

## Food supply and disposition

The food statistics program relies on supply-disposition analysis. The stocks at the beginning of a period are combined with the flows in during that period to estimate total supplies. Total disposition is computed as flows out during the period, while ending stocks represent the total supply minus the total disposition. Consequently, the total supply for a given commodity in a given time period must equal the total disposition plus ending stocks for the same period. And, the ending stocks of one period must equal the beginning stocks of the next period. In reality, it is unusual for all stocks and flows to be measured directly. However, using the basic principles, a missing component can be derived residually.

On the disposition side, exports, manufacturing and waste are displayed followed by ending stocks. Domestic disappearance or food available for consumption is derived by subtracting the flows out plus ending stocks from the total supply. The domestic disappearance is viewed as the total amount of food available at the retail level.

Domestic disappearance is divided by the Canadian population as of July 1<sup>st</sup> of the year depicted to calculate the food available per person, per year, at the retail level. It is normally expressed on a weight basis in kilograms unless that is inappropriate, as is the case with beverages.

The data are sometimes displayed on a different basis depending on the commodity. For example, processed fruits and vegetables are displayed on a retail basis and fresh equivalent basis. The different basis for the retail weight is displayed simply to provide additional information for analytical purposes.

The information required to produce the food statistics is extensive and varied. The sources of data often reach deeply into the agricultural statistics program relying on surveys conducted by the Agriculture Division (AD). A few other divisions in Statistics Canada such as the International Trade Division (ITD) or the Manufacturing and Energy Division (MED) contribute crucial components of the data set. Trade statistics used are those produced on a customs basis which is derived from the administrative records of the Canada Border Services Agency and the United States Customs Border Protection. These trade statistics cover the physical movement of goods. Considerable administrative data from organisations such as Agriculture and Agri-Food Canada (AAFC), provincial departments and industry groups are also invaluable.

**Beginning stocks** represent the physical inventory of fresh and frozen products held in storage of a particular commodity at the beginning of the year. They equal the previous year's ending stocks. This item has a fairly small impact on domestic disappearance because the magnitude of changes in inventories is typically small. There are numerous commodities for which inventory data are not available; however, given the small impact of these data, the effect of this type of data gap is considered minor. Due to confidentiality, some inventory data are not displayed but they are used in the calculation.

**Production** represents the amount of a particular commodity that is produced during the reference year. The data are often based on independent surveys of farms and food processors. Many of the surveys are conducted by AD.

**Imports** include all goods which have crossed Canada's territorial boundary, whether for immediate consumption in Canada or stored in bonded custom warehouses.

**Total supply** is the sum of beginning stocks plus production plus imports. This number represents the total supply of a particular commodity that is available for any use.

**Exports** include goods grown, extracted or manufactured in Canada, including goods of foreign origin which have been materially transformed in Canada. Re-exports are exports of goods of foreign origin which have not been materially transformed in Canada,

including foreign goods withdrawn for export from bonded customs warehouses. Total exports are the sum of domestic exports and re-exports.

**Manufacturing** data include requirements for processing, seed, animal feed and industrial use. If data are available at a more detailed level, then an important component of manufacturing is the amount used for processing. At the same time, the processed commodities need to be accounted for. For instance, apples contain an amount for processing and processed apples, be they canned, dried, frozen, made into apple sauce or pie filling, are accounted for as individual commodities. If detailed data are not available for processed products, then the commodity is accounted for at a less processed level even though it might often be used as an input into further processing. For instance, wheat flour is accounted for but the wheat flour products from breads to cookies are not accounted for. Consequently, there is no deduction from wheat flour to account for further processing.

**Waste** factors attempt to account for quantities removed during processing or that are lost in storage. They do not allow for losses at the retail level, in households, restaurants or institutions during storage and preparation, or for unconsumed food.

**Ending stocks** represent the physical inventory of fresh and frozen products held in storage of a particular commodity at the end of the year. They equal the following beginning stocks. This item has a fairly small impact on net supply because it is truly the change in inventories that has any impact. There are numerous commodities for which inventory data are not available; however, given the small impact of these data, the effect of this type of data gap is considered minor. Due to confidentiality, some inventory data are not displayed but they are used in the calculation.

**Domestic disposition** is derived by subtracting other uses and ending stocks from the total supply. The other uses include exports, manufacturing and waste. Domestic disposition represents the total food available for human consumption from the Canadian food supply chain.

**Food available per person** is calculated by dividing the domestic disposition by the Canadian population as of July 1<sup>st</sup> of the reference year.

The food available per person is presented in a number of ways.

**Retail weight** – This is the volume of food available per person, for consumption, at the retail level. It is viewed as the most important number as it displays levels and trends for individual foods. It allows for easy comparisons of one type of food to another and within or between food groups. Furthermore, it is the number on which all other calculations are based including different ways of displaying the data and estimates of loss-adjusted food available. Processed fruits and vegetables or selected beverages are displayed on a fresh equivalent basis. Dairy products are depicted on a milk solids basis. Estimates based on the sugar content are provided for sugar products such as refined sugar, honey or maple syrup, while estimates for oils and fats include those based on the fat content. Red meats are displayed on a boneless and carcass basis, while poultry is provided on an eviscerated and boneless basis. Fish data are provided on an edible weight basis. In the case of alcoholic beverages, the data are estimated for two population groups. One estimate is based on the total Canadian population. The other represents the population of Canadians who are 15 years of age and older.

**Adjusted for losses** – Losses occur in the storage, preparation and cooking of the food, as well as the food that makes it to the plate but not consumed, or plate loss. These losses can occur in the retail store, home, restaurants or institutions. The losses are deducted from the food available for consumption at retail weight to derive food available for consumption adjusted for losses. The objective is to provide a proxy of fork-level consumption based on food supply data. Factors used to adjust the food available data are estimates themselves and caution should be used when working with the data, as

they are based on a static model. The factors are taken from the Economic Research Service of the United States Department of Agriculture.

The waste factors that account for quantities removed during processing or lost in storage at the industrial level are removed before domestic disposition is calculated and therefore do not appear in the retail weight available per person.

## **Perspective by food group**

### **Cereal products**

The food available for consumption value on a per capita or per person basis for cereal products describes what is available after the products leave the mills and therefore, further processing is not included under the manufacturing category. For wheat flour, rye flour, oatmeal and rolled oats, production and stocks data are derived from a monthly survey of Canadian millers, conducted by the Crops Section of the Agriculture Division. Data for imports and exports of these products are obtained from ITD. Included in wheat production are Canadian western red spring, red winter wheat, soft white spring wheat, and amber durum wheat; and Ontario and Quebec winter and spring wheat.

Per capita food available figures are provided for pot and pearl barley, corn flour and meal; however, some calculation components are hidden because of confidentiality restrictions.

Nearly all of the domestic supply of rice is imported. Production data represent Canadian wild rice production, as provided by the Manitoba, Saskatchewan and Ontario departments of agriculture. Import data includes that for wild rice. Stocks data are not available for rice.

For breakfast foods, the data include prepared, ready-to-serve breakfast foods, unprepared oatmeal and rolled oats and other unprepared cereals. The volume of oatmeal and rolled oats is removed from the production and trade data to avoid double counting. Historically, the production of breakfast foods was based on shipments data provided by MED.

### **Sugars and syrups**

The per capita availability of refined sugar includes all sugar destined for domestic and commercial uses (baking, confectionery). It is provided in retail weight (the weight of the product itself) and on a sugar content (the quantity of sugar in a product) basis.

In the past, Manufacturing Division collected information on the production and stocks of refined sugar through surveys of all known Canadian refiners of raw sugar. Manufacturing inputs in refineries include cane or beet sugar, chemically pure sucrose in solid form and liquid sucrose. Imported sugar products include granulated, cubed, brown and confectioner's sugar. Exports consist of refined cane and beet sugar. Stocks and production data are now provided by the Canadian Sugar Institute.

In 2005, following consultations with the Canadian Sugar Institute, the food supply-disposition for refined sugar was modified to include imports and exports of sugar containing products. Canada increasingly exports more sugar containing products than it imports.

Production data of maple products for Ontario, Nova Scotia and New Brunswick are collected by AD through a producer survey while production and stocks data for the province of Quebec are provided by the Institut de la Statistique du Québec. Production is recorded in units of maple syrup, but all maple products (taffy, butter, syrup) are converted to a maple sugar equivalent. Artificially produced maple items are not counted, only farm produced maple sugar. All trade data are converted to a maple sugar equivalent in order to maintain consistent units throughout the supply-disposition tables. These tables are reported on a crop year basis (April-March).

Estimates of honey production are derived from a survey of beekeepers. Beginning stocks (if there are any) and imports are added to production to obtain total supply. Ending stocks (where applicable) and exports are deducted to produce a domestic disposition figure. The food available data for honey is reported in retail weight and on a sugar content basis.

## **Meats**

The procedure used to calculate the food available for beef, veal, pork, mutton and lamb is basically the same. Animals slaughtered include federally inspected slaughtering provided by Agriculture and Agri-Food Canada (AAFC) and estimates for those slaughtered in commercial establishments not under federal inspection as well as on-farm slaughtering. The total warm dressed carcass weight is obtained from information collected by AAFC on animals slaughtered under federal inspection by the Canadian Food Inspection Agency (CFIA).

To convert to a cold dressed basis, beef is reduced by 1.5% to allow for shrinkage and 2.04 kg per carcass are added to account for head meat recovery. Veal is reduced by 15% to allow for shrinkage and removal of the hide, 0.23 kg per carcass is subtracted to account for kidney which is weighted in the carcass and 0.36 kg per carcass is added to account for head meat recovery.

Mutton and lamb are reduced by 3% for shrinkage, 0.09 kg per carcass is subtracted for kidney and 0.18 kg per carcass is added to account for head meat recovery.

In 1988, a new methodology was developed for estimating pork available on a carcass basis in order to reflect the trend towards leaner hogs. Warm carcass weight is reduced by 3% for shrinkage to arrive at a cold carcass weight. A further 0.68 kg per carcass is deducted for kidney and tongue which is left in the carcass. The result is pork carcass production. Previously, 17% of cold carcass weight had been subtracted to account for larding fat. This however, is no longer done.

The retail conversion factor for pork is similar to that developed for beef. It is calculated on the portion of the carcass that is available for consumption after removing the skin, bone and trimmed fat. The average cold dressed carcass weight is obtained by dividing the cold dressed weight for federally inspected slaughter by the number of animals slaughtered under federal inspection. This average cold dressed carcass weight is then multiplied by the total number of animals slaughtered to obtain a total cold dressed carcass weight. From the total supply, exports and ending stocks are subtracted to arrive at the domestic consumption. For pork, manufacturing and waste are removed from the supply to arrive at domestic consumption.

Exports of meats are collected and published by ITD. Conversion factors are applied to these exports to bring them to a cold dressed carcass basis.

Offal includes variety meats such as liver, heart, kidney, tongue, sweetbreads, oxtail and edible tripe and is calculated on a specific weight per carcass basis. The procedure for calculating the per capita availability of offal is basically the same as described for other meats.

## **Poultry**

Production and beginning stocks are added to imports to derive total supply. From total supply, exports and ending stocks are deducted to produce domestic disposition. Live imports and exports are converted to an eviscerated basis (dressed, ready for sale). Since the supply-disposition is calculated on an eviscerated weight basis, no further manufacturing or waste factor calculation is applicable. The available data are expressed in terms of eviscerated weight.

## **Fish**

Data are available for four categories: fresh and frozen seafood, processed seafood, total shellfish and freshwater fish. Production data are provided by Fisheries and Oceans Canada for the commercial fishery and aquaculture survey data are obtained from AD. Information on stocks is not available. Imports and exports data are obtained from ITD. Initially all the data are converted to an edible weight basis due to the variety of species, products, sources and conversion factors. Therefore, the food available information is provided only on an edible weight basis.

### **Eggs**

Total egg production includes all eggs sold for consumption, consumed by producers, sold for hatching, and leakers and rejects. Production from registered, non-registered and hatchery supply flocks are included in these estimates. Egg production is derived using average layer numbers and their estimated rates of lay. Administrative data from AAFC and the Canadian Egg Marketing Agency and information from surveys conducted by AD are used when compiling these estimates. Data on beginning and ending stocks are obtained from a monthly survey conducted by AD in conjunction with AAFC, while information on imports and exports is provided by ITD. The manufacturing figure represents domestically produced eggs used for hatching and is therefore not included in the amount available for human consumption.

Processed eggs are not included in manufacturing but are converted to shell egg equivalent and are incorporated into the supply-disposition. The waste figure contains the leakers and rejects, those eggs which did not meet quality control standards.

### **Pulses**

Agriculture Division reports production on pulses such as peas, lentils, mustard seed, canary seed, sunflower seed and chickpeas on a field-run basis through a producer survey. The product is removed from the field and the total weight-harvested is reported as production with no allowances made for spoilage. Import and export data are provided by ITD. Imports are added to production to obtain total supply; there is no information available for stocks. All imports and exports are converted to a whole pea equivalent to allow trade data, which includes split peas, to be incorporated. Data for dry peas and dry beans are presented on a crop year basis (August - July). The manufacturing figure includes seed requirements and quantity used by manufacturers. Approximately 2% of production is removed to account for waste. Dry peas used for manufacturing include feed and seed requirements as well as processing.

### **Nuts**

The bulk of Canada's supply of nuts is imported. There is some limited production of filberts and hazelnuts in British Columbia. The British Columbia Department of Agriculture provides information on this production. Imports and exports are reported by ITD and most trade data are reported on a shelled weight basis. Where appropriate, commodities are converted to shell weight. The supply of tree nuts is comprised of imports such as almonds, Brazil nuts, pecans and walnuts, and does not include oil-producing nuts (such as bechnuts).

### **Dairy products**

Information on dairy products is obtained from several sources. Fluid milk and cream production data are derived mainly from administrative data supplied by the milk marketing boards in each province, based on the sales by dairies. The waste figure, which accounts for milk lost in transfer and shrinkage, is incorporated into the sales data. Since there are no stocks, imports, exports or other waste deductions for fluid milk and cream, production constitutes the domestic disposition for these items. Information for other dairy products and by-products such as cheddar, processed and variety cheese, condensed and powdered milk, ice cream, cottage cheese, sherbet, milkshake, ice milk, yogurt and sour cream, originates from provincial marketing boards and departments of

agriculture and is compiled by AD. Production and stocks data are released on a quarterly basis and import and export information is obtained from ITD and the Canadian Dairy Commission for a few exported products. Most of these products are considered as final products not requiring further processing and therefore manufacturing data are not reported. A waste figure is incorporated into the production data. This value is also expressed in terms of milk solids (i.e., the portion of the product which comprises butterfat and non-fat solids such as protein and calcium, etc). The milk solid values are calculated on a weight basis rather than a volume basis.

### **Oils and Fats**

There are four categories of oils and fats. They include: butter, margarine, salad (or vegetable) oils, along with shortening and shortening oils. The data depicting the amounts available for consumption are presented on a retail weight and fat content basis.

Butter is estimated independently with information that originates from provincial marketing boards and departments of agriculture and is compiled by AD. Trade data for butter are obtained from the ITD and the Canadian Dairy Commission.

The other three categories are treated as a group. To backtrack a little, prior to 1994, production data on margarine, salad oils, shortening and shortening oils were based on sales to retail and commercial outlets, therefore no stock information was required. Trade data for these products were obtained from the ITD. They were considered as final products not requiring further processing and therefore, manufacturing data were not reported. A waste figure had already been accounted for in the production data, so no additional waste factor was applied.

In July 1995, the survey of oils and fats, conducted by MED, underwent some revisions in co-operation with the Canadian Oilseed Processors Association. Prior to July 1995, the target population was intended to cover 100% of the production of deodorized oils and fats. Also included were purchases of Canadian deodorized oils and fats for those reporting establishments. From July 1995 on, emphasis was placed on production and the purchasing aspect was dropped, reducing the number of companies surveyed in the last half of 1995. However, the annual figures for 1995 still included the data from those companies that were eliminated from the last half of the year.

With the changes in methodology in 1995, MED cautioned users when comparing data prior to 1995 with data from 1995 on. An earlier break in the series occurred in 1988 when a new descriptive coding system was introduced.

In 1995, the degree of estimation for non-response was 1.8%. By 2001, the last year for this survey, estimation for non-response had grown to 37.3%. After 2001, manufacturing data no longer existed making it necessary to find an alternative source. Until this new source could be found and tested, trend analysis was used as a substitute.

The series related to oils and fats underwent a major review in 2003, partially due to a loss of manufacturing data and partially to ensure the data were reasonable due to the large increase in the amounts available over time. The oils are currently worked as a group and then distributed to three categories. The categories include margarine, salad oils, along with shortening and shortening oils.

The current method relies on supply-disposition calculations for canola oil, soybean oil and other oils. Canola and soybean oil provide the largest contribution to the estimates. Confidential beginning and ending stocks are provided by the Grain Marketing Unit, Agriculture Division. Production data originate with the Crushing Survey conducted by the Unit. Technically, the data are obtained from the Canadian Oilseed Processors Association due to a cooperative agreement between the Unit and the Association. Small adjustments are made to the data to adjust it to a crude basis. Trade data are provided by ITD. Using

ratios, pet food and chemical use of oils are deducted before the net use is residually derived.

Other oils are based on trade data as they are not produced in Canada. Exports are netted from imports for numerous oils including palm, peanut, olive, sesame, sunflower, safflower, cottonseed and corn oil. Trade in margarine and shortening are also taken into account.

Once the total amount available for all oils is derived, it is distributed to the components of butter, margarine, salad oils and shortening. After butter is accounted for, the residual is distributed amongst the other three items based on proportions established historically.

### **Fresh fruits**

Production of fresh fruits is provided by AD. Information is gathered through producer surveys or directly from the representatives of various provincial departments of agriculture. Stocks data for apples are obtained from AFFC. The import and export data, based on a calendar year basis, originate from ITD. For several commodities the total supply is imported (avocados, bananas, coconuts, dates, figs, guavas and mangoes, muskmelons and cantaloupes, winter melons, papayas, prunes, plums and sloes, pineapples, quinces). The quantity of each commodity acquired by processors or used as manufacturing inputs is reported under manufacturing. This may be the amount reported by processors. Manufacturing inputs are removed from the domestic disposition of fresh items to avoid double counting. The information is obtained from AD and MED.

### **Citrus fruits**

Information on citrus fruits is obtained from the import and export data available from ITD. Since there are no stocks or domestic production of these commodities, imports constitute domestic disposition for these items. In 1988, the data for mandarins became available and have been added to this table. However, they continue to be included with fresh oranges in order to maintain a consistent historical time series.

### **Processed fruits**

Historically, the production of processed fruit products was reported by manufacturers to MED. Data on stocks of canned and frozen fruits were available from MED. Import and export data based on a calendar year basis originate from ITD. Processed products are considered as end products so there is no further manufacturing component.

### **Fresh vegetables**

Production of fresh vegetables is reported by AD. Information is gathered through producer surveys or directly from the representatives of various provincial departments of agriculture. Stocks of fresh vegetables are reported by AAFC. These commodities include cabbage, carrots, onions and shallots, white potatoes, rutabagas and turnips. The import and export data originate from ITD. For several commodities the total supply is imported (artichokes, Chinese cabbage, other edible root vegetables, eggplant, kohlrabi, manioc, okra, olives, other leguminous vegetables, rapini, and sweet potatoes).

Agriculture Division produces six estimates including: potatoes, white; potatoes, fresh; potatoes, processed; potatoes, frozen; potatoes, chips; and potatoes, processed, other. Potatoes, white are a sum of fresh and processed potatoes while potatoes, processed are a sum of the three categories of processed potatoes.

The calculation to estimate the volume of fresh potatoes available for consumption starts with the January 1 stocks of fresh potatoes provided by AAFC, plus that year's estimate of production from AD and the imports of fresh potatoes as reported by ITD, minus the volume of fresh potatoes that is diverted to processing, cattle feed, exported or used for seed. We also subtract the fresh stocks at the end of the year to estimate domestic disposition.

## **Processed vegetables**

The production of processed vegetable products was reported by manufacturers to MED. Import and export data on a calendar year basis originate from ITD. As processed products are considered as end products, there is no further manufacturing component.

For processed potato products, supply estimates start with the volume of processed product estimated to be held in storage at the beginning of the year. Then the volume of potatoes diverted to manufacturing from the fresh potato supply and the imports of processed product are added in. The exports of processed product and estimated volume of processed stocks held in storage at the end of the year are subtracted to estimate domestic disposition.

It is important to note that these calculations are all done in fresh equivalents, so the imports and export data is converted to fresh equivalents based on industry factors.

The volume of potatoes available for manufactured products is allocated to frozen, chips and other, based on the processing usage for each of those products by province. Due to the number of processors, some of the data are considered confidential and cannot be displayed.

## **Juices**

The information on grapefruit, grape, lemon, orange and pineapple juices is obtained from the import and export data available from ITD. Since there are no stocks or data on domestic production of these commodities, imports constitute domestic disposition for these items. In the case of apple and tomato juices, information on production and stocks was available from MED. Fruit juices are measured in terms of weight not volume. Once converted to kilograms, frozen and unfrozen concentrates are converted to a single strength basis. Then all juice products can be referenced as single strength juice which can be converted to a fresh equivalent weight. Two available figures are published - one in kilograms and one in litres.

## **Beverages, non-alcoholic**

### **Tea, coffee and cocoa**

All components of the supply-disposition reported for tea are in tea leaf equivalent and litres. Coffee is reported in bean equivalent and litres. Cocoa is expressed in bean equivalent. There is no domestic production of these commodities; imports and beginning stocks represent the total supply. The per capita disappearance of coffee is based on adjusted domestic retail sales data. These commodities are converted to weight for comparability purposes.

### **Soft drinks**

Domestic disposition is based on total domestic sales, as provided by the Canadian Soft Drink Association. Included in the imports and exports are data for mineral and aerated waters, which contain added sugars, other sweeteners, or flavours. The data on imports and exports are provided for information only and are not used in the calculation.

### **Bottled water**

Bottled water data were calculated using the domestic sales information provided by the Canadian Bottled Water Association. These data represent sales of bottled water, which includes spring water, mineral water, well water, artesian water, purified water and carbonated bottled water. Bottled water cannot contain sweeteners or chemical additives and must be calorie free and sugar free. Soda water, seltzer water and tonic water are not considered bottled water. Currently, there is no source of data for this commodity.

## **Alcoholic beverages**

Domestic disposition along with trade data are the only components of the supply-disposition tables that are provided. Current preliminary sales data are provided by the Canadian Brewers' Association for beer, by the Association of Canadian Distillers for liquor and wine. Data based on sales from the Public Sector Statistics Division, Statistics Canada are used to update these preliminary figures. The data used to calculate the estimates are comprised of three parts: 1) sales by liquor authorities to final consumers and holders of licenses to resell; 2) sales by wineries and breweries to holders of licenses to resell; 3) sales by winery and brewery retail outlets to final consumer. However, these data do not contain information on sales generated by those establishments which offer either "brew on premises" services or sell products for "at home" production of beer and wine.

There are two estimates published for alcoholic beverage consumption. One estimate is based on the total Canadian population. The other represents the population of Canadians who are 15 years of age and older.