

Exponent[®]

*Center for Chemical Regulation and Food
Safety*

**Water footprint of
consumption among the U.S.
population**





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Prepared for

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Acronyms and Abbreviations

EPA	U.S. Environmental Protection Agency
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	Food and Agriculture Organization Corporate Statistical Database
FBS	Food Balance Sheets
FCID	Food Commodity Intake Database
FNDDS	Food and Nutrient Database for Dietary Studies
g	gram
kg	kilogram
L	Liter
m	meter
NHANES	National Health and Nutrition Examination Survey
UNESCO	The United Nations Educational, Scientific and Cultural Organization
UNESCO-IHE	UNESCO-IHE Institute for Water Education
U.S.	United States
WWEIA	What We Eat in America

Introduction

A measure of human's appropriation of freshwater resources is defined as the "water footprint" (Mekonnen and Hoekstra, 2011). Globally, the water footprint of the average consumer during the period of 1996-2005 was primarily from consumption of agricultural products (92%) while industrial goods and domestic water use make up the remainder (Mekonnen and Hoekstra, 2011). At the request of the California Rice Commission, Exponent, Inc. estimated the total daily water footprint associated with daily dietary consumption among the United States (U.S.) Population. Specifically, this report summarizes two primary objectives: 1.) Estimate the water footprint of consumption for an individual in the U.S. from all foods consumed daily and 2.) Estimate the water footprint associated with an "average eating occasion" of foods typically consumed in the U.S. Using the most recent Food Balance Sheets (FBS) from the Food and Agriculture Organization of the United Nations (FAO) statistical database (FAOSTAT) and the estimated water footprint (including blue, green, and grey water uses) from The United Nations Educational, Scientific and Cultural Organization (UNESCO)-IHE's Institute for Water Education 2010 report for crops and derived crop products (Mekonnen and Hoekstra, 2010a) and animal products (Mekonnen and Hoekstra, 2010b), Exponent generated daily mean per capita water footprints to represent the average consumer in the U.S. population's use of freshwater water resources in a given day from their diet alone. In addition, Exponent identified "average eating occasions" to illustrate the water footprint associated with typical food or meals consumed in the U.S. (e.g., hamburger and fries, a turkey sandwich, etc.).

This report is divided into two sections that describe the methods and results of the analyses that were conducted to answer the two objectives outlined above.

Objective 1: Water footprint of daily consumption

Available Data

Dietary consumption

The average U.S. consumer's daily diet was based on the most recent Food Balance Sheets (FBS) from the Food and Agriculture Organization of the United Nations (FAO) statistical database (FAOSTAT). The FAO compiles the FBS every year based on cross sectional data for 179 countries and more than 100 foods and agricultural products from country-level data on the production, use (e.g., seed, livestock feed, food processing, non-food uses and losses) and trade of food commodities. In the FBS, processed commodities are vertically standardized into primary commodity equivalents. Per capita consumption is derived by the FAO using the disappearance method to estimate the amount of food available for human consumption. The U.S. per capita food supply data in FAOSTAT is currently available through 2011. Exponent used the most recent three years of data to obtain three-year average estimates (i.e., 2009-2011) to account for annual fluctuations in the food supply.

Water footprint of agricultural crops and animal products

Data on the estimated water footprint of food consumed by the U.S. population was based on the UNESCO-IHE's Institute for Water Education 2010 report for crops and derived crop products (Mekonnen and Hoekstra, 2010a) and animal products (Mekonnen and Hoekstra, 2010b). These two reports quantify the green, blue, and grey water footprint of crop production throughout the world for the period 1996-2005. Water footprint estimates are based on models that incorporate the soil water balance and climatic conditions within each country for 146 crops and more than 200 derived crop products such as flours and beverages and eight animal categories (beef and dairy cattle, pig, sheep, goat, broiler and layer chicken and horses) at a 5 by 5 arc minute grid.

The water footprint is the sum of the water use, or water consumption, required of the processes taken to produce the crop or animal product. Three types of water were modelled and included in the UNESCO reports and are defined below:

- Blue: surface and ground water
- Green: rain water
- Grey: freshwater required to assimilate the load of pollutants based on existing ambient water quality standards

The current analysis focuses on consumptive water uses, and therefore is limited to the blue and green water sources. The amount of water footprint (m^3/ton) for a given crop or animal product

was estimated for the U.S. by dividing the total annual volume of green and blue water use (m³/year) by the quantity of production (ton/year) based on the national average yield data from FAOSTAT for the ten-year period 1996-2005.

In 2011, Mekonnen and Hoekstra published the average water footprint within a country weighted based on the origin of the commodity for use in estimating national water footprints of consumption (see Appendix VI; Mekonnen and Hoekstra, 2011). The entirety of the food supply that is consumed within a country does not all originate within that country and therefore, these estimates account for the import and export profile of commodities within a country. The data from this 2011 report, weighted for origin of the commodity, were used in the current analysis.

Methods

To estimate the water footprint of consumption associated with the U.S. population's daily diet, Exponent matched the origin-adjusted water footprint data to the reported food availability based on 69 FAO food groups, which were reported in both databases (See Appendix I for a complete description of the FAO food groups included in the analysis). The water footprint data was based on the data obtained from Mekonnen and Hoekstra (2011) adjusted for country of origin. The estimated daily water consumption for an individual in the U.S. associated with production of the foods included in their diet was estimated using the following equation:

$$WC_{Total\ diet} = \sum_{x=1}^{69} [WF_{green,x} \times FS_x + WF_{blue,x} \times FS_x] \times \frac{1\ year}{365\ days} \times \frac{0.26\ gallons}{Liter}$$

Where:

$WC_{Total\ diet}$ = An individual's total daily water footprint of consumption (gallons/day)

$WF_{green,x}$ = Green water footprint of consumption for commodity X (L/kg)

$WF_{blue,x}$ = Blue water footprint of consumption for commodity X (L/kg)

FS_x = Per capita food availability for commodity (kg/year)

The individual FAO food groups were further aggregated into broad crop groups (e.g., rice, nuts, fruits, vegetables, etc.) and the percent contribution to the total daily water footprint of consumption for various selected broad crop groups were estimated.

Results

The water footprint of consumption for an individual in the U.S. over one day (gallons per capita per day) for their entire diet as well as individual commodity groups is summarized in Table 1 and Figure 1. The water footprint of consumption is separated into green, blue, and total (green and blue combined). An average consumer in the U.S. population consumes 1,326 gallons of green and blue water per day from agricultural products alone. The large majority of the total

water footprint of consumption is from use of green water (i.e., rainwater) (Figure 2). The agricultural product with the highest water footprint of consumption is beef, largely due to the water footprint of animal feed and Americans' high consumption of this commodity.

It is important to note that the water footprint of consumption presented in Table 1 and Figure 1 are a combination of two factors: 1.) the amount of the commodity consumed by the U.S. population and 2.) the water footprint of that commodity. Therefore, a commodity that has a small water footprint but is consumed in large amounts by the U.S. population may have the same water footprint of consumption as a commodity with a large water footprint but is not largely consumed in the U.S.

When aggregated into FAO commodity groups, the largest contributor to the water footprint of consumption in the U.S. is meat followed by sweeteners (Figure 3). As discussed above, meat's water footprint is large due to the amount of animal feed necessary to sustain the livestock in addition to the high consumption of meat in the American diet. The sweetener category includes sweeteners in non-alcoholic beverages such as soft drinks and juice drinks, which are also highly consumed in the U.S. population.

Table 1. Water footprint of consumption (gallons/capita/day) based on U.S. average water footprint weighted by source of food (1996-2005) and FAOSTAT FBS Per Capita Food Supply in the U.S. (2007-2009).

FAO Food Commodity ¹	Water footprint of consumption (Gallons/capita/day)		
	Green (Rainwater)	Blue (Surface and ground water)	Total (Green and Blue)
Total	1,224	102	1,326
Beef	361.30	14.43	375.73
Sweeteners (includes from non-alcoholic beverages excl milk, fruit juices, coffee and tea)	209.68	0	209.68
Milk - Excluding Butter	118.92	10.89	129.81
Wheat and products	105.30	5.09	110.38
Pork	62.33	9.30	71.62
Poultry	62.01	6.71	68.72
Soybean Oil	49.45	2.92	52.37
Coffee and coffee products	41.30	0.20	41.49
Cocoa Beans and cocoa products	38.35	0.01	38.36
Sugar (Raw Equivalent)	22.03	5.45	27.47
Meat, Other	24.60	1.62	26.22
Beer	11.09	2.51	13.60
Eggs	12.00	1.29	13.30
Vegetables, Other	6.74	5.41	12.15

FAO Food Commodity ¹	Water footprint of consumption (Gallons/capita/day)		
	Green (Rainwater)	Blue (Surface and ground water)	Total (Green and Blue)
Rice (Milled Equivalent)	3.87	6.58	10.45
Beef, Poultry, and Pork Fat (raw)	8.00	0.74	8.74
Olive Oil	6.86	0.91	7.77
Nuts and products	2.95	4.66	7.61
Fruits, Other	3.91	3.61	7.52
Rape and Mustard Oil	6.75	0.01	6.76
Oranges, Mandarins	5.25	1.17	6.42
Apples and apple products	2.95	3.25	6.20
Butter	5.11	0.47	5.58
Potatoes and potato products	2.12	3.28	5.41
Corn and corn products	4.67	0.56	5.24
Groundnuts (Shelled Equivalent)	4.29	0.74	5.02
Oats	3.29	0.89	4.18
Beans (dried)	2.57	0.90	3.47
Tea	3.01	0.38	3.40
Spices, Other	2.60	0.67	3.27
Tomatoes and tomato products	0.96	2.15	3.11
Offals (organs), Edible	2.55	0.11	2.67
Bananas	2.30	0.34	2.64
Sheep & Goat Meat	2.44	0.08	2.52
Wine	1.16	1.31	2.48
Corn Germ Oil	1.88	0.23	2.10
Lemons, Limes and products	1.45	0.39	1.84
Coconut Oil	1.83	0	1.83
Grapes and products (excl wine)	0.81	0.91	1.72
Sunflowerseed Oil	1.59	0.07	1.66
Coconuts	1.55	0	1.55
Pimento	0.91	0.38	1.28
Cereals, Other	1.21	0.05	1.26
Oilcrops Oil, Other	0.99	0.23	1.22
Olives (including preserved)	1.05	0.14	1.19
Pepper, spice	1.06	0.05	1.12
Plantains	0.96	0.02	0.98
Onions	0.40	0.54	0.94
Groundnut Oil	0.78	0.13	0.91
Pineapples and products	0.66	0.02	0.68
Pulses, Other and products	0.60	0.03	0.62
Sweet Potatoes	0.51	0.11	0.61
Sesame seed	0.56	0.02	0.58
Sorghum and products	0.52	0.03	0.56
Rye and products	0.46	0.03	0.49
Barley and products	0.34	0.08	0.42
Peas, dried	0.37	0.02	0.39

FAO Food Commodity ¹	Water footprint of consumption (Gallons/capita/day)		
	Green (Rainwater)	Blue (Surface and ground water)	Total (Green and Blue)
Grapefruit and products	0.29	0.08	0.36
Palm kernel Oil	0.18	0	0.18
Root vegetables, Other	0.16	0.02	0.17
Cottonseed Oil	0.10	0.05	0.15
Citrus, Other	0.08	0.01	0.09
Dates	0.03	0.01	0.04
Soybeans excl soybean oil	0.04	<0.01	0.04
Cassava and products	0.04	0	0.04
Oilcrops, Other	0.02	0.01	0.03
Yams	0.03	0	0.03
Cream	0.01	<0.01	0.01

1. The description of several of the FAO food commodities have been slightly modified to terms more commonly used to describe the U.S. diet (e.g., "Bovine meat" was changed to "Beef").

Figure 1. Water footprint of consumption (gallons/capita/day) based on U.S. average green (rainwater) and blue (surface and ground) water footprint weighted by source of food (1996-2005) and FAOSTAT FBS per capita food supply in the U.S. (2007-2009).

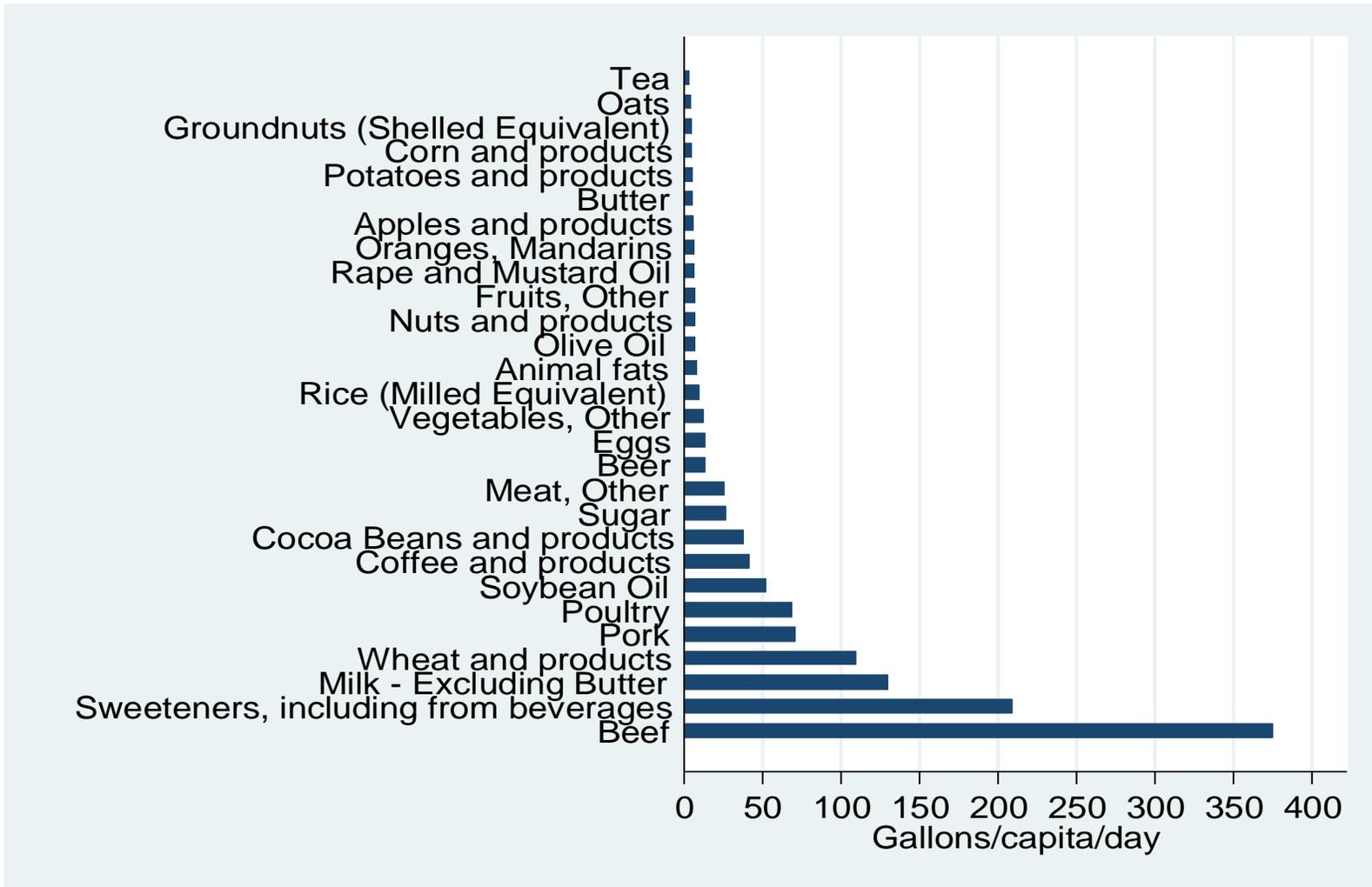


Figure 2. Percent contribution of green (rainwater) and blue (surface and ground) water sources to the total water footprint of consumption in the U.S.

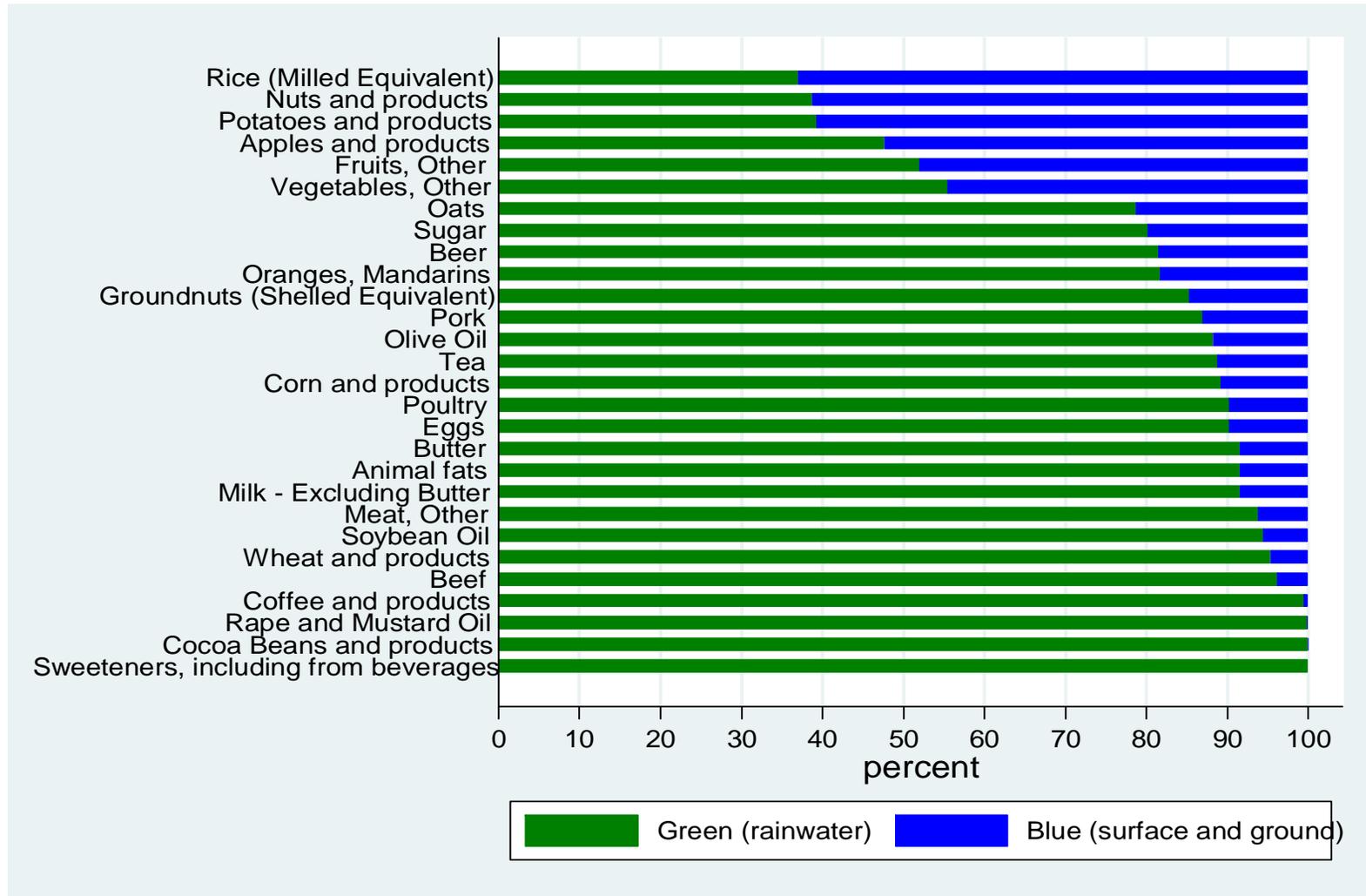
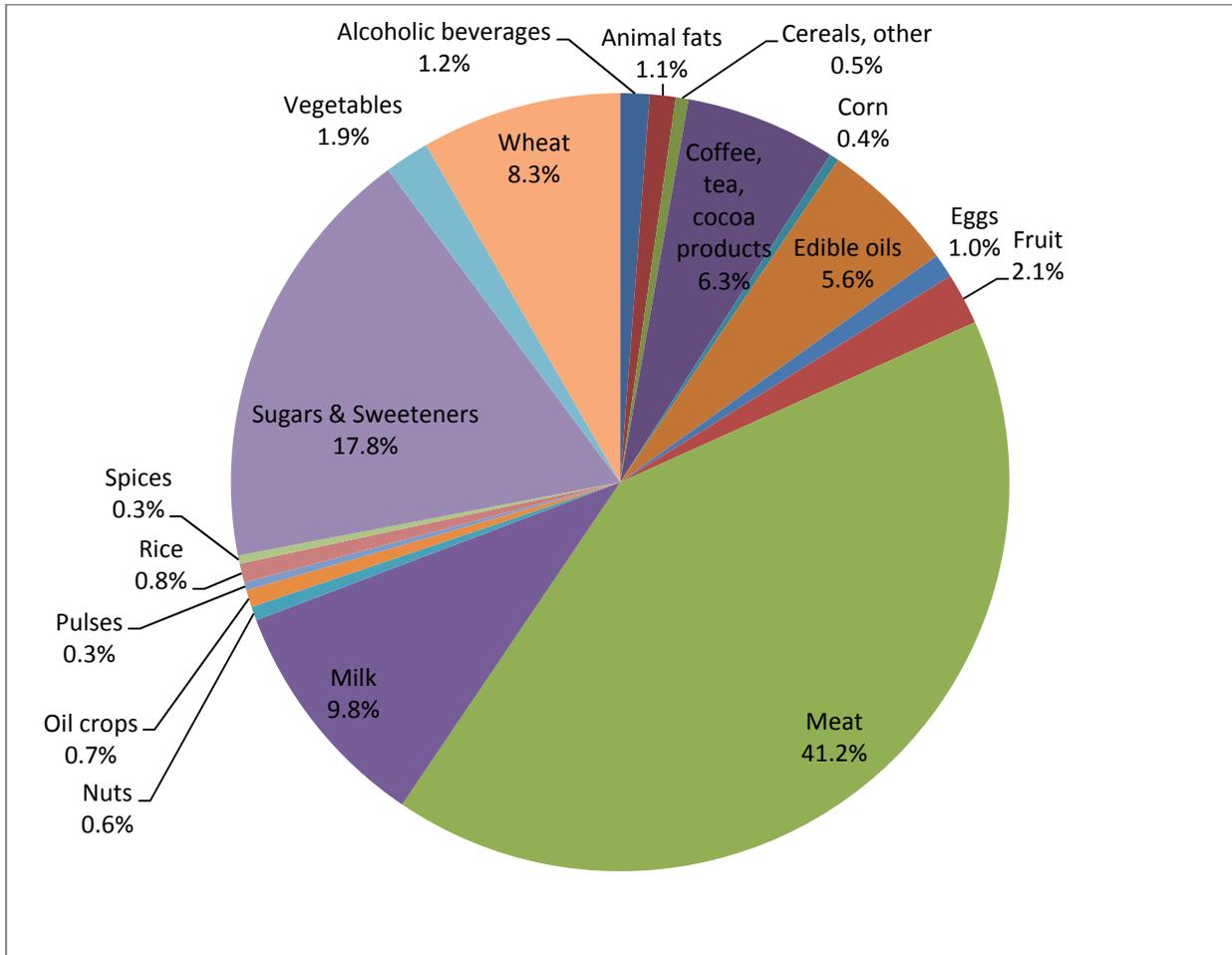


Figure 3. Total water footprint (blue and green water combined) of consumption among the U.S. population: Percent contribution of aggregated FAO food categories



Objective 2: Water footprint of average eating occasions

Exponent identified “average eating occasions” for the U.S. population in order to estimate the water footprint of consumption associated with typical foods consumed in the American diet. In other words, the amount of water necessary to produce all crops and/or animal products for a serving of various foods was derived based on the water footprint data described in the previous section, the U.S. Environmental Protection Agency (EPA)’s What We Eat in America Food Commodity Intake Database 2005-2010 (WWEIA-FCID 2005-10), and USDA’s What’s In The Foods You Eat Search Tool 2001-2012. The data and methods used to derive these estimates are summarized below.

Available data

Eating occasions

Food constituent data (or recipes) at the raw agricultural commodity level were obtained from EPA’s WWEIA-FCID 2005-10 (EPA, 2015). The WWEIA-FCID 2005-10 translates foods as reported consumed in the dietary component of the National Health and Nutrition Examination Survey (NHANES), a national food survey, into its corresponding agricultural commodities and reported as a percentage of the finished food product as consumed.

The amount of finished food consumed per eating occasion (or serving) was based on USDA’s *What’s In the Foods You Eat Search Tool, 2011-12* (USDA, 2014) which provides nutrient profiles and common portion sizes for foods eaten in the US. The underlying data for this online search tool is the Food and Nutrient Database for Dietary Studies (FNDDS) used to process and analyze the dietary component of NHANES.

Water footprint of agricultural crops and animal products

Estimated water footprint (including blue and green water uses) were based on UNESCO-IHE’s Institute for Water Education 2010 reports (Mekonnen and Hoekstra, 2010a,b). This data is described in a previous section.

Methods

The water footprint per eating occasion was derived for select food and beverages (Table 2). Exponent mapped the water footprint of the commodities to WWEIA-FCID commodity ingredients that make up foods as reported consumed to estimate the amount of water consumed per serving of the selected food or beverage examples by water footprint type (i.e., green and

blue) as well as total (green and blue combined). The mapping of the water footprint data to FCID commodities links the water footprint of each commodity to the proportion each commodity makes up of a given food (e.g., the proportion of raw beef in a hamburger). The water footprint per eating occasion was then calculated for each water footprint type (i.e., green and blue) by taking the product of the water footprint data, the proportion of each commodity that makes up a given food, and the amount of food per serving or eating occasion; the sum of each commodity is the resulting amount of water footprint per eating occasion (gallons/serving or eating occasion).

$$WC_{green} = \sum_{x=1}^n WF_{green,x} \left(\frac{L}{kg} \right) x \text{ Percent of } x \text{ in food } x \frac{\text{amount of food (g)}}{EO} x \frac{1 \text{ kg}}{1,000 \text{ g}} x \frac{0.26 \text{ gallons}}{1 \text{ Liter}}$$

$$WC_{blue} = \sum_{x=1}^n WF_{blue,x} \left(\frac{L}{kg} \right) x \text{ Percent of } x \text{ in food } x \frac{\text{amount of food (g)}}{EO} x \frac{1 \text{ kg}}{1,000 \text{ g}} x \frac{0.26 \text{ gallons}}{1 \text{ Liter}}$$

$$WC_{total} = WF_{green} + WF_{blue}$$

Where:

- WC_{total} = Total gallons of water per eating occasion (EO) (Gallons/EO)
- WC_{green} = Gallons of green water per eating occasion (EO) (Gallons/EO)
- WC_{blue} = Gallons of blue water per eating occasion (EO) (Gallons/EO)
- WF_{green,x} = Green water footprint for commodity X (L/kg)
- WF_{blue,x} = Blue water footprint for commodity X (L/kg)
- EO = eating occasion defined as a standard serving of the food¹
- n = Number of commodities in a food

Results

The water footprint of a typical eating occasion (or serving) of select foods and beverages in the U.S. (gallons per eating occasion) is summarized in Table 2. The water footprint of an eating occasion is separated into green, blue, and total (green and blue combined). Based on this analysis, an eating occasion consisting of a hamburger, fries, and a cola require 502 gallons of freshwater.

¹ Based on USDA's *What's In the Foods You Eat Search Tool, 2011-12* (USDA, 2014)

**Table 2. Estimates of water for average eating occasions of select foods and beverages
(Gallons/eating occasion)**

Eating Occasion	Average Eating Occasion (grams of food and/or beverage per eating occasion ²)	Gallons water per eating occasion		
		Green (rainwater)	Blue (Surface and ground)	Total (Green and Blue)
Hamburger, fries, and cola	609	478	24	502
Beef burrito	297	302	23	325
Frankfurter or hot dog, beef	57	221	9	230
Chicken, rice, and vegetables with gravy mixture	252	192	15	207
Lasagna with meat	206	114	7	121
Turkey submarine sandwich and potato chips	252	84	8	92
Sushi, vegetable roll (6 piece), soybeans, and a beer	606	51	25	76
Bowl of cheerios with milk and a cup of coffee	387	56	3	60
Almonds	30	18	32	50
Peanut butter and jelly sandwich	93	31	5	36
Pizza, cheese, regular crust	119	29	3	32
Cooked rice	140	8	16	24
Beer	360	11	7	19
Coffee with sugar and cream	237	16	1	16
Popcorn	30	9	1	10
Spinach, raw	85	1	1	2

² Assuming 1 standard serving of each food item.

Limitations

Consumption data

The FAO categories in the FAOSTAT FBS directly matches to the water footprint data provided in the UNESCO reports and were therefore determined to be a reasonable choice of consumption data for this analysis. However, the FAO FBS per capita consumption data do not reflect actual consumption but instead reflect the food supply in a country and may not accurately capture non-food uses, waste, etc. Disappearance data are known to over-estimate consumption when consumption is measured in either household or individual surveys and it is not possible to evaluate differences in consumption by different groups in the population. Therefore, evaluations conducted using “disappearance” data can usually be assumed an overestimate of consumption at the person-level.

Water footprint data

Limitations of the water footprint data are described in detail in the referenced reports (Mekonnen and Hoekstra; 2010a, 2010b, and 2011). Briefly, the water footprint data are 10-year averages for the period 1996-2005 due to reliance on climate data, which is typically averaged over multiple years. Therefore, any recent changes in climate or soil types within the U.S. may not be reflected in the water footprints used in the current analysis. Additionally, the origin country of the commodities consumed in the U.S. are limited to one step (i.e., just one other country). Therefore, if a commodity originates in one country but is imported and then exported from another country, the original country’s water footprint for that commodity will not be reflected in the calculation. Finally, the water footprint estimates are modelled and based on a large collection of assumptions and inputs that all contain uncertainties. Therefore, any interpretation of the results of the current analysis should be viewed with caution and an understanding of the underlying data used to derive the estimates presented.

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Appendix I. Additional description of FAO food commodity classifications³

Item FAO Code	Item Name	Definition
2617	Apples	Default composition: 515 Apples, 518 Apple juice, single strength, 519 Apple juice, concentrated
2615	Bananas	Default composition: 486 Bananas
2513	Barley	Default composition: 44 Barley, 45 Pot Barley, 46 Barley Pearled, 49 Malt, 50 Malt Extract; nutrient data only: 47 Bran of Barley, 48 Barley Flour and Grits
2546	Beans	Default composition: 176 Beans, dry
2656	Beer	Default composition: 51 Beer of Barley
2532	Cassava	Default composition: 125 Cassava, 126 Flour of Cassava, 127 Tapioca of Cassava, 128 Cassava Dried, 129 Cassava Starch
2520	Cereals, Other	Default composition: 68 Popcorn, 89 Buckwheat, 90 Flour of Buckwheat, 92 Quinoa, 94 Fonio, 95 Flour of Fonio, 97 Triticale, 98 Flour of Triticale, 101 Canary seed, 103 Mixed grain, 104 Flour of Mixed Grain, 108 Cereals, nes, 111 Flour of Cereals, 113 Cereal Preparations, Nes; nutrient data only: 91 Bran Buckwheat, 96 Bran of Fonio, 99 Bran of Triticale, 105 Bran of Mixed Grains, 112 Bran of Cereals
2614	Citrus, Other	Default composition: 512 Citrus fruit, nes, 513 Citrus juice, single strength, 514 Citrus juice, concentrated
2633	Cocoa Beans	Default composition: 661 Cocoa beans, 662 Cocoa Paste, 665 Cocoa powder and Cake, 666 Chocolate Prsnes
2578	Coconut Oil	Default composition: 252 Coconut (copra) oil
2560	Coconuts - Incl Copra	Default composition: 249 Coconuts, 250 Coconuts Desiccated, 251 Copra
2630	Coffee	Default composition: 656 Coffee, green, 657 Coffee Roasted, 659 Coffee Extracts
2575	Cottonseed Oil	Default composition: 331 Cottonseed oil
2619	Dates	Default composition: 577 Dates
2625	Fruits, Other	Default composition: 521 Pears, 523 Quinces, 526 Apricots, 527 Dry Apricots, 530 Sour cherries, 531 Cherries, 534 Peaches and nectarines, 536 Plums and sloes, 537 Plums Dried (Prunes), 538 Plum juice, single strength, 539 Plum juice, concentrated, 541 Stone fruit, nes, 542 Pome fruit, nes, 544 Strawberries, 547 Raspberries, 549 Gooseberries, 550 Currants, 552 Blueberries, 554 Cranberries, 558 Berries Nes, 567 Watermelons, 568 Other melons (inc.cantaloupes), 569 Figs, 570 Figs Dried, 571 Mangoes, mangosteens, guavas, 572 Avocados, 583 Mango Juice, 587 Persimmons, 591 Cashewapple, 592 Kiwi fruit, 600 Papayas, 603 Fruit, tropical fresh nes, 604 Fruit Tropical Dried Nes, 619 Fruit Fresh Nes, 620 Fruit Dried Nes, 622 Fruit Juice Nes, 623 Fruit Prp Nes, 624 Flour of Fruits, 625 Fruit,Nut,Peel, Sugar Prs, 626

³ Available at: <http://faostat.fao.org/site/655/default.aspx>

Item FAO Code	Item Name	Definition
		Homogen. Cooked Fruit Prp
2613	Grapefruit	Default composition: 507 Grapefruit (inc. pomelos), 509 Juice of Grapefruit, 510 Grapefruit juice, concentrated
2620	Grapes	Default composition: 560 Grapes, 561 Raisins, 562 Grape Juice, 563 Must of Grapes
2572	Groundnut Oil	Default composition: 244 Groundnut oil
2556	Groundnuts (Shelled Eq)	Default composition: 242 Groundnuts, with shell, 243 Groundnuts Shelled, 246 Prepared Groundnuts, 247 Peanut Butter
2612	Lemons, Limes	Default composition: 497 Lemons and limes, 498 Lemon juice, single strength, 499 Lemon juice, concentrated
2514	Corn	Default composition: 56 Maize, 58 Flour of Maize, 64 Starch of Maize, 846 Gluten Feed and Meal; nutrient data only: 57 Germ of Maize, 59 Bran of Maize, 63 Maize gluten
2582	Corn Germ Oil	Default composition: 60 Maize oil
2551	Nuts	Default composition: 216 Brazil nuts, with shell, 217 Cashew nuts, with shell, 220 Chestnuts, 221 Almonds, with shell, 222 Walnuts, with shell, 223 Pistachios, 224 Kolanuts, 225 Hazelnuts, with shell, 226 Arecanuts, 229 Brazil Nuts Shelled, 230 Cashew Nuts Shelled, 231 Almonds Shelled, 232 Walnuts Shelled, 233 Hazelnuts Shelled, 234 Nuts, nes, 235 Prepared Nuts (Exc.Groundnuts)
2516	Oats	Default composition: 75 Oats, 76 Oats Rolled; nutrient data only: 77 Bran of Oats
2586	Oilcrops Oil, Other	Default composition: 264 Butter of Karite Nuts, 266 Oil of Castor Beans, 276 Oil of Tung Nuts, 278 Oil of Jojoba, 281 Safflower oil, 297 Poppy Oil, 306 Vegetable Tallow, 307 Stillingia Oil, 313 Oil of Kapok, 334 Linseed oil, 337 Oil of Hempseed, 340 Oil of vegetable origin, nes, 664 Cocoa Butter, 1241 Liquid Margarine, 1242 Margrine Short, 1273 Castor Oil Hydr (Opal Wax), 1274 Oil Boiled Etc, 1275 Oil Hydrogenated
2570	Oilcrops, Other	Default composition: 263 Karite Nuts (Sheanuts), 265 Castor oil seed, 275 Tung Nuts, 277 Jojoba Seeds, 280 Safflower seed, 296 Poppy seed, 299 Melonseed, 305 Tallowtree Seeds, 310 Kapok Fruit, 311 Kapokseed in Shell, 312 Kapokseed Shelled, 333 Linseed, 336 Hempseed, 339 Oilseeds, Nes, 343 Flour of Oilseeds
2580	Olive Oil	Default composition: 261 Olive oil, virgin, 274 Oil of Olive Residues

Item FAO Code	Item Name	Definition
2563	Olives	Default composition: 260 Olives, 262 Olives Preserved
2602	Onions	Default composition: 403 Onions, dry
2611	Oranges, Mandarins	Default composition: 490 Oranges, 491 Orange juice, single strength, 492 Orange juice, concentrated, 495 Tangerines, mandarins, clem., 496 Tangerine Juice
2576	Palm kernel Oil	Default composition: 258 Palm kernel oil
2547	Peas	Default composition: 187 Peas, dry
2640	Pepper	Default composition: 687 Pepper (Piper spp.)
2641	Pimento	Default composition: 689 Chillies and peppers, dry
2618	Pineapples	Default composition: 574 Pineapples, 575 Pineapples Cand, 576 Juice of Pineapples, 580 Pineapple Juice Conc
2616	Plantains	Default composition: 489 Plantains
2531	Potatoes	Default composition: 116 Potatoes, 117 Potatoes Flour, 118 Frozen Potatoes, 119 Starch of Potatoes, 121 Tapioca of Potatoes
2549	Pulses, Other	Default composition: 181 Broad beans, horse beans, dry, 191 Chick peas, 195 Cow peas, dry, 197 Pigeon peas, 201 Lentils, 203 Bambara beans, 205 Vetches, 210 Lupins, 211 Pulses, nes, 212 Flour of Pulses; nutrient data only: 213 Bran of Pulses
2574	Rape and Mustard Oil	Default composition: 271 Rapeseed oil, 293 Mustard oil
2805	Rice (Milled Equivalent)	Default composition: 27 Rice, paddy, 28 Rice Husked, 29 Milled/Husked Rice, 31 Rice Milled, 32 Rice Broken, 34 Starch of Rice, 38 Rice Flour; nutrient data only: 33 Rice gluten, 35 Bran of Rice
2534	Roots, Other	Default composition: 135 Yautia (cocoyam), 136 Taro (cocoyam), 149 Roots and Tubers, nes, 150 Flour of Roots and Tubers, 151 Roots and Tubers Dried
2515	Rye	Default composition: 71 Rye, 72 Flour of Rye; nutrient data only: 73 Bran of Rye
2561	Sesameseed	Default composition: 289 Sesame seed
2518	Sorghum	Default composition: 83 Sorghum, 84 Flour of Sorghum; nutrient data only: 85 Bran of Sorghum
2571	Soybean Oil	Default composition: 237 Soybean oil
2555	Soybeans	Default composition: 236 Soybeans, 239 Soya Sauce, 240 Soya Paste, 241 Soya Curd
2645	Spices, Other	Default composition: 692 Vanilla, 693 Cinnamon (canella), 702 Nutmeg, mace and cardamoms, 711 Anise, badian, fennel, corian., 720 Ginger, 723 Spices, nes
2542	Sugar (Raw Equivalent)	Default composition: 158 Cane sugar, raw, centrifugal, 159 Beet sugar, raw, centrifugal, 162 Sugar Raw Centrifugal, 164 Sugar Refined, 168 Sugar Confectionery, 171 Sugar flavoured
2557	Sunflowerseed	Default composition: 267 Sunflower seed
2573	Sunflowerseed Oil	Default composition: 268 Sunflower oil
2533	Sweet Potatoes	Default composition: 122 Sweet potatoes

Item FAO Code	Item Name	Definition
2543	Sweeteners, Other	Default composition: 154 Fructose Chemically Pure, 155 Maltose Chemically Pure, 160 Maple Sugar and Syrups, 161 Sugar crops, nes, 166 Other Fructose and Syrup, 167 Sugar, nes, 172 Glucose and Dextrose, 173 Lactose, 175 Isoglucose, 633 Beverage Non-Alc; nutrient data only: 165 Molasses
2635	Tea	Default composition: 667 Tea, 671 Maté, 672 Extracts Tea, Mate, Prep
2601	Tomatoes	Default composition: 388 Tomatoes, 389 Tomatojuice Concentrated, 390 Juice of Tomatoes, 391 Paste of Tomatoes, 392 Tomato Peeled
2605	Vegetables, Other	Default composition: 358 Cabbages and other brassicas, 366 Artichokes, 367 Asparagus, 372 Lettuce and chicory, 373 Spinach, 378 Cassava leaves, 393 Cauliflowers and broccoli, 394 Pumpkins, squash and gourds, 397 Cucumbers and gherkins, 399 Eggplants (aubergines), 401 Chillies and peppers, green, 402 Onions (inc. shallots), green, 406 Garlic, 407 Leeks, other alliaceous veg, 414 Beans, green, 417 Peas, green, 420 Leguminous vegetables, nes, 423 String beans, 426 Carrots and turnips, 430 Okra, 446 Maize, green, 447 Sweet Corn Frozen, 448 Sweet Corn Prep or Preserved, 449 Mushrooms and truffles, 450 Dried Mushrooms, 451 Canned Mushrooms, 459 Chicory roots, 461 Carobs, 463 Vegetables fresh nes, 464 Vegetables, dried nes, 465 Vegetables, canned nes, 466 Juice of Vegetables Nes, 469 Vegetables Dehydrated, 471 Vegetables in Vinegar, 472 Vegetables Preserved Nes, 473 Vegetable Frozen, 474 Veg.in Tem. Preservatives, 475 Veg.Prep. Or Pres.Frozen, 476 Homogen.Veget.Prep, 567 Watermelons, 568 Other melons (inc.cantaloupes), 658 Coffee Subst. Cont.Coffee
2511	Wheat	Default composition: 15 Wheat, 16 Flour of Wheat, 18 Macaroni, 20 Bread, 21 Bulgur, 22 Pastry, 23 Starch of Wheat, 41 Breakfast Cereals, 110 Wafers; nutrient data only: 17 Bran of Wheat, 19 Germ of Wheat, 24 Gluten of Wheat, 114 Mixes and Doughs, 115 Food Prep,Flour,Malt Extract
2655	Wine	Default composition: 564 Wine, 565 Vermouths and Similar
2535	Yams	Default composition: 137 Yams
2731	Beef	Default composition: 867 Cattle meat, 870 Meat-CattleBoneless(Beef and Veal), 872 Meat of Beef,Drd, Slt,d,Smkd, 873 Meat Extracts, 874 Sausage Beef and Veal, 875 Preparations of Beef Meat, 876 Beef canned, 877 Homogen.Meat Prp., 947 Buffalo meat
2740	Butter	Default composition: 886 Butter Cow Milk, 887 Ghee,Butteroil of Cow Milk, 952 Butter of Bufmilk, 953 Ghee Oil of Buf, 983 Butter,Ghee of Sheep Milk, 1022 Butter of Goat Mlk
2743	Cream	Default composition: 885 Cream Fresh
2744	Eggs	Default composition: 1062 Hen eggs, in shell, 1063 Eggs Liquid, 1064 Eggs Dried, 1091 Other bird eggs,in shell; nutrient data only: 916 Egg Albumine

Item FAO Code	Item Name	Definition
2737	Fats, Animals, Raw	Default composition: 869 Fat of Cattle, 871 Cattle Butch.Fat, 949 Fat of Buffaloes, 979 Fat of Sheep, 994 Grease incl. Lanolin Wool, 1019 Fat of Goats, 1037 Fat of Pigs, 1040 Pig Butcher Fat, 1043 Lard, 1065 Fat of Poultry, 1066 Fat of Ptry Rend, 1129 Fat of Camels, 1160 Fat Other Camelids, 1168 Oils,Fats of Animal Nes, 1221 Lard Stearine Oil, 1222 Degras, 1225 Tallow, 1243 Fat Prep Nes
2735	Meat, Other	Default composition: 1089 Bird meat, nes, 1097 Horse meat, 1108 Meat of Asses, 1111 Meat of Mules, 1127 Camel meat, 1141 Rabbit meat, 1151 Meat of Other Rod, 1158 Meat Oth Camelids, 1163 Game meat, 1164 Meat Dried Nes, 1166 Meat nes, 1172 Prepared Meat Nes, 1176 Snails, Not Sea
2848	Milk - Excluding Butter	Default composition: 882 Cow milk, whole, fresh, 888 Milk Skm of Cows, 889 Milk Whole Cond, 890 Whey Condensed, 891 Yoghurt, 892 Yogh Conc.Or Not, 893 Butterm.,Curdl,Acid.Milk, 894 Milk Whole Evp, 895 Milk Skimmed Evp, 896 Milk Skimmed Cond, 897 Milk Whole Dried, 898 Milk Skimmed Dry, 899 Milkdry Buttermilk, 900 Whey Dry, 901 Cheese of Whole Cow Milk, 904 Cheese of Skimmed Cow Milk, 905 Whey Cheese, 907 Processed Cheese, 908 Reconsti.Ted Milk, 917 Casein, 951 Buffalo milk, whole, fresh, 954 Milk Skim of Buf, 955 Cheese of Bufmilk, 982 Sheep milk, whole, fresh, 984 Cheese of Sheep Milk, 985 Milk Skmd Sheep, 1020 Goat milk, whole, fresh, 1021 Cheese of Goat Milk, 1023 Milk Skimd Goats, 1130 Camel milk, whole, fresh; nutrient data only: 903 Whey Fresh, 909 Prod.of Nat.Milk Constit, 910 Ice Cream and Edible Ice
2732	Sheep & Goat Meat	Default composition: 977 Sheep meat, 1017 Goat meat
2736	Offals, Edible	Default composition: 868 Offals of Cattle, Edible, 878 Liver Prep., 948 Offals of Buffaloes,Edible, 978 Offals of Sheep,Edible, 1018 Offals of Goats, Edible, 1036 Offals of Pigs, Edible, 1059 Offals Liver Chicken, 1074 Offals Liver Geese, 1075 Offals Liver Duck, 1081 Offals Liver Turkeys, 1098 Offals of Horses, 1128 Offals of Camels,Edible, 1159 Offals Other Camelids, 1167 Offals Nes
2733	Pork	Default composition: 1035 Pig meat, 1038 Pork, 1039 Bacon and Ham, 1041 Sausages of Pig Meat, 1042 Prep of Pig Meat
2734	Poultry Meat	Default composition: 1058 Chicken meat, 1060 Fat Liver Prep (Foie Gras), 1061 Meat of Chicken Canned, 1069 Duck meat, 1073 Goose and guinea fowl meat, 1080 Turkey meat