How We Waste $31 Billion in Food a Year

By EE Fung and W.L. Rathje

Tossing $31 billion into garbage cans sounds incredible, but Americans do it every year. At the very end of an energy-intensive food chain, families waste about 10 percent of their food at home, and maybe more outside. An average household spends at least $140 a year for food which is hauled to landfills or washed down sewers.

Only 40 percent of the food discarded in garbage cans is hard-to-save plate scrapings; the other 60 percent is identifiable single items, from beef chunks and bread slices to heads of lettuce and half-eaten apples. While no one intends to waste, our actions often lead to food losses. With study, this unintended behavior can be understood and perhaps changed.

As our era of cheap energy and resources is ending, consumers, industry, and policymakers are increasingly interested in food conservation. Avoidable food waste is the largest and most economical source of additional food available in our society. In mining this potential resource, we need to evaluate food losses at all levels. Wastage during production, processing, and marketing has often been researched by professionals. Food discarded at the retail level has been studied from time to time, and groups like the Community for Creative Non-Violence in Washington, DC, are feeding people at soup kitchens with food salvaged from supermarket dumpsters.

Most food decisions, however, are made by consumers as family units. Our discussion will focus on this family level, where household food managers can use any and all information available on efficient food strategies. Small changes in domestic food utilization could result in substantial savings in both an economic and ecological sense.

How much food waste takes place in the home? Why does it differ among households? What is the potential for reducing such losses? The U.S. Department of Agriculture has long recognized the need for reliable data on food waste. Some early surveys have suggested the extent and nature of the problem. We will discuss the estimates of food loss calculated by comparing records of the foods that go into households with records of individual consumption, and the household characteristics related to patterns of food waste, based on the National

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An inherent problem in these self-reported surveys is the moral implications of waste. Few Americans like to admit wasting food, even to themselves. Therefore, some researchers have turned directly to garbage cans where food debris can be carefully recorded.

For 9 years, the Garbage Project of the University of Arizona has been analyzing scientifically selected samples of household refuse. The basic procedure involves sorting refuse to calculate 1) the quantity of foods purchased by summing the net weights and fluid volumes on package labels and 2) the quantity of foods wasted by summing the actual weights of discarded foods. This method does have its limitations, such as lack of coverage of food not purchased in labeled packages, and food sent down garbage disposals. Nevertheless, the absolute weight of once-edible foods found in residential refuse represents the minimum level of household food waste. Garbage studies in several urban centers, supplemented by interviews and panel discussions, have provided many clues to patterns of food waste.

We can begin to build a model of household food waste behavior by looking at food discard as the material leftover of a series of purchasing, storage, preparation, and consumption behaviors. Attitudes toward the environment, waste, and health are constantly shaping food management patterns, and food waste is often the result of complex behaviors which are directed toward goals, such as convenience, other than simple efficiency. Within this intricate web of attitudes and actions, some patterns in food waste behavior have been identified.

**General Environmental Factors**

Consumers today do their hunting and gathering in a quickly changing environment. All along, we let common sense be our guide through storms of inflation, new product innovations, and commodity shortages. How correct are our intuitions? Logically, we might assume that when inflation increases, food losses decrease. In fact, as the rate of inflation rises, waste as a percentage of purchased food declines only slightly, and this results mainly from fewer plate scrapings. It is likely that serving sizes have been cut while other shopping, storage, and preparation behaviors remain largely unchanged. Logically, we might assume that when the price goes up on a particular food commodity, it is wasted less. Sometimes this expectation is fulfilled. As cost increases gradually, poultry, fresh fruit, and grain products are thrown away less.

Sometimes there are surprises. During the beef shortage of 1973 and sugar shortage of 1975, when newspaper headlines were shouting about soaring prices and scarce supplies, larger quantities of these foods were found wasted in garbage cans. This was probably the result of buying cheaper cuts of beef, more sugar substitutes, and larger quantities than normal. Most likely, these drastic experiments ("crisis buying") led to unexpected waste, either because of taste preferences or unforeseen problems in meal-planning or storage. Innovative moneysaving food experiments by homemakers may not be appreciated by the family and the shortrun response to a shortage can be decreased efficiency.

Logically, we might assume that busy
city life leads to overflowing trash cans. In fact, estimated food losses show little difference among central cities, suburbs, and nonmetropolitan areas. There may be regional differences, but city lights probably do not deserve too much of the blame.

**Income Level** — Social class stereotypes are poor predictors of food waste; in fact, food efficiency is predicted more strongly by attitudes, knowledge, and food management behaviors than by more fixed, unchanging characteristics of households. Nevertheless, such characteristics do have an influence on food waste. Low-income populations tend to discard less edible food overall as well as a lower proportion of single identifiable items. Middle-income populations do not typically respond to inflation by economizing on food. Although “guilt” over food waste is as popular as ever, middle-income consumers have not made the same shift downward in food losses as lower income households. In general, it is the allocated food budget rather than the gross income that determines waste behavior — the greater the budget the greater the waste and the greater the potential for savings.

Large families and those with children usually do not have much problem with leftovers or food waste. Nevertheless, many parents think their children waste food at alarming rates and that lessons of conservation have not been communicated successfully. How much of this feeling is attributable to the “good old days syndrome” remains an interesting question. Homemakers often claim that shrinking family size is just as difficult to adjust to in their cooking habits as it is emotionally. Because of larger appetites, adult men in small households can more easily accommodate standard package sizes than women.

**Ethnicity** — At present, information relating ethnicity to food waste is scarce, except for studies in Tucson, Ariz. There, Mexican-American households are more efficient food users than Anglos, independent of income. This may be due to cultural patterns which influence when, and the extent to which, leftovers are reused. Mexican-American homemakers tend to keep leftovers for less than 3 days. However, the more common utilization of leftovers as snacks, the practice of cooking from scratch, and incorporation of the same food ingredients — tomato puree, green chili, tortillas, cheese and others — into many different meals throughout the week all lead to less food waste.

Food discard is predicted by food safety knowledge — the more known about food safety, the less waste — but not by formal education or nutrition knowledge. In fact, the highly educated throw away more food as large single items. “When in doubt, throw it out” is still a good slogan, but consumer education programs should be designed to decrease doubt. Available kitchen facilities have an effect on purchase and utilization patterns. Lack of freezer space may prevent adequate storage of perishable foods. An automatic defrosting refrigerator may dry out foods before use. Heating leftovers in a microwave oven brings out fresher flavor than conventional reheating and may change patterns of food waste. Nevertheless, it is not clear to what extent these material factors influence efficient food management.

**Working Mothers** — A working mother is often considered an important factor con-
tributing to food waste, but a recent na-
tional survey reaches no such conclusion. When a homemaker starts an outside job, orderly consumption of purchased food may be disrupted, and the family may take some time to rearrange priorities. In the long run, however, this arrangement seems compatible with normal efficiency.

How the Pitch Rate Varies
How much food waste is caused by unex-
examined family habits? What are the priorities that we trade food efficiency for? Can Americans afford the luxury of deploiring leftovers? Different loss pat-
terns are found with different types of foods, packages, and processing tech-
niques. Not surprisingly, the majority of foods lost are unprocessed, with fresh fruits and vegetables being the leading items.

There are other differences in wastage rates which are related to food type: white bread is discarded at a higher rate than dark bread, chicken higher than beef, and pastries are the highest of all sweet snacks. Frozen fruits and vege-
tables are pitched at a higher rate than canned products. Different kinds of proc-
essed meat are thrown out at significant-
ly different rates, with lunchmeat leading, ham next, and bologna the last.

Two other patterns should be noted here. First, households that consume larger amounts of convenience foods waste a greater percentage of their fresh produce. This may relate to attitude dif-
fences — where less thought and ef-
fort are put into meal-planning and prepa-
ration, more waste is likely to occur overall. Second, the more frequently an item is purchased and consumed, the less it is wasted. Specialty items, used only infrequently, are wasted at much higher rates. For example, just about every household regularly consumes bread in standard 16 oz or 24 oz wrap-
ers. Waste with these wrappers is only the last one or two slices. Specialty breads — hotdog buns, muffins, and others — are used much less frequently, and their wrappers are usually associated with 40 percent or more waste. Obviously, efficient use of specialty items takes considerable foresight and planning.

Single items discarded in large quantities are mostly foods purchased but never used. Such waste is often the result of compulsive buying or buying foods of in-
ferior quality. Nutritionists recommend consuming a wide variety of foods. Whether this compensates for food loss-
es awaits further investigation.

The Ham and the Pan — Food prepara-
tion habits, some traced back to child-
hood lessons, can lead to differences in waste behavior. For example, during a panel discussion one woman remembered that her mother always cut the end off a ham before cooking it. Following her mother’s example, the woman always cut the end off a ham and threw the end away. She did this for years until she found out that her mother had cut the ham so that it would fit into a particular pan.

A more typical example is the habit of peeling potatoes rather than preparing them with the skin still on. Even in peel-
ing, the skillful use of a paring knife pro-
duces much less waste than the use of a vegetable peeler. Habits in food storage also affect food waste. For example, cleaning habits determine how likely it is that foods will be “hidden” in refrigerators or cabinets until spoiled.
A strong predictor of the amount of food loss is knowledge concerning the safety of perishable foods. People who throw food away based on an expiration date or an arbitrary time limit without using sensory means as a check are apt to have more waste. Changes in dining plans lead to waste. Family lifestyles that involve ir-regular or separate meal schedules for members, frequent house guests or parties, or different persons doing the grocery shopping and cooking, may require extra planning efforts to avoid food losses. Each family member has specific nutritional needs and food preferences. Sometimes the changing nutritional needs of an individual may not be recognized by the food manager and result in rejection of prepared foods. Family members demanding different diets again leave additional room for food waste.

**Leftover Rankings** — In some households, foods perceived safe but unpalatable or too little for one serving are thrown away routinely. Some types of leftovers are generally desirable and often planned for, such as stews or chili, while others, such as fish, carry negative connotations. Leftovers get recycled in many different ways in households — some families save leftover pizza for another dinner, some throw it out, and some even present it for breakfast.

When families accept the sweet agony of raising their own foods, they may be producing food for thought at the same time. We do not yet know how much is saved in the home food budget, but people who feel responsible for the environment tend to throw out less food. Lessons such as “remember the starving children in . . .” and “clean your plate or else . . .” may affect the attitudes and behaviors of children. Will enforcement of guilt feelings turn into positive habits of food conservation? We do not know.

**Doing Battle Against Waste**

Is it reasonable to think that household food losses can be salvaged? Home food
waste ranges from approximately 6 to 25 percent or more. Some kinds of household food loss may be inevitable, but the waste of large quantities of single items — probably the most susceptible to change — runs as high as 80 percent of food waste. Setting a moderate goal for reducing waste is realistic and achievable.

When we look at the ways environmental, sociocultural, and food management factors shape food waste behavior, the prospect for change is encouraging. Food safety knowledge, attitude toward the environment, food managing skills, types of food, packaging and processing, all affect food efficiency behavior in systematic ways. Fortunately, factors difficult to change — such as household size, education, working mothers, and available kitchen facilities — are not always good predictors of waste behavior.

Income seems to be a motivational factor in food efficiency rather than a determining factor. In addition, rising food prices do not necessarily lead to common sense corrections of efficiency on the part of consumers themselves. Programs through education, technology, and policy have a good potential for success, particularly if they do not conflict with other priorities which are related to food choices and handling behaviors.

Changes in consumer behavior may prove to be an effective solution to food availability without an increased expenditure of energy. Consumer education programs will be most successful if directed at population groups with more variable behaviors and thus more capacity to change. Middle-income families so far retain more options for adjustment in food utilization than low-income families that are closer to the lower limit of efficiency.

Programs to decrease food waste at the household level could profitably include information on food safety, values of personal responsibility for the environment, and food management methods emphasizing ways to save money and cope with economic stress.

For years, a major thrust of the food industry has been to modify food processing and delivery systems to meet customers’ needs. With increasing consumer concern over food efficiency, industry might be expected to study the magnitude of household food losses related to specific packaging and processing systems and the cost-benefit relationship of alternative food products.

Obviously, we still have more questions than answers. Food resource utilization is not a single, tightly knit set of behaviors. The apparently efficient food patterns of some subcultures (like the Mexican-Americans) need to be examined further. It is important to apply what we already know to practical program planning. It is equally important to monitor consumer behavior in a changing environment on a long-term basis for program evaluation. Since each research method in this area — interview, questionnaire, and garbage analysis — has its own advantages and biases, a combination of methods should be used to build a comprehensive model of the factors which affect food discard behaviors.

Further Reading