USDA's Food Availability Data System and Food Loss Estimates

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Outline

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- Background
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    - Food loss estimates
- Four types of output
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ERS Definition of Food Loss

Food loss represents the edible amount of food, postharvest, that is available for human consumption but is not consumed for any reason. It includes cooking loss and natural shrinkage (e.g., moisture loss); loss from mold, pests, or inadequate climate control; and food waste.

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Background

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Food Availability Data System (FADS) has three data series:

- Food Availability (FA) data, 1909-2012
- Loss-Adjusted Food Availability data (LAFA), 1970-2012
  - Food Loss Estimates, 2008, 2010
- Nutrient Availability data, 1909-2006

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62 Fruit Categories in FADS

FRESH: oranges, tangerines, grapefruit, lemons, limes, apples, apricots, avocados, bananas, blueberries, cantaloupe, cherries, cranberries, grapes, honeydew, kiwifruit, mangoes, papaya, peaches, pears, pineapple, plums, strawberries, and watermelon.

CANNED: apples and applesauce, apricots, sweet cherries, tart cherries, peaches, pears, pineapple, plums, and olives.

FROZEN: blackberries, blueberries, raspberries, strawberries, other berries, apples, apricots, sweet cherries, tart cherries, peaches, plums and prunes, and other frozen fruit,

DRIED: apples, apricots, dates, figs, peaches, pears, plums, grapes (raisins)

JUICE: grapefruit, lemon, lime, orange, apple, cranberry, grape, pineapple, and prune.

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67 Vegetable Categories in FADS

FRESH: artichokes, asparagus, bell peppers, broccoli, Brussels sprouts, cabbage, carrots, cauliflower, celery, collard greens, sweet corn, cucumbers, eggplant, escarole and endive, garlic, kale, head lettuce, Romaine and leaf lettuce, lima beans, mushrooms, mustard greens, okra, onions, potatoes, pumpkin, radishes, snap beans, spinach, squash, sweet potatoes, tomatoes, turnip greens.

CANNED: asparagus, snap beans, cabbage (sauerkraut), carrots, sweet corn, cucumbers (pickles), green peas, mushrooms, Chile peppers, potatoes, tomatoes, other canned vegetables.

FROZEN: asparagus, snap beans, broccoli, carrots, cauliflower, sweet corn, green peas, lima beans, potatoes, spinach, miscellaneous frozen vegetables.

DRIED: peas and lentils, edible beans, black beans, great northern beans, lima beans, navy beans, pinto beans, red kidney beans, and other dry beans.

DEHYDRATED: Dehydrated onions, Dehydrated potatoes, Potato chips and shoestring potatoes.

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Food Availability Data

(core series)

Annual Production + Imports + Beginning Inventories

↓

Minus

↓

Exports + Farm and Industrial Uses + Ending Inventories

↓

Equals

↓

U.S. Food Availability

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Loss-Adjusted Food Availability Data

- For each commodity in the Food Availability Data System (FADS), where the Food Availability (FA) data spreadsheet ends is where the corresponding Loss-Adjusted Food Availability spreadsheet begins.

- Like the FA estimates, the LAFA Estimates serve as popular proxies for actual consumption for over 200 commodities (e.g., fresh spinach, beef, and eggs) in the United States.
  - In pounds, calories, and servings
- Estimates are useful for studying food consumption trends.
  - Per capita estimates are provided for individual commodities and food groups and where appropriate, in total.

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LAFA Series Adjusts FA Series for 3 Types of Losses

1) Loss at the primary level

   (e.g., farm weight to retail weight)

2) Loss at the retail level

3) Loss at the consumer level:

   (a) Non-edible share

   (b) Cooking loss and uneaten food

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Fresh carrots example of the different types of loss adjustments in the ERS Loss-Adjusted Food Availability data (per capita)

Year	Primary weight[2]	Loss from primary to retail weight	Retail weight	Loss from retail/ institutional to consumer level	Consumer weight	Loss at consumer level		Total loss, all levels	Per capita availability adjusted for loss			Calories per cup-equivalent	Grams per cup-equivalent	Calories available daily	Food Pattern Equivalents available daily
						Nonedible share	Other (cooking loss and uneaten food)								
	Lbs/year	Percent	Lbs/year	Percent	Lbs/year	Percent	Percent	Percent	Lbs/year	Oz/day	G/day	Number	Grams	Number	Cups
1990	8.29	3.0	8.04	5.1	7.63	11.0	34.0	49	4.20	0.18	5.21	52.0	128.0	2.1	0.041
1991	7.71	3.0	7.48	5.1	7.10	11.0	34.0	49	3.90	0.17	4.85	52.0	128.0	2.0	0.038
1992	8.29	3.0	8.04	5.1	7.63	11.0	34.0	49	4.20	0.18	5.21	52.0	128.0	2.1	0.041
1993	10.85	3.0	10.52	5.1	9.98	11.0	34.0	49	5.49	0.24	6.82	52.0	128.0	2.8	0.053
1994	12.68	3.0	12.30	5.1	11.66	11.0	34.0	49	6.42	0.28	7.97	52.0	128.0	3.2	0.062
1995	11.19	3.0	10.86	5.1	10.30	11.0	34.0	49	5.66	0.25	7.04	52.0	128.0	2.9	0.055
1996	12.37	3.0	12.00	5.1	11.38	11.0	34.0	49	6.26	0.27	7.78	52.0	128.0	3.2	0.061
1997	14.11	3.0	13.69	5.1	12.99	11.0	34.0	49	7.14	0.31	8.88	52.0	128.0	3.6	0.069
1998	9.53	3.0	9.24	5.1	8.77	11.0	34.0	49	4.82	0.21	5.99	52.0	128.0	2.4	0.047
1999	9.25	3.0	8.98	5.1	8.51	11.0	34.0	49	4.68	0.21	5.82	52.0	128.0	2.4	0.045
2000	9.20	3.0	8.93	5.1	8.47	11.0	34.0	49	4.66	0.20	5.79	52.0	128.0	2.4	0.045
2001	9.38	3.0	9.10	5.1	8.63	11.0	34.0	49	4.75	0.21	5.90	52.0	128.0	2.4	0.046
2002	8.42	3.0	8.16	5.1	7.75	11.0	34.0	49	4.26	0.19	5.29	52.0	128.0	2.2	0.041
2003	8.78	3.0	8.52	5.1	8.08	11.0	34.0	49	4.44	0.19	5.52	52.0	128.0	2.2	0.043
2004	8.72	3.0	8.46	5.1	8.02	11.0	34.0	49	4.41	0.19	5.48	52.0	128.0	2.2	0.043
2005	8.66	3.0	8.40	5.1	7.97	11.0	34.0	49	4.39	0.19	5.45	52.0	128.0	2.2	0.043
2006	8.11	3.0	7.86	5.1	7.46	11.0	34.0	49	4.10	0.18	5.10	52.0	128.0	2.1	0.040
2007	8.05	3.0	7.81	5.1	7.41	11.0	34.0	49	4.07	0.18	5.06	52.0	128.0	2.1	0.040
2008	8.07	3.0	7.82	5.1	7.42	11.0	34.0	49	4.08	0.18	5.07	52.0	128.0	2.1	0.040
2009	7.39	3.0	7.16	5.1	6.80	11.0	34.0	49	3.74	0.16	4.65	52.0	128.0	1.9	0.036
2010	7.61	3.0	7.38	5.1	7.00	11.0	34.0	49	3.85	0.17	4.79	52.0	128.0	1.9	0.037

Note: Loss estimates from retail/institutional to consumer level for fresh fruit, vegetables, meat, poultry, and seafood have been updated. See http://www.ers.usda.gov/publications/eib44/. Also, loss estimates at the consumer level have been updated. See http://www.ers.usda.gov/Publications/TB1927/. [1]This table uses aggregate food availability data, adjusts for losses, and converts the remaining supply into daily per capita calories and Food Pattern Equivalents. [2]The basic availability estimate is made at a primary distribution level, which is dictated for each commodity by the structure of the marketing system and data availability. [3]Calories per cup-equivalent and grams per cup-equivalent were obtained from USDA's Nutrient Database for Standard Reference Release, http://ndb.nal.usda.gov/ndb/foods/list. [4]Food Pattern Equivalents multiplied by calories per cup-equivalent. [5]Grams per day divided by grams per-cup equivalent.

Source: USDA/Economic Research Service. Data last updated Feb. 1, 2012. Note: The loss factors presented here are first estimates and are intended to serve as a starting point for additional research and d
We welcome suggestions to expand on and improve our loss estimates. Contact Jean Buzby at jbuzby@ers.usda.gov or Jeanine Bentley at jbentley@ers.usda.gov

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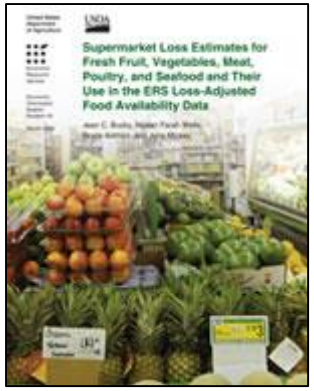
Initiatives

1. Losses at the primary level—farm to retail weight

University of Minnesota's Food Industry Center (TFIC) Pennsylvania State University and the International Life Sciences Institute (ILSI)

2. Losses at the retail level

Buzby, Wells, Axtman, and Mickey. (2009)
"Supermarket Loss Estimates for Fresh Fruit, Vegetables, Meat, Poultry, and Seafood and Their Use in the ERS Loss-Adjusted Food Availability Data.



3. Losses at the consumer level

Muth, Karns, Nielsen, Buzby, and Wells (2011)
"Consumer-Level Food Loss Estimates and Their Use in the ERS Loss-Adjusted Food Availability Data."

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Four Types of Output

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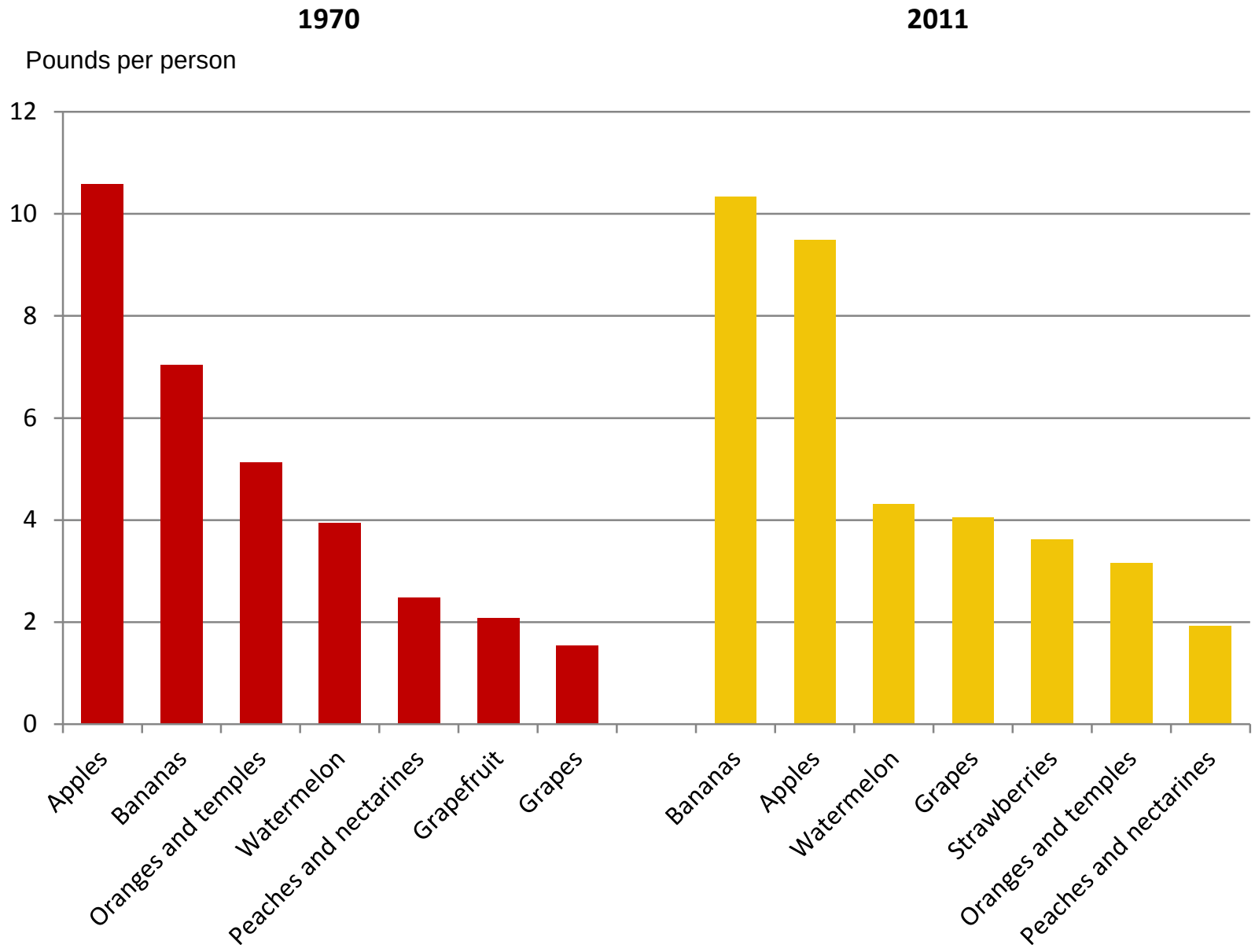
Most common fruits available for U.S. consumers., 1970 vs. 2011



Source: USDA, Economic Research Service, Loss-Adjusted Food Availability Data

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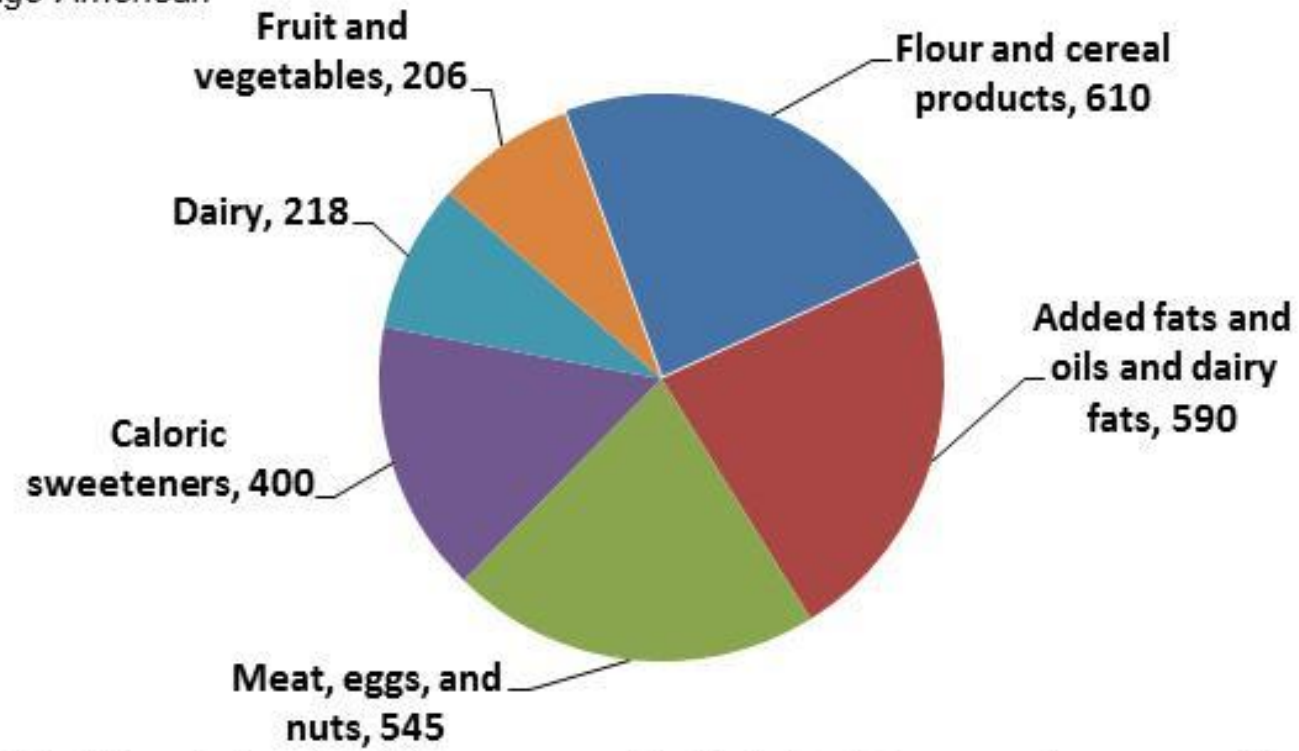
Flour and cereal products provided more calories per day for the average american than any other food group in 2010

Fruit, vegetables and dairy products provided smaller shares of calories per day for the average American



Note: Added fats and oils and added sugars are added to foods during processing or preparation. They do not include naturally-occurring fats and sugars in food (e.g., fats in meat or sugars in fruits).

Loss-Adjusted Food availability data serve as proxies for food consumption

Source: ERS/USDA based on data from various sources (see Loss-Adjusted Food Availability Documentation). Data as of February 2014.

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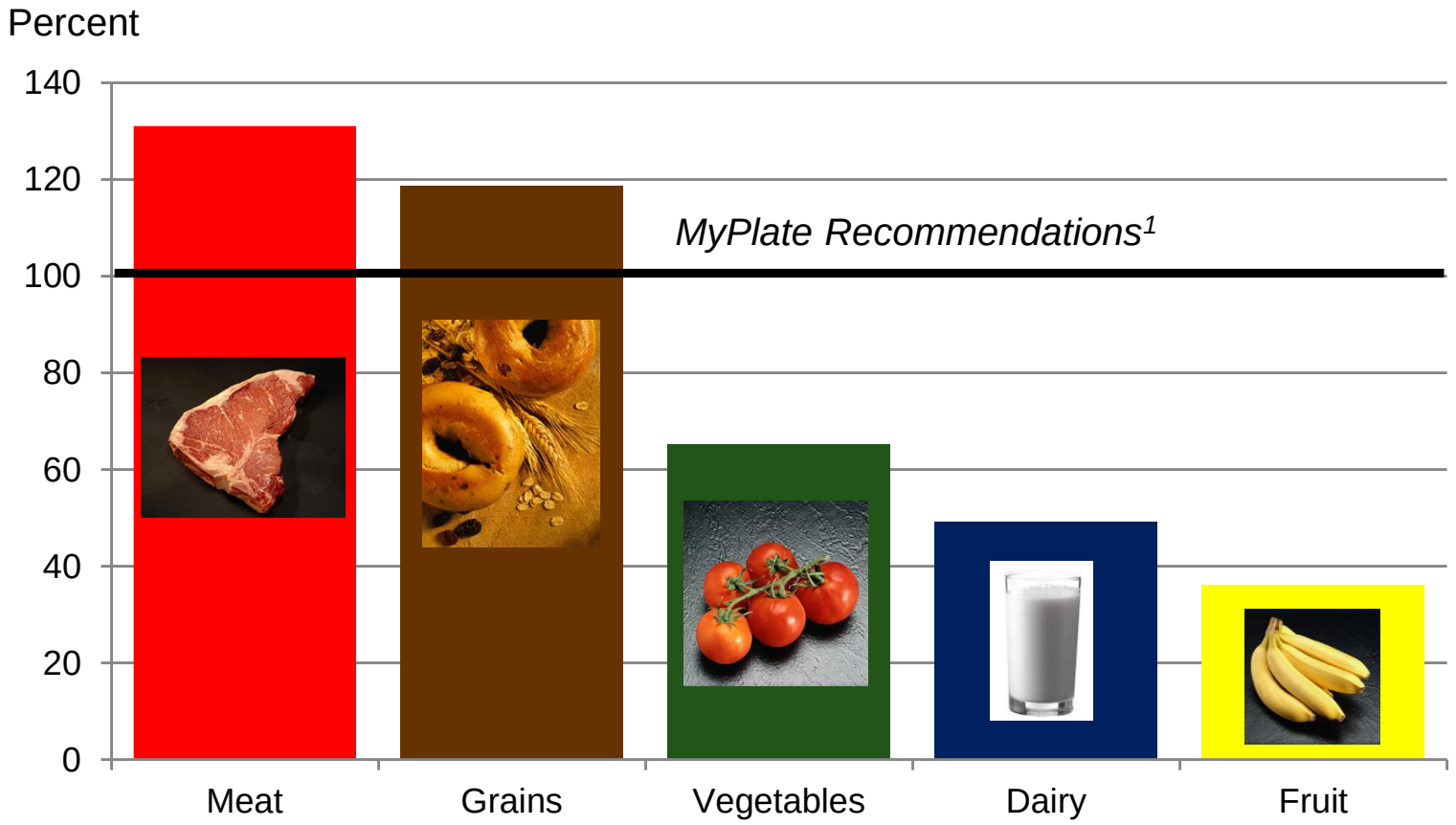
American diets are out of balance with dietary recommendations, 2012



Note: Rice data was discontinued and thus was not included in the grains group. Loss-Adjusted Food Availability data serve as proxies for food consumption.

[1]Based on a 2,000-calorie diet.

Source: Calculated by ERS/USDA based on data from various sources (see Loss-Adjusted Food Availability Documentation). Data as of February 2014.

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US Food Loss Estimates

According to the Loss-Adjusted Food Availability (LAFA) data series (2010):

- 31% or 133 billion pounds of the available food supply were lost at the retail and consumer levels.
  - Retail-level losses tally 10% (42.9 billion pounds)
  - Consumer level losses total 21% (83.1 billion pounds)

- Estimated total value of food loss was $161.6 billion.

- Had losses on-farm and between the farm and retailer been included, total postharvest loss in the US would be over 31%.

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Estimated Total Food Loss in the United States, 2010

Commodity	Losses from Food Supply*		
	Retail Level		Total
	Billion pounds		
Dairy products	9.3	16.2	25.4
Vegetables	7.0	18.2	25.2
Grain products	7.2	11.3	18.5
Fruit	6.0	12.5	18.4
Added sugar and sweeteners	4.5	12.3	16.7
Meat, poultry, and fish	2.7	12.7	15.3
Added fats and oils	5.4	4.5	9.9
Eggs	0.7	2.1	2.8
Tree nuts and peanuts	0.2	0.3	0.5
Total	43.0	89.9	132.9

*Totals may not add due to rounding.

Source: USDA, Economic Research Service.

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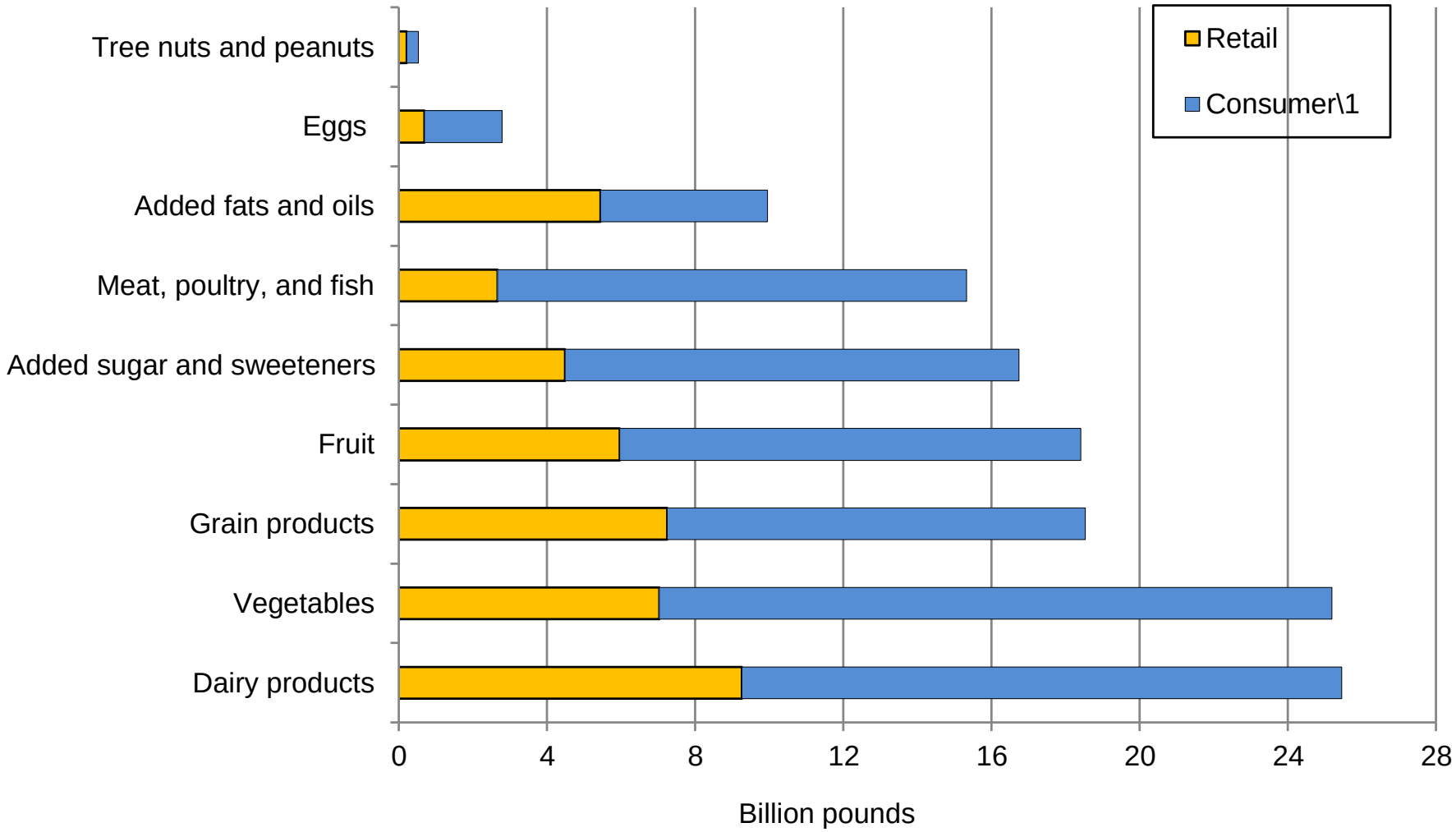
Quantity losses at the consumer level are larger than retail level losses for all categories except added fats and oils



1\ Includes loss in the home and in away-from-home locations. Includes cooking shrinkage and uneaten food.

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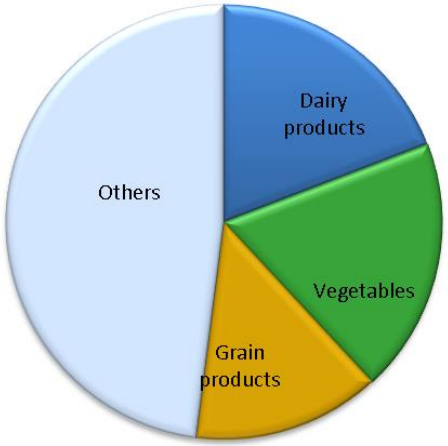
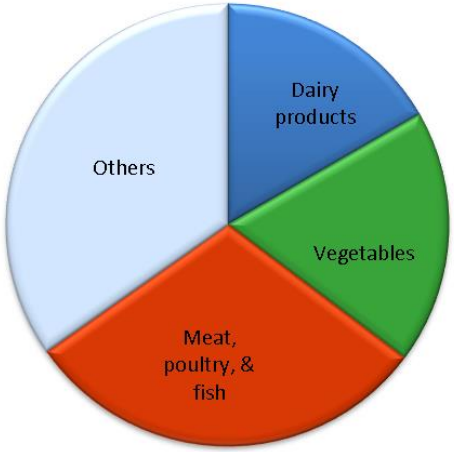
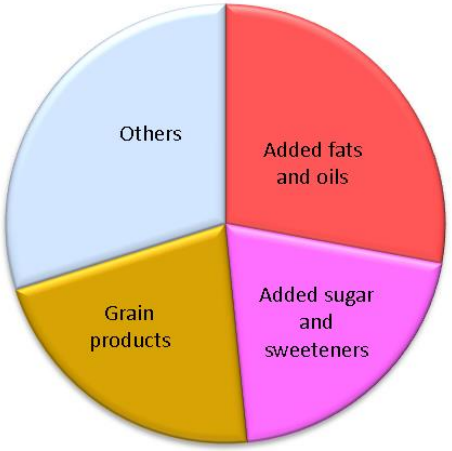
The top three food groups in terms of annual food loss vary depending on if measured by amount, value, or calories



Amount



Value



Calories

Source: USDA, Economic Research Service Loss-Adjusted Food Availability data.

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Individual foods with the highest percent losses differ from foods with the most food loss

U.S. Vegetable Loss in 2010

Food	Retail and Consumer Level Loss		
	Million pounds	*Million dollars*	*Percent loss*
Top 3 Foods by Percent Loss			
Fresh mustard greens	76	$104	77
Fresh pumpkin	908	$163	72
Fresh turnip greens	71	$71	63
Top 3 Foods by Pounds and Dollars			
Canned tomatoes	2,916	$3,749	32
Fresh tomatoes	1,058	$2,918	19
Fresh onions	2,809	$2,350	49

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LAFA Challenges and Potential Opportunities for Improvement (1)

- Data limitations prevent estimating total food loss across all commodities at the farm level and at the farm to retail levels.
- Some retail level loss estimates need updating and documenting:
  - Added fats and oils
  - Added sugars and sweeteners
  - Fluid milk and dairy products
  - Grain products
  - Processed fruits and vegetables (e.g., canned, frozen, dried, and juice)
  - Eggs, peanuts and tree nuts
- Some consumer level loss estimates need revisiting, for example:
  - Dry edible beans and dry edible peas and lentils
  - Select fruits and vegetables (e.g., fresh grapefruit, dried pears, fresh okra), particularly fruit juices
  - Select beverage milks
  - Select grains
  - Select sugar and sweeteners
  - Select added fats and oils

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LAFA Challenges and Potential Opportunities for Improvement (2)

- Food loss estimates (i.e., conversion factors) for individual foods and levels are for the entire data series range (1970-2012), with few exceptions.
- Food donations at the retail level or transfers to thrift shops suggest food may be eaten and therefore should not be counted as food loss.
- Structure of the series (e.g., where inedible share is removed) could be revisited.
- The consumer level in the LAFA series could potentially be split into home and away from home, if data are available.
- Consumer level losses could be subdivided further (e.g., separate column for cooking loss, plate waste, etc.) if data are available.

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Examples of Partnerships

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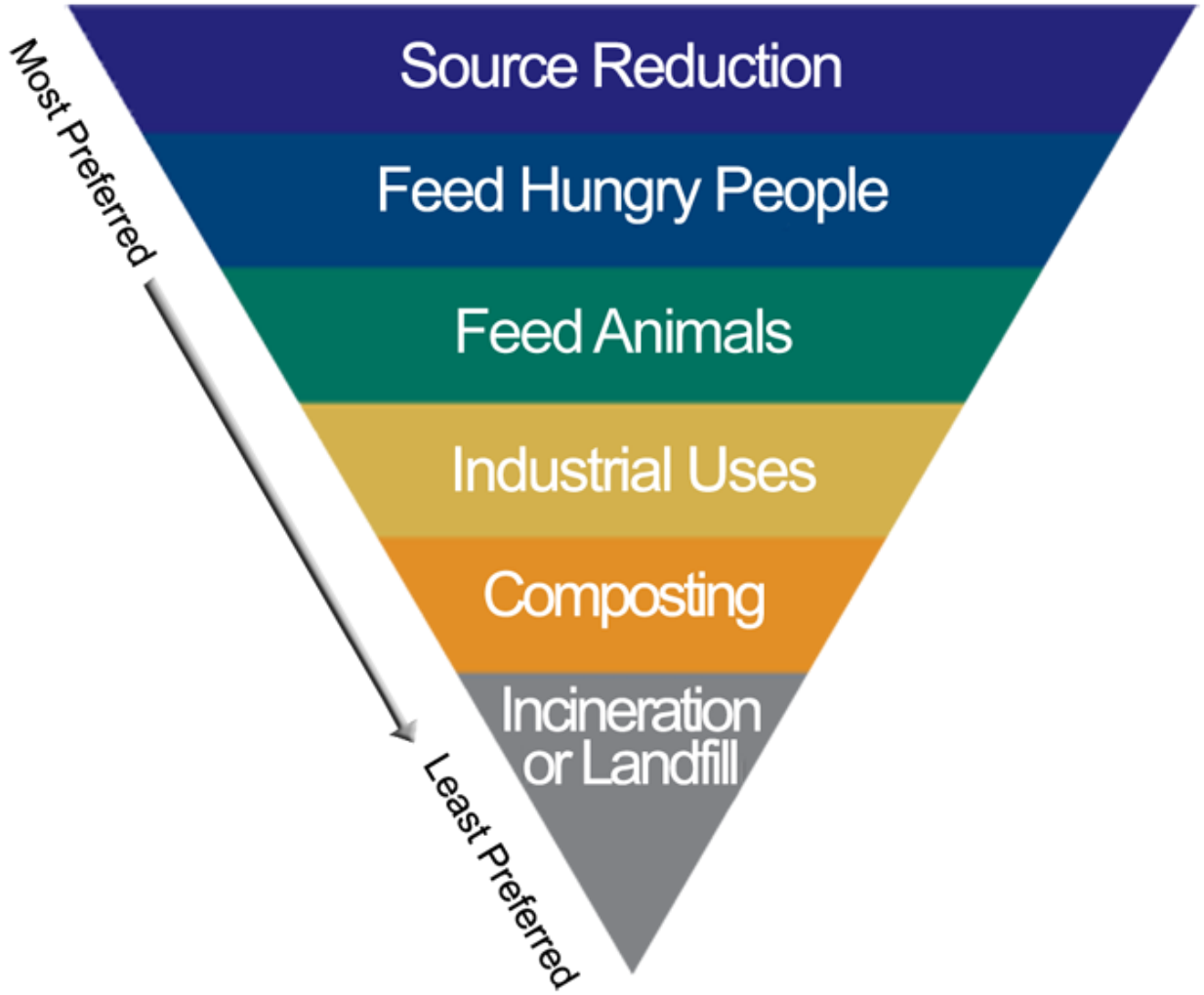
Food Recovery Hierarchy



Source: U.S. EPA, http://www.epa.gov/foodrecoverychallenge/

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U.S. Food Waste CHALLENGE

The U.S. Department of Agriculture and the U.S. Environmental Protection Agency challenge producers, processors, manufacturers, retailers, counties, and other government agencies to join the effort to:

Reduce food loss and waste

Recover wholesome food for human consumption

Recycle discards to other uses

(Source: Elise Golan OCE/USDA: http://www.usda.gov/oce/foodwaste)

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Food Waste Reduction Alliance

- 3-year industry-wide initiative in the US to reduce food waste in food manufacturing, retail stores, and restaurants, partly by increasing donations to food banks and decreasing food sent to landfills.
- It is a joint project led by:
  - Grocery Manufactures Association (GMA)
  - Food Marketing Institute (FMI)
  - National Restaurant Association (NRA)
- Best Practices & Emerging Solutions Toolkit

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Summary

1) Quantity food losses at the consumer level in the US are larger than at the retail level for all food groups except added fats and oils.

2) The ranking of food loss varies depends on if measured by amount, value, or calories.

3) Individual foods with the highest percent losses differ from foods with the most food loss.

4) Measuring food loss is challenging and data intensive.

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ERS Food Availability (Per Capita) Data System

http://www.ers.usda.gov/data-products/food-availability-(per-capita)-data-system.aspx

Which includes: Excel spreadsheets, Food Availability Documentation, Loss Adjusted Food Availability Documentation, and much more…

Buzby, Wells, and Hyman. "**The Estimated Amount, Value and Calories of Post-Harvest Food Loss at the Retail and Consumer Levels in the United States**." Economic Research Service, U.S. Department of Agriculture, EIB-121, February 2014.

http://www.ers.usda.gov/media/1282296/eib121.pdf

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Further Information

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- Hodges, R.J., J.C. Buzby, and B. Bennett. "Postharvest Losses and Waste in Developed and Less Developed Countries: Opportunities to Improve Resource Use." Journal of Agricultural Sciences, Vol. 149, Supplement S1((November 2010)::37-45. doi: 10.1017/S0021859610000936. http://www.bis.gov.uk/assets/foresight/docs/food-and-farming/science/11-561-sr15-postharvest-losses-and-waste.pdf *[Note: In table 1 "tonnes" is not a U.S. short or long ton. (The appropriate conversion factor for this kind of "tonne" is: 1 tonne = 2204.62262 pounds).*

- Muth, Mary K., Shawn A. Karns, Samara J. Nielsen, Jean C. Buzby, and Hodan Farah Wells. "Consumer-Level Food Loss Estimates and Their Use in the ERS Loss-Adjusted Food Availability Data." Economic Research Service, U.S. Department of Agriculture, Technical Bulletin No. (TB-1927) 123 pp, January 2011. http://www.ers.usda.gov/Publications/TB1927/

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