	105	105			
Rye	94	94			
Oats	91	91			
Millet	105				

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Table 15.3 Prices utilized and their source (continued)

	Price \$/MT	FAO production yearbook \$/MT	USDA agricultural statistics \$/MT	FAO commodity review \$/MT	USDA/ERS estimates \$/MT
Sorghum	105				
Other Cereals					
Milled Rice	90298				
Livestock Products					
Bovine Meat	2060		2060	1980	
Sheep & Goat Meat	2735		2735	1745	
Pig Meat	1370		1370	2830	
Poultry Meat	1215		1215	1335	
Meat, Other Animals	1750		1750		
Edible Offal	500				
Eggs, Wholesale	1085		1085		
Hides & Skins	1125		1125	2020	
Blood Meal	500				
Bovine Livestock	1465		1465		
Sheep & Goat Livestock	1405		1405		
Hogs	1015		1015		
Poultry Livestock	900		900		
Other Livestock	1250		1250		
Eggs, Farm-Level	880		880		
Milk, Farm-Level	250		250	290	
Milk, Wholesale	600		600		
Butter, Ghee	1825	1825			
Cheese	2905	2905			
Cream	2400	2400			
Whey	400	400			
Silk	1740	1740			
Wool	1210	1210			

Sources: 1992 FAO Production Yearbook, 1992 Agricultural Statistics, 1992 FAO Commodity Review, and estimates provided by ERS personnel.

Table 15.4. Price aggregates from USDA agricultural statistics data

FAO commodity	Underlying commodity	Dollar value	Quantity produced	Price \$/lb.	\$/mt.
Nuts & products	Pecans	240362	166000	1.45	3192.04
	Pistachios	151410	147000	1.03	2270.64
	Walnuts	286230	406000	0.71	1554.17
	Almonds	691340	548000	1.26	2781.13
	Hazelnuts	15304	55400	0.28	608.98
	Macadamia	32640	48000	0.68	1499.06
	<i>Average</i>	1417286	1370400	1.03	2279.92
Rape & mustard seed	Mustard Seed	1545	14504	0.11	234.83
	Rape seed	1449	14455	0.10	220.98
	<i>Average</i>	2994	28959	0.10	227.92
Other oilseeds	Canola	14245	144037	0.10	218.02
	Safflower	57159	406775	0.14	309.77
	<i>Average</i>	71404	550812	0.13	285.78
Tomatoes	Fresh	1396950	1951.65	0.36	788.97
	Process	509413	8777.4	0.03	63.97
	<i>Average</i>	1906363	10729.05	0.09	195.85
Other vegetables	Fresh				
	Artichokes	43447	1104	0.39	867.56
	Asparagus	172808	2351	0.74	1620.40
	Lima Beans	4428	123	0.36	793.62
	Snap Beans	138518	3932	0.35	776.61
	Broccoli	284423	12447	0.23	503.74
	Brussel Sprout	17140	560	0.31	674.73
	Cabbage	207108	23267	0.09	196.23
	Cantaloups	251059	18111	0.14	305.59
	Carrots	352735	32792	0.11	237.13
	Cauliflower	193937	6904	0.28	619.26
	Celery	258662	21052	0.12	270.86
	Sweet Corn	270576	18473	0.15	322.90
	Cucumbers	174740	9156	0.19	420.72
	Eggplant	20650	882	0.23	516.13

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Table 15.4. Price aggregates from USDA agricultural statistics data (continued)

FAO commodity	Underlying commodity	Dollar value	Quantity produced	Price \$/lb.	\$/mt.
Other vegetables	Escarole	11148	537	0.21	457.65
	Garlic	102854	3795	0.27	597.47
	Honeydew M.	63811	4740	0.13	296.77
	Head Lettuce	882240	70810	0.12	274.66
	Leaf Lettuce	187153	8235	0.23	501.01
	Rom. Lettuce	99743	5652	0.18	389.04
	Bell Peppers	386153	14428	0.27	590.02
	Spinach	54911	2351	0.23	514.89
	Watermelons	223400	37783	0.06	130.35
	Processing				
	Lima Beans	16823	799.8	0.21	463.69
	Snap Beans	112031	12918	0.09	191.18
	Beets	5879	2354.4	0.02	55.05
	Cabbage	6130	3310.4	0.02	40.82
	Sweet Corn	209583	65032	0.03	71.05
	Cucumbers	117585	11161.4	0.11	232.24
	Spinach	13037	2214.4	0.06	129.79
	<i>Average</i>	4882712	397275.4	0.12	270.94
Oranges, tangerines	Oranges	1489938	21100200	0.07	155.67
	Tangerines	83222	292500	0.28	627.22
	<i>Average</i>	1573160	21392700	0.07	162.11
Lemons & limes	Lemons	239872	1884800	0.13	280.56
	Limes	6547	88000	0.07	164.01
	<i>Average</i>	246419	1972800	0.12	275.36
Citrus fruit, n.e.s	Tangelos	16147	152500	0.11	233.42
	Temples	12458	125000	0.10	219.71
	<i>Average</i>	28605	277500	0.10	227.24
Other fruit	Peaches	378652	2659000	0.14	313.93
	Pears	273188	1852200	0.15	325.15
	Cherries	230903	411135.1	0.56	1238.10
	Apricots	37838	212800	0.18	391.98
	Plums	63033	500000	0.13	277.91
	Prunes	198044	457200	0.43	954.92
	Figs	18985	93800	0.20	446.19
	Nectarines	73710	472000	0.16	344.27
	Kiwi fruit	13833	104600	0.13	291.54
	Avocados	118120	583200	0.20	446.49
	Papayas	14415	71300	0.20	445.69
	Cranberries	213292	416000	0.51	1130.29
	Strawberries	683892	1313800	0.52	1147.54
	<i>Average</i>	2317905	9147035.1	0.25	558.63

Table 15.5 GTAP version 4 crop-based commodity values by region

Region	GTAP version 4 commodity	Production	Imports	Exports	Availability	Feed
Argentina	Vegetables, fruit, nuts	3547.903	146.319	662.066	3034.841	0.000
	Oilseeds	3510.788	0.631	805.606	2930.964	0.002
	Sugar cane, sugar beet	525.000	0.000	0.000	525.000	0.000
	Plant-based fibers	379.200	10.854	118.977	271.077	0.000
	Crops, n.e.c	891.081	124.368	299.665	715.784	12.951
	Vegetable oils & fats	3481.944	23.194	3002.853	479.814	72.206
	Sugar	480.088	2.676	36.744	460.948	130.793
Australia	Vegetables, fruit, nuts	2152.776	177.241	522.662	1717.183	202.252
	Oilseeds	160.464	35.426	37.090	158.954	27.949
	Sugar cane, sugar beet	838.751	0.000	0.000	838.751	0.000
	Plant-based fibers	703.500	3.268	685.429	36.339	0.000
	Crops, n.e.c	44.836	243.084	30.299	257.121	0.001
	Vegetable oils & fats	698.995	99.497	380.716	424.901	109.697
	Sugar	1039.668	15.262	465.433	414.078	200.263
Brazil	Vegetables, fruit, nuts	14833.351	220.034	3482.147	11558.037	84.040
	Oilseeds	4718.511	118.722	876.323	4134.284	253.175
	Sugar cane, sugar beet	8144.247	0.000	0.000	8144.247	231.000
	Plant-based fibers	1076.872	276.952	60.384	1293.441	0.000
	Crops, n.e.c	8762.729	141.193	2926.558	6077.768	2029.489
	Vegetable oils & fats	4600.732	118.978	2300.684	2530.026	896.444
	Sugar	3421.941	19.468	469.717	2958.449	156.300
Canada	Vegetables, fruit, nuts	1538.513	1777.252	439.639	2864.858	158.562
	Oilseeds	1333.227	41.478	615.696	920.903	140.970
	Sugar cane, sugar beet	36.495	0.007	0.000	36.502	0.730
	Plant-based fibers	0.000	68.465	0.158	68.307	0.000
	Crops, n.e.c	269.948	452.293	251.285	480.462	0.366
	Vegetable oils & fats	1283.879	238.217	614.530	925.303	404.404
	Sugar	106.106	267.185	91.152	288.026	47.675
Colombia	Vegetables, fruit, nuts	3103.799	84.550	732.135	2450.065	244.517
	Oilseeds	49.632	44.247	0.478	108.025	0.000
	Sugar cane, sugar beet	867.901	0.000	0.543	867.357	3.358
	Plant-based fibers	174.756	17.163	62.969	128.951	0.000
	Crops, n.e.c	1834.170	34.104	1273.704	582.869	29.865
	Vegetable oils & fats	267.545	112.260	4.422	375.383	120.553
	Sugar	580.732	3.745	98.485	411.463	24.152
Chile	Vegetables, fruit, nuts	1843.937	62.249	749.294	1152.981	15.459
	Oilseeds	19.795	1.423	0.092	20.400	0.000
	Sugar cane, sugar beet	161.481	0.000	0.000	161.481	0.000
	Plant-based fibers	3.600	36.477	0.000	40.077	0.000
	Crops, n.e.c	66.594	81.075	26.087	121.582	0.002
	Vegetable oils & fats	38.737	93.731	1.232	129.436	38.273
	Sugar	120.676	19.001	2.117	140.396	19.063

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Table 15.5 GTAP version 4 crop-based commodity values by region (continued)

Region	GTAP version 4 commodity	Production	Imports	Exports	Availability	Feed
China	Vegetables, fruit, nuts	82401.700	111.393	1559.801	81003.719	14240.02
	Oilseeds	6258.989	29.295	231.524	5973.659	451.076
	Sugar cane, sugar beet	2868.435	0.001	0.179	2790.256	414.000
	Plant-based fibers	6992.490	416.433	224.447	7184.476	0.000
	Crops, n.e.c	16109.735	530.178	986.670	15653.237	312.230
	Vegetable oils & fats	6357.782	580.540	661.585	6321.906	1407.303
	Sugar	2411.110	206.289	359.551	2304.248	16.471
Denmark	Vegetables, fruit, nuts	376.728	305.658	127.517	567.369	171.810
	Oilseeds	174.143	9.182	85.949	110.018	51.321
	Sugar cane, sugar beet	0.000	1.970	0.505	1.465	0.000
	Plant-based fibers	4.635	33.875	6.949	31.561	0.000
	Crops, n.e.c	208.973	203.913	34.911	365.998	23.554
	Vegetable oils & fats	204.837	736.854	101.655	835.510	543.699
	Sugar	0.886	109.979	23.187	86.376	43.560
Finland	Vegetables, fruit, nuts	190.765	200.088	16.446	362.725	18.618
	Oilseeds	29.172	43.190	0.014	72.348	0.186
	Sugar cane, sugar beet	47.205	1.248	0.000	48.453	0.000
	Plant-based fibers	0.000	0.851	0.000	0.851	0.000
	Crops, n.e.c	0.000	121.818	17.968	103.800	0.001
	Vegetable oils & fats	101.849	17.197	17.726	92.320	51.730
	Sugar	47.781	19.354	18.095	52.040	0.100
Former Soviet Union	Vegetables, fruit, nuts	23400.899	737.933	91.295	24287.530	4786.095
	Oilseeds	1846.045	1.039	57.630	1997.231	200.004
	Sugar cane, sugar beet	2966.895	0.000	0.000	2966.895	274.561
	Plant-based fibers	3756.000	35.820	743.573	3048.248	0.000
	Crops, n.e.c	1253.834	1107.553	18.595	2342.793	15.527
	Vegetable oils & fats	4020.591	888.960	107.864	4737.686	1762.040
	Sugar	2187.164	905.095	55.311	2878.948	252.000
Germany	Vegetables, fruit, nuts	4789.296	4030.814	1075.056	8304.759	723.166
	Oilseeds	922.874	366.084	354.736	969.503	228.015
	Sugar cane, sugar beet	34.615	69.294	4.872	97.532	12.942
	Plant-based fibers	249.404	445.638	137.206	564.237	0.000
	Crops, n.e.c	2154.682	3788.266	710.839	5242.258	456.180
	Vegetable oils & fats	2155.425	2558.129	1103.216	3763.067	1262.159
	Sugar	76.793	1231.018	449.871	857.845	96.400
Hong Kong	Vegetables, fruit, nuts	27.080	715.017	295.986	446.303	2.482
	Oilseeds	0.000	13.728	8.731	5.019	0.045
	Sugar cane, sugar beet	0.000	0.057	0.001	0.056	0.000
	Plant-based fibers	0.000	327.587	41.135	286.452	0.000
	Crops, n.e.c	1.002	555.024	474.654	81.922	1.713
	Vegetable oils & fats	28.490	111.533	64.679	77.060	4.717
	Sugar	0.000	44.752	8.199	36.553	0.808

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Table 15.5 GTAP version 4 crop-based commodity values by region (continued)

Region	GTAP version 4 commodity	Production	Imports	Exports	Availability	Feed
India	Vegetables, fruit, nuts	45283.152	346.500	394.564	45235.076	434.227
	Oilseeds	3207.307	3.345	11.991	3235.797	94.427
	Sugar cane, sugar beet	7620.000	0.145	0.000	7620.144	68.859
	Plant-based fibers	3536.280	83.579	99.134	3520.726	0.000
	Crops, n.e.c	8340.433	39.568	947.866	7452.395	0.002
	Vegetable oils & fats	6675.782	157.951	865.985	5558.970	2370.373
	Sugar	5084.579	3.199	106.223	4268.288	122.312
Indonesia	Vegetables, fruit, nuts	6487.405	103.259	143.724	6446.962	16.110
	Oilseeds	549.908	164.940	4.045	709.274	0.388
	Sugar cane, sugar beet	960.000	0.000	0.000	960.000	0.000
	Plant-based fibers	17.162	659.653	1.920	674.219	0.000
	Crops, n.e.c	7846.239	215.129	2891.248	5186.025	61.052
	Vegetable oils & fats	2102.897	265.685	940.819	1255.363	222.978
	Sugar	771.258	73.348	168.806	655.799	12.000
Japan	Vegetables, fruit, nuts	6813.027	1916.791	17.978	8720.537	47.392
	Oilseeds	50.303	1620.136	0.789	1659.636	40.750
	Sugar cane, sugar beet	214.515	0.002	0.000	214.517	0.000
	Plant-based fibers	0.072	827.421	0.028	827.465	0.000
	Crops, n.e.c	462.590	2188.157	51.877	2597.828	0.002
	Vegetable oils & fats	1949.323	629.883	11.964	2540.298	1176.996
	Sugar	560.543	522.909	2.719	1077.734	71.400
Korea	Vegetables, fruit, nuts	4150.638	390.143	48.065	4492.698	20.076
	Oilseeds	56.170	313.253	0.228	369.195	8.225
	Sugar cane, sugar beet	0.000	0.000	0.000	0.000	0.000
	Plant-based fibers	0.195	576.922	4.159	572.958	0.000
	Crops, n.e.c	321.520	982.873	39.824	1264.568	0.002
	Vegetable oils & fats	363.206	637.843	5.517	993.745	531.597
	Sugar	202.290	367.224	64.459	478.388	0.000
Malaysia	Vegetables, fruit, nuts	735.348	268.149	189.795	817.159	5.424
	Oilseeds	257.096	129.113	7.161	379.084	1.819
	Sugar cane, sugar beet	33.750	0.001	0.233	33.517	0.038
	Plant-based fibers	0.000	71.825	0.116	71.709	0.000
	Crops, n.e.c	1596.211	241.575	1254.625	601.453	3.979
	Vegetable oils & fats	3145.184	226.770	2918.276	467.160	188.979
	Sugar	46.090	170.482	53.970	162.603	19.824
Mexico	Vegetables, fruit, nuts	7930.449	1597.357	859.096	8733.208	911.986
	Oilseeds	179.080	87.123	11.161	258.052	0.000
	Sugar cane, sugar beet	1198.657	0.000	0.001	1198.656	23.973
	Plant-based fibers	70.895	160.900	38.495	193.301	0.000
	Crops, n.e.c	617.418	216.129	316.554	519.318	0.002
	Vegetable oils & fats	1482.830	740.188	9.003	2229.596	1086.551
	Sugar	1634.360	83.735	14.861	2237.719	0.000

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Table 15.5 GTAP version 4 crop-based commodity values by region (continued)

Region	GTAP version 4 commodity	Production	Imports	Exports	Availability	Feed
Morocco	Vegetables, fruit, nuts	2125.430	10.135	244.054	1920.911	27.860
	Oilseeds	33.518	29.038	0.012	62.544	0.000
	Sugar cane, sugar beet	153.746	0.000	0.000	153.746	0.000
	Plant-based fibers	5.145	64.534	1.238	68.441	0.000
	Crops, n.e.c	85.569	174.950	14.470	245.566	0.000
	Vegetable oils & fats	97.610	118.114	4.190	217.196	53.875
	Sugar	138.015	75.219	11.863	201.371	44.516
New Zealand	Vegetables, fruit, nuts	565.549	92.695	310.588	352.195	4.859
	Oilseeds	0.552	10.435	0.217	10.798	10.434
	Sugar cane, sugar beet	0.000	0.000	0.000	0.000	0.000
	Plant-based fibers	0.000	0.483	0.000	0.483	0.000
	Crops, n.e.c	5.927	47.592	5.411	47.808	0.002
	Vegetable oils & fats	187.836	32.006	149.688	65.325	1.350
	Sugar	7.681	42.363	8.557	41.487	0.000
Philippines	Vegetables, fruit, nuts	4616.410	72.535	677.986	4010.959	190.782
	Oilseeds	7.652	13.041	2.059	25.598	0.000
	Sugar cane, sugar beet	900.000	0.000	0.001	899.999	36.000
	Plant-based fibers	113.958	85.747	0.000	90.097	0.000
	Crops, n.e.c	2536.240	127.009	260.783	2312.466	13.622
	Vegetable oils & fats	943.292	180.634	670.391	453.535	175.900
	Sugar	642.607	14.108	137.345	424.401	3.000
South Africa Customs Union	Vegetables, fruit, nuts	1670.547	146.955	479.753	1371.096	35.321
	Oilseeds	63.071	58.248	2.932	118.102	1.863
	Sugar cane, sugar beet	499.662	0.003	0.001	499.663	0.000
	Plant-based fibers	36.707	55.366	19.471	72.601	0.000
	Crops, n.e.c	169.274	277.875	67.129	380.620	0.000
	Vegetable oils & fats	298.124	248.557	80.053	461.384	123.573
	Sugar	618.442	33.229	209.729	459.029	83.131
Sri Lanka	Vegetables, fruit, nuts	529.192	49.091	16.751	561.578	4.050
	Oilseeds	0.578	0.155	0.318	0.540	0.000
	Sugar cane, sugar beet	21.933	0.000	0.000	21.933	0.000
	Plant-based fibers	0.000	19.774	0.008	19.767	0.000
	Crops, n.e.c	910.629	56.681	537.449	459.861	13.963
	Vegetable oils & fats	31.324	33.344	1.539	68.754	18.470
	Sugar	8.735	70.170	0.019	75.767	3.861
Sweden	Vegetables, fruit, nuts	275.207	495.145	26.888	729.860	40.560
	Oilseeds	62.260	14.141	1.732	81.268	22.950
	Sugar cane, sugar beet	96.120	0.018	0.003	96.135	0.000
	Plant-based fibers	0.000	7.598	0.133	7.465	0.000
	Crops, n.e.c	0.000	239.772	34.418	205.253	0.013
	Vegetable oils & fats	127.417	117.928	42.523	200.572	102.674
	Sugar	83.796	41.418	5.536	125.903	27.434

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Table 15.5 GTAP version 4 crop-based commodity values by region (continued)

Region	GTAP v.4 Commodity	Production	Imports	Exports	Availability	Feed
Taiwan	Vegetables, fruit, nuts	1932.266	265.644	164.381	2035.601	31.262
	Oilseeds	4.913	546.772	0.779	571.523	13.301
	Sugar cane, sugar beet	175.727	0.000	0.000	175.727	0.000
	Plant-based fibers	0.005	449.017	0.087	448.934	0.000
	Crops, n.e.c	137.325	527.521	42.657	629.928	0.094
	Vegetable oils & fats	553.782	250.628	7.287	797.123	386.106
	Sugar	175.223	169.266	4.702	341.195	55.500
Thailand	Vegetables, fruit, nuts	3812.391	25.994	544.036	3294.315	0.000
	Oilseeds	164.379	42.561	3.240	186.051	0.112
	Sugar cane, sugar beet	1424.400	0.000	0.000	1364.399	0.000
	Plant-based fibers	97.343	637.363	2.626	732.080	0.000
	Crops, n.e.c	5918.596	53.081	6225.719	619.418	0.103
	Vegetable oils & fats	322.521	253.640	10.229	565.750	331.983
	Sugar	1692.913	2.041	1051.005	573.588	0.000
Turkey	Vegetables, fruit, nuts	8221.420	141.666	746.324	7616.760	1004.345
	Oilseeds	683.041	142.165	207.480	669.653	5.592
	Sugar cane, sugar beet	204.250	21.021	0.373	224.898	0.000
	Plant-based fibers	1008.149	271.473	113.661	1165.961	0.000
	Crops, n.e.c	4519.841	179.164	510.839	4188.165	405.549
	Vegetable oils & fats	978.370	205.608	91.305	1097.039	258.579
	Sugar	1393.379	186.298	307.321	1272.356	103.268
United Kingdom	Vegetables, fruit, nuts	1656.381	2464.655	305.597	3728.161	564.605
	Oilseeds	380.017	454.167	129.250	688.268	93.082
	Sugar cane, sugar beet	0.000	22.019	0.036	21.983	2.821
	Plant-based fibers	32.786	152.956	8.816	176.644	0.000
	Crops, n.e.c	1445.282	1140.870	197.871	2384.945	39.896
	Vegetable oils & fats	1004.813	1214.438	179.776	2038.136	718.230
	Sugar	10.116	815.171	338.468	486.819	80.360
United States	Vegetables, fruit, nuts	22311.953	8059.532	4419.245	25418.550	115.861
	Oilseeds	14978.101	107.649	4790.720	10160.046	313.850
	Sugar cane, sugar beet	2016.060	0.000	0.486	2015.574	0.000
	Plant-based fibers	5296.500	4.177	2120.006	3180.671	0.000
	Crops, n.e.c	3061.931	4987.681	2083.991	5663.858	125.347
	Vegetable oils & fats	15286.095	894.965	3961.170	12172.265	5075.677
	Sugar	4672.477	609.485	162.750	2272.163	690.000
Uruguay	Vegetables, fruit, nuts	207.732	43.099	42.846	209.266	3.678
	Oilseeds	18.282	1.815	8.522	11.575	0.000
	Sugar cane, sugar beet	23.361	0.000	0.000	23.361	4.659
	Plant-based fibers	0.210	13.020	0.000	13.230	0.000
	Crops, n.e.c	8.190	71.790	3.194	76.786	0.000
	Vegetable oils & fats	46.799	10.094	29.802	30.591	15.117
	Sugar	16.672	12.894	2.766	23.500	2.078

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Table 15.5 GTAP version 4 crop-based commodity values by region (continued)

Region	GTAP version 4 commodity	Production	Imports	Exports	Availability	Feed
Venezuela	Vegetables, fruit, nuts	1443.343	102.988	56.173	1481.890	11.754
	Oilseeds	12.853	28.117	7.110	33.861	0.000
	Sugar cane, sugar beet	213.493	0.001	0.000	213.494	0.000
	Plant-based fibers	41.198	41.508	5.287	77.420	0.000
	Crops, n.e.c	242.106	58.589	60.704	239.990	6.059
	Vegetable oils & fats	135.515	360.887	5.684	474.200	174.424
	Sugar	201.929	67.905	0.530	245.890	32.697
Vietnam	Vegetables, fruit, nuts	2338.068	4.871	75.054	2267.885	37.399
	Oilseeds	86.198	5.641	0.438	91.401	4.300
	Sugar cane, sugar beet	0.000	0.000	0.000	0.000	0.000
	Plant-based fibers	7.084	12.669	0.003	19.750	0.000
	Crops, n.e.c.	1932.188	0.000	234.944	1699.886	47.506
	Vegetable oils & fats	958.800	11.050	56.348	907.810	97.745
	Sugar	359.714	12.821	78.375	320.130	19.311
Central America	Vegetables, fruit, nuts	6132.072	294.058	2403.949	4028.722	168.882
	Oilseeds	20.880	3.118	5.967	18.189	1.695
	Sugar cane, sugar beet	2926.760	0.000	0.003	2926.757	134.935
	Plant-based fibers	89.238	67.894	54.380	110.253	0.000
	Crops, n.e.c.	1704.554	87.614	1013.693	709.886	25.112
	Vegetable oils & fats	273.464	583.978	38.795	812.398	270.103
	Sugar	3013.568	71.956	1762.033	1333.041	253.967
Central European Associates	Vegetables, fruit, nuts	11020.392	795.510	1164.042	10795.947	1952.534
	Oilseeds	829.681	71.967	160.697	801.769	16.721
	Sugar cane, sugar beet	1021.055	5.098	6.021	1020.133	42.180
	Plant-based fibers	12.140	354.479	22.228	344.271	0.000
	Crops, n.e.c	627.511	957.466	386.573	1235.747	18.789
	Vegetable oils & fats	1701.830	559.582	288.156	1972.572	1253.617
	Sugar	1013.502	184.600	304.831	986.903	48.656
EFTA	Vegetables, fruit, nuts	652.035	630.165	35.313	1164.463	50.793
	Oilseeds	12.618	87.609	2.941	98.077	0.306
	Sugar cane, sugar beet	40.827	0.027	0.000	40.854	0.016
	Plant-based fibers	0.000	86.515	1.151	85.364	0.000
	Crops, n.e.c	4.575	365.301	162.427	207.448	0.147
	Vegetable oils & fats	159.602	90.667	46.179	218.150	96.683
	Sugar	38.229	108.883	3.766	143.151	26.644

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Table 15.5 GTAP version 4 crop-based commodity values by region (continued)

Region	GTAP version 4 commodity	Production	Imports	Exports	Availability	Feed
Rest of European Union	Vegetables, fruit, nuts	28694.650	8030.336	6647.907	29398.014	2265.265
	Oilseeds	4146.524	1407.181	1606.662	3817.394	1509.794
	Sugar cane, sugar beet	844.649	315.626	267.290	1003.059	41.506
	Plant-based fibers	1868.488	1526.599	880.774	2422.622	36.405
	Crops, n.e.c	14181.646	8767.041	4179.935	18805.607	3533.324
	Vegetable oils & fats	12874.614	9925.645	3326.475	19717.603	4807.372
	Sugar	2070.267	2821.434	1927.806	2970.985	598.999
Rest of Middle East	Vegetables, fruit, nuts	15154.012	1542.715	1458.727	15213.388	474.697
	Oilseeds	150.283	158.224	7.066	299.296	56.667
	Sugar cane, sugar beet	400.903	0.089	0.001	403.242	21.137
	Plant-based fibers	585.448	49.892	244.336	391.004	0.000
	Crops, n.e.c	408.939	1135.738	164.212	1397.033	54.344
	Vegetable oils & fats	391.823	955.080	18.019	1338.123	411.887
	Sugar	352.097	696.159	51.021	887.544	126.452
Rest of North Africa	Vegetables, fruit, nuts	8700.614	328.934	209.288	8840.931	57.146
	Oilseeds	119.775	5.972	1.436	131.217	1.156
	Sugar cane, sugar beet	397.788	0.000	0.022	397.765	4.500
	Plant-based fibers	556.475	117.725	23.312	650.888	0.000
	Crops, n.e.c	133.775	761.497	24.599	861.218	15.915
	Vegetable oils & fats	240.794	936.470	51.231	1174.351	278.399
	Sugar	358.957	251.894	49.103	666.347	43.718
Rest of Andean Pact	Vegetables, fruit, nuts	4506.520	27.892	1421.901	3111.612	298.975
	Oilseeds	134.362	6.162	24.029	118.022	13.585
	Sugar cane, sugar beet	471.284	0.000	0.000	471.284	57.076
	Plant-based fibers	113.007	9.486	32.078	90.415	0.000
	Crops, n.e.c	636.871	11.123	252.986	376.388	43.269
	Vegetable oils & fats	253.625	122.652	27.899	354.458	110.667
	Sugar	324.382	67.531	30.837	365.595	29.100
Rest of South America	Vegetables, fruit, nuts	433.124	15.269	20.913	427.481	16.950
	Oilseeds	460.775	1.677	203.025	235.927	11.435
	Sugar cane, sugar beet	177.816	0.000	0.000	177.816	14.247
	Plant-based fibers	215.072	0.600	268.734	3.938	0.000
	Crops, n.e.c	653.655	26.738	28.288	651.764	311.201
	Vegetable oils & fats	208.725	5.719	130.284	93.886	41.130
	Sugar	121.446	5.193	43.474	80.006	29.415
Rest of Southern Africa	Vegetables, fruit, nuts	2979.354	62.973	77.707	2998.109	10.221
	Oilseeds	88.489	33.099	7.413	107.714	0.229
	Sugar cane, sugar beet	328.352	0.000	0.001	328.351	0.081
	Plant-based fibers	219.409	16.590	159.579	109.420	0.000
	Crops, n.e.c	4210.561	32.985	1312.831	2812.062	46.886
	Vegetable oils & fats	253.558	168.735	20.806	413.824	125.834
	Sugar	314.235	56.447	185.646	188.872	36.106

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Table 15.5 GTAP version 4 crop-based commodity values by region (continued)

Region	GTAP version 4 commodity	Production	Imports	Exports	Availability	Feed
Rest of Sub-Saharan Africa	Vegetables, fruit, nuts	32092.333	168.302	336.406	31931.467	841.918
	Oilseeds	767.809	4.447	42.710	713.928	1.737
	Sugar cane, sugar beet	680.239	0.000	0.000	680.239	2.577
	Plant-based fibers	1232.299	61.012	872.280	382.481	0.000
	Crops, n.e.c	16816.212	194.793	2972.148	14154.703	773.646
	Vegetable oils & fats	2010.079	444.408	370.696	2116.374	460.477
	Sugar	567.468	279.653	106.894	745.632	102.745
Rest of World	Vegetables, fruit, nuts	6764.267	134.572	313.626	6583.343	139.768
	Oilseeds	214.812	33.927	11.483	237.219	14.038
	Sugar cane, sugar beet	227.711	6.890	6.944	227.657	2.833
	Plant-based fibers	97.292	72.851	11.618	159.606	0.000
	Crops, n.e.c	1205.542	156.899	408.980	974.183	1.770
	Vegetable oils & fats	785.107	200.322	165.298	830.662	433.339
	Sugar	186.352	146.994	116.201	201.769	17.074

Table 15.6 GTAP version 4 livestock-based commodity values by region

Region	GTAP version 4 commodity	Production	Imports	Exports	Availability
(\$ millions)					
Argentina	Raw milk	1698.830	46.698	15.139	1730.388
	Bovine cattle, sheep	3750.927	24.339	471.747	3303.517
	Animal products, n.e.c.	730.493	66.448	47.573	749.367
	Bovine cattle, sheep meat	5676.580	36.687	700.188	5013.077
	Meat products n.e.c	1094.334	89.941	76.599	1107.673
Australia	Raw milk	1735.250	9.724	139.650	1605.324
	Bovine cattle, sheep	3585.079	7.539	1845.736	1746.880
	Animal products, n.e.c.	768.273	7.521	26.297	749.496
	Bovine cattle, sheep meat	6025.520	12.383	3045.518	2991.923
	Meat products n.e.c	1189.078	10.740	124.896	1074.772
Brazil	Raw milk	4104.705	46.43	3.58	4147.555
	Bovine cattle, sheep	5948.803	153.538	635.621	5466.718
	Animal products, n.e.c.	3997.922	0.121	402.807	3595.234
	Bovine cattle, sheep meat	8706.351	223.047	895.231	8034.165
	Meat products n.e.c	5664.901	5.769	545.384	5125.284
Canada	Raw milk	1908.250	6.115	17.790	1896.571
	Bovine cattle, sheep	1329.570	339.465	227.804	1442.010
	Animal products, n.e.c.	1923.686	76.293	280.953	1722.026
	Bovine cattle, sheep meat	1907.833	495.601	357.452	2047.411
	Meat products n.e.c	2664.244	123.624	461.106	2330.812
Chile	Raw milk	387.500	26.467	3.855	410.113
	Bovine cattle, sheep	317.117	51.266	3.327	365.056
	Animal products, n.e.c.	338.346	0.742	14.528	324.561
	Bovine cattle, sheep meat	473.269	74.642	6.985	540.926
	Meat products n.e.c	480.683	5.176	20.488	465.372
China	Raw milk	1953.500	19.377	11.299	1961.578
	Bovine cattle, sheep	4397.645	2.998	144.331	4256.310
	Animal products, n.e.c.	31300.030	72.579	266.830	31105.774
	Bovine cattle, sheep meat	7203.605	21.424	208.495	7016.529
	Meat products n.e.c	42997.053	273.613	406.472	42864.190
Colombia	Raw milk	1053.475	7.903	0.501	1060.878
	Bovine cattle, sheep	999.810	0.124	11.652	988.281
	Animal products, n.e.c.	458.091	8.467	0.563	465.994
	Bovine cattle, sheep meat	1469.099	7.182	16.649	1459.632
	Meat products n.e.c	657.346	16.448	0.849	672.946
Denmark	Raw milk	1101.175	4.528	160.456	945.247
	Bovine cattle, sheep	320.575	81.222	222.929	168.405
	Animal products, n.e.c.	1534.748	22.647	1086.994	409.516
	Bovine cattle, sheep meat	460.246	118.076	326.351	237.353
	Meat products n.e.c	2127.890	39.067	1555.865	529.569

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Table 15.6 GTAP version 4 livestock-based commodity values by region

Region	GTAP version 4 commodity	Production	Imports	Exports	Availability
(\$ millions)					
Finland	Raw milk	618.839	0.152	5.668	614.380
	Bovine cattle, sheep	173.512	0.867	26.077	148.302
	Animal products, n.e.c.	227.513	0.431	15.194	212.752
	Bovine cattle, sheep meat	252.442	9.017	42.160	219.558
	Meat products n.e.c	322.257	15.042	30.978	306.815
Former Soviet Union	Raw milk	25333.500	209.103	17.857	25524.750
	Bovine cattle, sheep	13388.643	1078.700	37.724	14429.619
	Animal products, n.e.c.	9163.300	573.422	10.375	9576.438
	Bovine cattle, sheep meat	20229.069	1585.617	109.394	21705.292
	Meat products n.e.c	13102.472	775.588	71.781	13603.939
Germany	Raw milk	7005.500	107.956	650.069	6463.385
	Bovine cattle, sheep	2740.677	778.760	987.219	2532.218
	Animal products, n.e.c.	4241.990	1373.631	245.192	5370.402
	Bovine cattle, sheep meat	4078.920	1172.061	1480.038	3771.026
	Meat products n.e.c	6163.189	1967.802	535.810	7595.335
Hong Kong	Raw milk	0.296	88.388	27.914	60.770
	Bovine cattle, sheep	51.991	88.410	8.051	132.350
	Animal products, n.e.c.	240.623	394.520	112.653	522.490
	Bovine cattle, sheep meat	74.045	142.763	25.979	190.829
	Meat products n.e.c	330.556	645.867	252.818	723.605
India	Raw milk	14662.500	1.987	0.252	14664.160
	Bovine cattle, sheep	4387.811	0.001	130.105	4257.707
	Animal products, n.e.c.	949.649	1.375	0.282	950.741
	Bovine cattle, sheep meat	7468.579	12.210	188.787	7292.001
	Meat products n.e.c	1550.736	5.780	0.470	1556.046
Indonesia	Raw milk	157.500	5.514	0.349	162.665
	Bovine cattle, sheep	531.470	8.940	0.847	539.562
	Animal products, n.e.c.	1084.425	4.732	11.991	1077.166
	Bovine cattle, sheep meat	829.265	28.930	1.390	856.805
	Meat products n.e.c	1515.173	55.237	17.381	1553.028
Japan	Raw milk	2144.111	1.357	0.036	2145.424
	Bovine cattle, sheep	867.428	909.677	5.164	1739.316
	Animal products, n.e.c.	2693.337	960.648	7.461	3646.524
	Bovine cattle, sheep meat	1249.149	1399.478	29.532	2572.524
	Meat products n.e.c	3773.894	1628.798	115.632	5283.769
Korea	Raw milk	455.336	1.820	0.018	457.139
	Bovine cattle, sheep	258.095	312.534	16.695	553.933
	Animal products, n.e.c.	1082.110	25.949	8.808	1099.251
	Bovine cattle, sheep meat	373.330	598.969	33.397	938.905
	Meat products n.e.c	1515.327	915.262	17.617	2412.999

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Table 15.6 GTAP version 4 livestock-based commodity values by region

Region	GTAP version 4 commodity	Production	Imports	Exports	Availability
(\$ millions)					
Malaysia	Raw milk	10.588	92.713	18.495	84.806
	Bovine cattle, sheep	26.938	104.816	8.195	123.562
	Animal products, n.e.c.	709.942	9.654	7.259	712.337
	Bovine cattle, sheep meat	38.481	154.274	11.538	181.220
	Meat products n.e.c	961.564	22.952	10.285	974.231
Mexico	Raw milk	1837.945	152.189	1.224	1988.909
	Bovine cattle, sheep	1926.566	247.261	6.783	2167.042
	Animal products, n.e.c.	1775.038	260.034	10.063	2025.009
	Bovine cattle, sheep meat	2849.690	442.915	10.917	3281.686
	Meat products n.e.c	2522.229	467.913	15.639	2974.503
Morocco	Raw milk	246.875	7.650	0.000	254.525
	Bovine cattle, sheep	384.426	11.065	0.000	395.491
	Animal products, n.e.c.	180.745	0.448	0.015	181.178
	Bovine cattle, sheep meat	649.443	21.252	0.068	670.545
	Meat products n.e.c	265.681	3.422	0.069	268.977
New Zealand	Raw milk	2046.250	3.037	532.440	1516.848
	Bovine cattle, sheep	1663.191	7.626	1244.201	459.775
	Animal products, n.e.c.	143.354	2.402	14.158	131.598
	Bovine cattle, sheep meat	3015.593	18.486	2208.448	872.713
	Meat products n.e.c	223.650	3.982	37.043	190.589
Philippines	Raw milk	7.625	58.901	0.149	66.378
	Bovine cattle, sheep	246.814	27.605	0.001	274.418
	Animal products, n.e.c.	1012.772	0.827	0.050	1013.549
	Bovine cattle, sheep meat	380.889	41.632	0.019	422.502
	Meat products n.e.c	1388.232	14.337	0.170	1402.401
South African Customs Union	Raw milk	661.813	27.823	9.031	680.605
	Bovine cattle, sheep	1553.853	86.456	93.264	1547.044
	Animal products, n.e.c.	517.232	54.619	8.262	563.588
	Bovine cattle, sheep meat	2521.297	134.329	175.511	2469.859
	Meat products n.e.c	797.359	75.520	32.006	834.841
Sri Lanka	Raw milk	70.436	54.143	0.321	124.258
	Bovine cattle, sheep	45.683	0.695	0.326	46.052
	Animal products, n.e.c.	15.220	0.398	0.171	15.468
	Bovine cattle, sheep meat	71.823	1.448	0.481	72.790
	Meat products n.e.c	23.872	0.667	0.240	24.328
Sweden	Raw milk	783.250	4.135	0.215	787.170
	Bovine cattle, sheep	196.693	38.358	10.676	224.375
	Animal products, n.e.c.	364.685	32.358	15.294	380.720
	Bovine cattle, sheep meat	286.014	63.358	25.037	324.335
	Meat products n.e.c	510.309	65.965	47.480	527.406

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Table 15.6 GTAP version 4 livestock-based commodity values by region

Region	GTAP version 4 commodity	Production	Imports	Exports	Availability
(\$ millions)					
Taiwan	Raw milk	64.328	122.059	0.011	186.376
	Bovine cattle, sheep	8.567	111.482	1.220	118.830
	Animal products, n.e.c.	1619.375	1.327	280.315	1340.388
	Bovine cattle, sheep meat	12.465	170.100	2.233	180.334
	Meat products n.e.c	2187.157	306.970	386.454	2107.704
Thailand	Raw milk	45.800	47.629	5.155	88.274
	Bovine cattle, sheep	371.246	2.525	7.244	366.525
	Animal products, n.e.c.	1049.591	0.285	169.450	880.436
	Bovine cattle, sheep meat	534.164	32.017	10.497	555.683
	Meat products n.e.c	1465.388	125.982	230.149	1361.234
Turkey	Raw milk	2569.813	2.914	0.040	2572.685
	Bovine cattle, sheep	964.880	43.960	8.822	1000.018
	Animal products, n.e.c.	400.108	2.693	2.397	400.403
	Bovine cattle, sheep meat	1709.487	156.547	16.405	1849.629
	Meat products n.e.c	590.087	65.837	3.448	652.475
United Kingdom	Raw milk	3654.250	62.960	205.930	3511.280
	Bovine cattle, sheep	1906.950	650.421	377.126	2180.243
	Animal products, n.e.c.	1971.186	722.410	204.978	2488.616
	Bovine cattle, sheep meat	3045.143	1053.625	687.395	3414.159
	Meat products n.e.c	2808.111	1065.006	398.365	3479.117
United States	Raw milk	17105.748	8.699	71.016	17041.068
	Bovine cattle, sheep	15769.975	1724.102	897.494	16635.891
	Animal products, n.e.c.	19070.443	290.975	989.158	18364.315
	Bovine cattle, sheep meat	22668.101	2486.295	1582.454	23626.533
	Meat products n.e.c	26454.361	473.316	1930.730	24986.216
Uruguay	Raw milk	277.857	0.015	19.499	258.373
	Bovine cattle, sheep	571.885	1.239	217.103	334.047
	Animal products, n.e.c.	60.131	0.873	9.208	51.795
	Bovine cattle, sheep meat	943.205	3.731	327.934	588.102
	Meat products n.e.c	95.622	1.492	15.054	82.060
Venezuela	Raw milk	394.010	111.505	0.214	505.301
	Bovine cattle, sheep	550.040	2.005	0.004	552.040
	Animal products, n.e.c.	569.770	7.934	13.057	564.644
	Bovine cattle, sheep meat	800.656	3.706	3.512	800.850
	Meat products n.e.c	800.305	12.148	23.393	789.058
Vietnam	Raw milk	16.750	0.000	0.000	16.750
	Bovine cattle, sheep	257.107	0.000	0.086	257.020
	Animal products, n.e.c.	1017.658	0.000	15.936	1001.723
	Bovine cattle, sheep meat	378.986	0.000	1.015	377.971
	Meat products n.e.c	1464.397	0.000	26.799	1437.600

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Table 15.6 GTAP version 4 livestock-based commodity values by region

Region	GTAP version 4 commodity	Production	Imports	Exports	Availability
(\$ millions)					
Central America	Raw milk	773.110	127.104	12.540	890.721
	Bovine cattle, sheep	833.735	59.935	100.932	792.740
	Animal products, n.e.c.	741.549	165.061	2.998	904.559
	Bovine cattle, sheep meat	1227.204	92.657	145.475	1174.391
	Meat products n.e.c	1051.290	229.863	6.186	1276.247
Central European Associates	Raw milk	6762.009	20.031	56.590	6725.448
	Bovine cattle, sheep	2314.982	94.510	192.501	2158.557
	Animal products, n.e.c.	6150.344	174.957	384.019	5913.891
	Bovine cattle, sheep meat	3464.407	167.343	290.218	3264.209
	Meat products n.e.c	8553.926	374.233	570.125	8324.497
EFTA	Raw milk	1482.353	13.091	0.606	1492.837
	Bovine cattle, sheep	425.756	30.875	14.919	441.712
	Animal products, n.e.c.	439.083	59.187	7.032	491.237
	Bovine cattle, sheep meat	645.896	55.550	43.761	657.917
	Meat products n.e.c	617.956	90.162	40.933	667.806
Rest of European Union	Raw milk	18230.429	1220.790	1677.751	17717.470
	Bovine cattle, sheep	9619.409	2426.515	3218.297	8804.312
	Animal products, n.e.c.	14403.235	2131.143	3143.935	13488.904
	Bovine cattle, sheep meat	14645.397	4046.086	4957.590	13702.093
	Meat products n.e.c	20526.784	3925.737	4930.009	19657.870
Rest of Middle East	Raw milk	2016.395	182.762	8.721	2188.845
	Bovine cattle, sheep	1652.459	577.763	44.516	2175.985
	Animal products, n.e.c.	1359.703	319.939	38.708	1640.693
	Bovine cattle, sheep meat	2958.981	934.757	102.373	3772.048
	Meat products n.e.c	1953.730	456.885	86.631	2321.840
Rest of North Africa	Raw milk	996.655	264.192	0.327	1263.520
	Bovine cattle, sheep	1203.822	228.163	5.734	1429.080
	Animal products, n.e.c.	733.869	1.678	1.436	734.110
	Bovine cattle, sheep meat	2018.520	336.070	13.108	2346.980
	Meat products n.e.c	1073.324	15.997	6.679	1082.640
Rest of Andean Pact	Raw milk	644.517	43.777	0.920	687.374
	Bovine cattle, sheep	623.729	3.866	0.612	626.983
	Animal products, n.e.c.	715.553	4.831	2.906	717.451
	Bovine cattle, sheep meat	945.863	6.212	5.037	947.038
	Meat products n.e.c	1014.194	7.693	14.959	1006.891
Rest of South America	Raw milk	68.350	6.350	0.000	74.700
	Bovine cattle, sheep	357.110	0.795	47.662	310.243
	Animal products, n.e.c.	169.439	7.745	0.000	177.184
	Bovine cattle, sheep meat	531.282	1.242	67.203	465.321
	Meat products n.e.c	245.823	10.543	0.114	256.251

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Table 15.6 GTAP version 4 livestock-based commodity values by region

Region	GTAP version 4 commodity	Production	Imports	Exports	Availability
(\$ millions)					
Rest of South Asia	Raw milk	4732.279	77.254	1.536	4807.997
	Bovine cattle, sheep	2400.189	1.280	0.267	2401.201
	Animal products, n.e.c.	273.277	0.370	0.349	273.299
	Bovine cattle, sheep meat	4543.190	12.233	3.690	4551.734
	Meat products n.e.c	563.426	1.919	0.930	564.415
Rest of Southern Africa	Raw milk	358.875	28.041	6.297	380.619
	Bovine cattle, sheep	724.781	43.193	27.518	739.540
	Animal products, n.e.c.	273.416	31.916	2.600	302.736
	Bovine cattle, sheep meat	1129.339	66.792	50.525	1144.318
	Meat products n.e.c	399.589	44.499	8.762	435.333
Rest of Sub-Saharan Africa	Raw milk	2977.106	103.181	8.317	3071.573
	Bovine cattle, sheep	3232.629	187.345	4.548	3417.151
	Animal products, n.e.c.	1693.112	69.090	0.246	1761.931
	Bovine cattle, sheep meat	5389.065	265.327	72.970	5583.762
	Meat products n.e.c	2484.076	94.190	29.695	2548.343
Rest of World	Raw milk	1402.106	51.013	2.173	1450.946
	Bovine cattle, sheep	1476.693	205.071	46.328	1635.196
	Animal products, n.e.c.	1682.229	103.492	19.138	1766.623
	Bovine cattle, sheep meat	2433.936	336.259	79.462	2690.398
	Meat products n.e.c	2356.100	151.853	35.394	2472.669

Table 15.7 Initial sales shares used for splitting non-grain crops

Sales to GTAP version 3 commodity	Initial share ^a
Other Livestock	Value of feed use shares
Other Food Products	Sales shares based on estimated relationship between production shares and sales shares in existing GTAP version 4 I/O tables.
Beverages & Tobacco	Sales shares based on estimated relationship between production shares and sales shares in existing GTAP version 4 I/O tables.
Own-Use	Value of production shares
Textiles	All sales originate from plant-based fibers
Consumption	Consumption shares based on estimated relationship between production shares and consumption shares in existing GTAP version 4 I/O tables.
Exports	Value of export shares
Total Production	Production value shares
All Else	Availability value share (production share less feed-use share)

^a Feed-use, production, export, and availability shares are based on FAO supply utilization data and estimated world prices.

Table 15.8 Sales from non-grain crops to other foods in version 4 I/O tables

GTAP version 4 commodity	Country	Vegetable oils	Sugar	Food n.e.c	Production share ^a	Sales: prod. ^b
Vegetable, fruits, nuts	Denmark	0.0001 ^c	0.0001	0.0624	0.5448	0.1145
Oilseeds		0.0000	0.0000	0.0521	0.0852	
Sugar cane & beets		0.0000	0.4166	0.0512	0.1157	3.6019
Plant-based fibers		0.2246	0.0000	0.1929	0.2543	
Crops, n.e.c		0.0000	0.0000	0.0000	0.0000	
Vegetable, fruits, nuts	EU	0.0000	0.0000	0.4811	0.4791	1.0043
Oilseeds		0.2683	0.0000	0.0000	0.0679	3.9510
Sugar cane & beets		0.0000	0.2506	0.0000	0.0577	4.3389
Plant-based fibers		0.0000	0.0000	0.0000	0.0006	
Crops, n.e.c		0.0000	0.0000	0.0000	0.3947	
Vegetable, fruits, nuts	UK	0.0000	0.0000	0.0965	0.5878	0.1641
Oilseeds		0.1373	0.0000	0.2463	0.1061	1.2950
Sugar cane & beets		0.0000	0.2679	0.0965	0.0839	3.1939
Plant-based fibers		0.0000	0.0000	0.0000	0.0000	
Crops, n.e.c		0.0000	0.0000	0.1555	0.2223	
Vegetable, fruits, nuts	Indonesia	0.0000	0.0000	0.0643	0.5586	0.1151
Oilseeds		0.2999	0.0438	0.0122	0.1165	2.5746
Sugar cane & beets		0.0000	0.3921	0.0001	0.0788	4.9763
Plant-based fibers		0.0003	0.0000	0.1701	0.2232	
Crops, n.e.c		0.0002	0.0147	0.0023	0.0229	
Vegetable, fruits, nuts	Uruguay	0.0000	0.0000	0.1273	0.6599	0.1929
Oilseeds		0.2652	0.0000	0.0000	0.0773	3.4319
Sugar cane & beets		0.0000	0.6076	0.0000	0.1553	3.9123
Plant-based fibers		0.0000	0.0000	0.0000	0.0000	
Crops, n.e.c		0.0000	0.0000	0.0000	0.1076	
Vegetable, fruits, nuts	US	0.0010	0.0001	0.2554	0.3860	0.6618
Oilseeds		0.4250	0.0002	0.1333	0.2493	1.7052
Sugar cane & beets		0.0000	0.1403	0.0001	0.0407	3.4512
Plant-based fibers		0.0236	0.0000	0.0001	0.1025	
Crops, n.e.c		0.0028	0.0000	0.0180	0.2216	
Vegetable, fruits, nuts	Australia	0.0000	0.1002	0.3464	0.4428	0.7824
Oilseeds		0.0179	0.0160	0.0964	0.0909	0.1971
Sugar cane & beets		0.0000	0.0253	0.0876	0.1125	0.2253
Plant-based fibers		0.0033	0.0217	0.0749	0.1454	
Crops, n.e.c		0.0000	0.0472	0.1630	0.2084	

^a Share of total production of non-grain crops based on FAO supply utilization data and estimated world prices.

^b Sales share of vegetables, fruits, and nuts to food products, n.e.c. divided by production share of vegetables, fruits, and nuts; sales share of oilseeds to vegetable oils divided production share of oilseeds; and sales share of sugar cane and beets to sugar divided by sugar cane and beet production share.

^c Sales shares of vegetables, fruits, and nuts; oilseeds; sugar cane and sugar beets; plant-based fibers; and crops, n.e.c, to vegetable oils & fats, sugar, and food, n.e.c. must sum to one. In other words, the sum across all elements in the 5x3 matrix for each region must sum to one.

Table 15.9 Estimated key sales shares for Argentina

GTAP version 4 commodity	Sales Shares								
	Production share ^a	Bovine cattle ^b	Animal products	Raw milk	Vegetable oils ^c	Sugar	Food prod. n.e.c.	Beverages & tobacco ^a	Consumption ^a
Vegetables, fruits, and nuts	0.4007	0			0.0000	0.0000	0.1066	0.6988	0.7588
Oilseeds	0.3965				0.7288	0.0000	0.0000	0.0000	0.1272
Sugar cane and beets	0.0593				0.0000	0.1646	0.0000	0.0000	0.0000
Plant-based fibers	0.0428				0.0000	0.0000	0.0000	0.0000	0.0000
Crops, n.e.c.	0.1006				0.0000	0.0000	0.0000	0.3012	0.1139
Vegetables oils & fats	0.1304	0.0000	0.0000	0.0000	0.1073	0.0000	0.1237	0.0000	0.0963
Sugar	0.0180	0.0000	0.0000	0.0000	0.0000	0.0747	0.0148	0.1396	0.0406
Food products, n.e.c.	0.8516	0.0293	0.3677	0.6030	0.0000	0.0000	0.6796	0.8604	0.8631
Bovine cattle, sheep & goats	0.5856				0.0000	0.0000	0.0000		0.6663
Animal products, n.e.c.	0.1492				0.0000	0.0000	1.0000		0.1386
Raw milk	0.2652				0.0000	0.0000	0.0000		0.1951
Bovine cattle, sheep meat	0.8044								0.7887
Meat products, n.e.c.	0.1956								0.2113

^a The column sum must equal one for all groups of commodities. For example, the production shares for vegetables, fruits, and nuts; oilseeds; sugar cane and beets; plant-based fiber; and crops, n.e.c. must sum to one.

^b The sum across the bovine cattle, animal products, and raw milk columns for vegetable oils & fats, sugar, and food products, n.e.c. must equal one.

^c The sum across the columns vegetable oils, sugar, and food products, n.e.c. must equal one for all groups of commodities.

Table 15.10 Initial shares used for splitting other livestock

Sales to GTAP version 3 commodity	Initial share
Own-use	Value of production shares
Meat products	No sales to meat products by dairy farms. One-to-one mapping between bovine livestock and meats, and animals n.e.c. and meats n.e.c.
Dairy products	All sales allocated to raw milk
Other food	All sales assumed to originate from animal products, n.e.c. and go to food products, n.e.c.
Consumption	Consumption shares based on existing GTAP version 4 I/O consumption and production shares.
Exports	Value of export share
Total production	Value of production shares
All else	Value of production shares

^a Production and export shares are based on FAO supply utilization data and estimated world prices.

Table 15.11 Initial shares used for splitting other food products

Category	Initial Share
Other Livestock	Sales shares for dairy farm, meat animals, and poultry & eggs in U.S. IO table, adjusted to include hogs with poultry & eggs
Other Food	Sales shares in 1982 U.S. IO table
Beverages & Tobacco	Sales shares in 1982 U.S. IO table
Consumption	Value of food consumption shares
Exports	Value of export shares
Total Production	Value of production shares
All Else	Value of production shares

Table 15.12 Estimated values of production, imports, and exports for regions without GTAP version 3 I/O tables

Region	GTAP version 4 commodity	Value (1992 \$ millions) of		
		Production	Imports	Exports
Germany	Paddy rice	0.000	0.000	0.000
	Wheat	2346.791	268.541	931.855
	Cereal grains, n.e.c.	1821.387	272.750	487.228
	Vegetables, fruits, nuts	4664.578	5780.357	869.244
	Oilseeds	613.624	1029.682	185.486
	Sugar cane and beet	1221.744	0.037	2.126
	Plant-based fibers	0.000	308.655	38.229
	Crops, n.e.c.	31.590	3267.573	995.662
	Bovine cattle, sheep, and goats	2740.677	778.760	987.219
	Animal products, n.e.c.	4241.990	1373.631	245.192
	Raw milk	7005.500	107.956	650.069
	Wool, silk-worms	8.470	82.321	13.489
	Bovine cattle meat	4078.920	1172.061	1480.038
	Meat products, n.e.c.	6163.189	1967.802	535.810
	Vegetable oils	2537.653	1778.345	1339.686
	Dairy products	13608.411	2052.266	1984.881
	Processed rice	0.000	76.385	16.581
	Sugar	1198.429	311.833	404.240
Finland	Paddy rice	0.000	0.000	0.000
	Wheat	32.057	9.630	29.751
	Cereal grains, n.e.c.	221.544	1.578	56.828
	Vegetables, fruits, nuts	190.765	200.088	16.446
	Oilseeds	29.172	43.190	0.014
	Sugar cane and beet	47.205	1.248	0.000
	Plant-based fibers	0.000	0.851	0.000
	Crops, n.e.c.	0.000	121.818	17.968
	Bovine cattle, sheep, and goats	173.512	0.867	26.077
	Animal products, n.e.c.	227.513	0.431	15.194
	Raw milk	618.839	0.152	5.668
	Wool, silk-worms	0.128	0.599	0.023
	Bovine cattle meat	252.442	9.017	42.160
	Meat products, n.e.c.	322.257	15.042	30.978
	Vegetable oils	101.849	17.197	17.726
	Dairy products	1073.447	7.703	165.356
	Processed rice	0.000	7.390	0.001
	Sugar	47.781	19.354	18.095

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Table 15.12 Estimated values of production, imports, and exports for regions without GTAP
version 3 I/O tables (continued)

		Value (1992 \$ millions) of		
Region	GTAP version 4 commodity	Production	Imports	Exports
Morocco	Paddy rice	2.873	0.000	0.000
	Wheat	235.886	373.153	0.098
	Cereal grains, n.e.c.	131.002	62.176	0.113
	Vegetables, fruits, nuts	2125.430	10.135	244.054
	Oilseeds	33.518	29.038	0.012
	Sugar cane and beet	153.746	0.000	0.000
	Plant-based fibers	5.145	64.534	1.238
	Crops, n.e.c.	85.569	174.950	14.470
	Bovine cattle, sheep, and goats	384.426	11.065	0.000
	Animal products, n.e.c.	180.745	0.448	0.015
	Raw milk	246.875	7.650	0.000
	Wool, silk-worms	20.933	2.151	0.000
	Bovine cattle meat	649.443	21.252	0.068
	Meat products, n.e.c.	265.681	3.422	0.069
	Vegetable oils	97.610	118.114	4.190
	Dairy products	391.273	55.764	0.055
	Processed rice	4.393	0.301	0.001
	Sugar	138.015	75.219	11.863
South Africa	Paddy rice	0.390	0.000	0.000
	Wheat	199.018	83.850	21.829
	Cereal grains, n.e.c.	344.536	426.590	59.802
	Vegetables, fruits, nuts	1585.985	81.791	459.704
	Oilseeds	62.347	57.616	0.204
	Sugar cane and beet	388.662	0.002	0.001
	Plant-based fibers	32.507	55.301	7.164
	Crops, n.e.c.	169.118	251.026	66.333
	Bovine cattle, sheep, and goats	1326.060	76.492	6.101
	Animal products, n.e.c.	486.070	37.298	5.366
	Raw milk	597.500	9.063	8.998
	Wool, silk-worms	176.055	2.568	47.778
	Bovine cattle meat	2156.463	118.654	41.325
	Meat products, n.e.c.	750.808	51.665	25.881
	Vegetable oils	290.947	240.119	78.915
	Dairy products	1283.510	18.546	15.520
	Processed rice	0.596	103.100	2.475
	Sugar	480.608	14.883	103.997

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Table 15.12 Estimated Values of Production, Imports, and Exports for Regions Without GTAP
Version 3 I/O Tables (continued)

		Value (1992 \$ millions) of		
Region	GTAP version 4 commodity	Production	Imports	Exports
Sri Lanka	Paddy rice	304.161	0.000	0.000
	Wheat	0.000	118.367	0.082
	Cereal grains, n.e.c.	3.591	4.014	0.018
	Vegetables, fruits, nuts	529.192	49.091	16.751
	Oilseeds	0.578	0.155	0.318
	Sugar cane and beet	21.933	0.000	0.000
	Plant-based fibers	0.000	19.774	0.008
	Crops, n.e.c.	910.629	56.681	537.449
	Bovine cattle, sheep, and goats	45.683	0.695	0.326
	Animal products, n.e.c.	15.220	0.398	0.171
	Raw milk	70.436	54.143	0.321
	Wool, silk-worms	0.000	0.009	0.000
	Bovine cattle meat	71.823	1.448	0.481
	Meat products, n.e.c.	23.872	0.667	0.240
	Vegetable oils	31.324	33.344	1.539
	Dairy products	278.492	10.074	0.048
	Processed rice	465.053	69.210	0.247
	Sugar	8.735	70.170	0.019
Sweden	Paddy rice	0.000	0.000	0.000
	Wheat	212.351	22.451	57.332
	Cereal grains, n.e.c.	218.200	11.521	77.979
	Vegetables, fruits, nuts	275.207	495.145	26.888
	Oilseeds	62.260	14.141	1.732
	Sugar cane and beet	96.120	0.018	0.003
	Plant-based fibers	0.000	7.598	0.133
	Crops, n.e.c.	0.000	239.772	34.418
	Bovine cattle, sheep, and goats	196.693	38.358	10.676
	Animal products, n.e.c.	364.685	32.358	15.294
	Raw milk	783.250	4.135	0.215
	Wool, silk-worms	0.605	0.184	0.099
	Bovine cattle meat	286.014	63.358	25.037
	Meat products, n.e.c.	510.309	65.965	47.480
	Vegetable oils	127.417	117.928	42.523
	Dairy products	1364.835	66.444	41.412
	Processed rice	0.000	15.430	0.431
	Sugar	83.796	41.418	5.536

Table 15.12 Estimated Values of Production, Imports, and Exports for Regions Without GTAP
Version 3 I/O Tables (continued)

Region	GTAP version 4 commodity	Value (1992 \$ millions) of		
		Production	Imports	Exports
Taiwan	Paddy rice	264.524	0.000	0.000
	Wheat	0.653	149.895	2.808
	Cereal grains, n.e.c.	46.953	603.673	0.084
	Vegetables, fruits, nuts	1932.266	265.644	164.381
	Oilseeds	4.913	546.772	0.779
	Sugar cane and beet	175.727	0.000	0.000
	Plant-based fibers	0.005	449.017	0.087
	Crops, n.e.c.	137.325	527.521	42.657
	Bovine cattle, sheep, and goats	8.567	111.482	1.220
	Animal products, n.e.c.	1619.375	1.327	280.315
	Raw milk	64.328	122.059	0.011
	Wool, silk-worms	0.003	42.127	15.850
	Bovine cattle meat	12.465	170.100	2.233
	Meat products, n.e.c.	2187.157	306.970	386.454
	Vegetable oils	553.782	250.628	7.287
	Dairy products	447.238	44.263	0.142
	Processed rice	394.140	1.410	33.957
	Sugar	175.223	169.266	4.702
Turkey	Paddy rice	27.950	0.000	0.000
	Wheat	2917.018	9.476	682.020
	Cereal grains, n.e.c.	928.379	29.089	83.548
	Vegetables, fruits, nuts	12334.733	70.146	1265.700
	Oilseeds	333.122	33.586	2.607
	Sugar cane and beet	680.675	0.000	0.001
	Plant-based fibers	860.559	205.255	50.931
	Crops, n.e.c.	1664.034	353.945	345.059
	Bovine cattle, sheep, and goats	964.880	43.960	8.822
	Animal products, n.e.c.	400.108	2.693	2.397
	Raw milk	2569.813	2.914	0.040
	Wool, silk-worms	29.126	23.680	0.797
	Bovine cattle meat	1709.487	156.547	16.405
	Meat products, n.e.c.	590.087	65.837	3.448
	Vegetable oils	535.476	481.394	153.026
	Dairy products	5061.068	32.921	8.483
	Processed rice	42.735	87.434	0.426
	Sugar	599.850	2.988	159.979

Table 15.12 Estimated Values of Production, Imports, and Exports for Regions Without GTAP
Version 3 I/O Tables (Cont)

Region	GTAP version 4 commodity	Value (1992 \$ millions) of		
		Production	Imports	Exports
Vietnam	Paddy rice	2806.739	0.000	0.000
	Wheat	0.000	55.280	0.133
	Cereal grains, n.e.c.	79.086	1.714	8.066
	Vegetables, fruits, nuts	4070.107	0.900	122.654
	Oilseeds	24.088	0.187	3.964
	Sugar cane and beet	193.110	0.000	0.000
	Plant-based fibers	15.645	12.534	0.471
	Crops, n.e.c.	1127.109	12.821	307.084
	Bovine cattle, sheep, and goats	257.107	0.000	0.086
	Animal products, n.e.c.	1017.658	0.000	15.936
	Raw milk	16.750	0.000	0.000
	Wool, silk-worms	0.870	7.986	0.137
	Bovine cattle meat	378.986	0.000	1.015
	Meat products, n.e.c.	1464.397	0.000	26.799
	Vegetable oils	147.005	14.968	4.294
	Dairy products	40.200	5.625	0.000
	Processed rice	4291.418	0.497	568.763
	Sugar	106.760	5.641	6.694