

DISPATCHES FROM A WASTEFUL NATION:
HOW AMERICA SQUANDERS ITS FOOD AND LEAVES CITIZENS HUNGRY

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ABSTRACT

**JONATHAN BLOOM: Dispatches from a Wasteful Nation:
How America Squanders its Food and Leaves Citizens Hungry
(Under the direction of Chris Roush, Barbara Friedman and John Florin)**

America is becoming increasingly wasteful with its food, as almost half of the products grown or produced in America are not eaten. This waste of resources costs farmers, food companies, individuals and the U.S. government more than \$100 billion each year. The majority of these losses could be avoided, possibly helping feed hungry citizens and reduce the American trade deficit. The purpose of this study is to illuminate the phenomenon of food waste, examining how and why America squanders so much edible food. To do so, this series of three journalistic articles will investigate food waste in farm, retail and household settings.

For Emily, without whom this project would not exist.

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INTRODUCTION

Nearly half of American produced food never gets eaten, as farmers, retailers and consumers throw away \$100 billion of food each year. According to a 2005 Department of Agriculture-funded study, an estimated 40 to 50 percent of food grown in America is lost or thrown away. The media occasionally writes about how much trash America produces, but few would imagine just how much food Americans squander. The journey from farm to store to home is a natural winnowing process which results in Americans wasting a substantial amount of what its farmers produce.

With obesity rates skyrocketing, it would seem that hunger is the least of America's worries. That's not the case. The percentage of Americans that experience hunger has increased for five straight years. The number of households experiencing hunger jumped by 43 percent from 1999 to 2004. With a growing number of its citizens going hungry, America's wholesale waste of potential nutrients takes on added importance.

Yet America produces plenty of food to feed its growing population. It is a leading grain producer and exporter. In 1994, the country produced enough food to supply roughly one and a half times the recommended calories per day. Because of their poverty, though, many Americans don't have enough to eat.

Food waste occurs in three distinct sectors: farms, food retailers—including convenience stores, farmers' markets and restaurants—and homes. Whereas some of the

examples of waste are unavoidable—moldy fruit discarded at supermarkets—others are not. Entire fields of crops are often not harvested but plowed under simply because it would cost farmers more to pick and transport them to a buyer than farmers would receive in return. Wrapped fast food burgers and convenience store sandwiches are tossed with no thought after a brief time under the keep-hot lights. Entire plates of untouched food are dumped at restaurants and leftovers from buffets are tossed into dumpsters.

The economic impact of food waste is significant and likely to become even more pronounced in the coming years. In addition to the aforementioned \$100 billion lost through edible food loss, U.S. towns and cities spend \$1 billion on food-waste disposal, according to *Consumers' Research Magazine*, a thrift-focused, industry publication. Sending anything to a landfill site costs money, whether it is unsold produce from a farm or construction debris from a work site. American farms, businesses and towns can save money and ease the environmental impact of landfills by separating food waste from regular trash. The resulting decrease in garbage volume would mean less expense for waste hauling and landfill fees.

Food waste will likely have a greater economic impact when rising fuel costs translate into higher food prices, said University of Arizona food loss researcher Timothy Jones. The large amount of oil used in fertilizing and harvesting crops as well as distributing products by truck will likely drive up food prices. If so, the food that is wasted will have a more significant economic impact. Jones suggests that higher prices will increase food waste awareness and diminish actual food loss.

Like the relatively widespread practice of recycling, food rescue makes sense economically and environmentally, says Jones. Yet, unlike conventional recycling, food

waste consciousness is lagging. Research by academics and the Department of Agriculture reveals that farms, retail operations and households, and in fact, all Americans will benefit from reducing food loss and rescuing food waste. Removing food waste from landfill dumping saves retail food outlets, restaurants and farms millions of dollars.

The average household wastes close to \$600 annually by throwing away edible food. Americans are throwing away a vast amount of resources, and their food waste is increasing. The average amount of household food waste tripled to 1.3 pounds per day from the 1980s to 2001, according an ongoing project at the University of Arizona. In 1995, Americans threw away some 96 billion pounds of edible food, more than 25 percent of all food produced in the U.S. That number has jumped to more than 100 billion pounds each year.

Given the sizable hunger and waste in the U.S., it is relatively easy for a small amount of food recovery to make a significant impact. Food recovery takes the form of collecting excess food from restaurants, retrieving rejected produce or slightly old perishable food from supermarkets and gleaning remaining crops from farms. In 1999, the Department of Agriculture estimated that if just 5 percent of the food currently wasted in a day was recovered, it could feed 4 million people that day.

The answers to America's growing problem of hunger are out there, as food rescue operations have shown. There is scant downside to reducing food waste; it's just a matter of motivation. This project will examine the waste of edible food in farm, retail and household settings, as well as real and potential solutions.

Literature Review

Among the research on waste, in environmental and sociological studies, there is little on food waste. Both researchers and journalists have documented the wastefulness of modern industrialized nations in general and America in particular. The focus in these discussions tends to be on garbage and pollution. While researchers have devoted a great deal of attention to composting food scraps, there has been less work on edible food loss. Most of the work on that topic is studies commissioned by the U.S. Department of Agriculture. But none of those reports feature an in-depth examination and discussion of where food loss occurs in the food production and delivery chain food waste occurs and what can be done to minimize the losses. This project will fill that gap.

Scholarly Work

There is a plethora of scholarly work on the topic of waste in general, the bulk of which focuses on the creation and disposal of garbage. More germane to this study is the topic of food waste, both edible and inedible food that is to be thrown away. In this research, the focus is on how to process the waste.

The scholarship centers on retail and institutional applications like schools, prisons and municipalities. In that endeavor, a kind of site-specific examination is common. For example, a 2003 article in the *Journal of Dietetic Association* provides a “decision tree” for food service operations to determine the best practice for waste disposal. The three authors studied a school district food processing center, a chain

restaurant, a college dining hall and a retirement community to examine the costs involved with waste related to the food industry. The majority of literature on food waste, often found in non-scholarly trade publications, centers on separating food waste from other trash. Some work, like D. Hang Yong's 2004 article in *Journal of Food Science*, centers on how composting benefits the environment. Yong's work details how food processing plants manage and even re-use waste.

The topic of wasting edible food, not how to dispose of both inedible and edible food waste, is more germane to this project. Academics, working both with and without the aid of the U.S. Department of Agriculture and Environmental Protection Agency, are responsible for the quantitative backbone of food loss research. Scholarly research addresses food loss at the retail outlets and households more than on farms. For example, the 1975 work by Harrison, Rathje and Hughes examines "Food Waste Behavior in an Urban Population." The article examines results from The Garbage Project, an archaeological venture that began at the University of Arizona and still operates at Stanford University that has student "garbologists" sort through representative trash samples from households. The three researchers found that 10 percent of all food in the trash was edible and they allow for an even higher figure due to the presence of garbage disposals.

Christopher Adams and Mary Tabacchi's "Perishable-Food-Rescue Programs" ran in the April 1997 *Cornell Hotel and Restaurant Administration Quarterly*. Adams and Tabacchi note how restaurants have curtailed food losses and examine how that affects food recovery programs dependent upon restaurants' wastefulness. The duo also

documents the attitudes and practices of participants in those food recovery programs by discussing the results of 1993 and 1994 surveys.

Timothy Jones, a researcher in the University of Arizona's Bureau of Applied Anthropology, has done the most exhaustive research on food waste. His 2005 study "Using Contemporary Archaeology and Applied Anthropology to Understand Food Loss in the American Food System" is much more practical than its name implies. Jones, as part of a Department of Agriculture project, quantifies food loss at many levels—harvesting, processing, storage, retail, foodservice and household. Jones found that, of all those realms, food waste is most prevalent at convenience stores. As a result of the always-available nature of these stores, 26 percent of their edible food is wasted. Supermarkets, by contrast, had edible food loss rates that averaged a scant 1 percent. Household food loss was approximately 14 percent, an increase from the estimate found in the Garbage Project's 1975 study.

Trade Publications

Much of the work on food loss appears in restaurant and other trade publications. A large portion of this work centers on how separating food waste can be financially beneficial for businesses, schools and municipalities. A brief article in *Business Development's* March/April 2004 issue notes that a pilot program for composting at a medium-sized Whole Foods store saved up to \$11,000 in disposal costs. Also on the topic of Whole Foods' environmental efforts, journalist Molly Farrell wrote in a 2004 article in

BioCycle, that the world's largest natural foods supermarket chain plans to eliminate food waste from its regular garbage output.

Kivi Leroux's 1999 article, "Lettuce Recycle," details food waste composting efforts in San Francisco and Chittendon, Vt. The municipalities both separate large amounts of their food waste tonnage from regular trash, saving millions of dollars annually in landfill dumping fees. Lynn Merrill's 2002 article in *Waste Age* examines the challenges food waste reduction efforts posed for an Ontario plant, the municipal trash service of Portland, Ore., and the Illinois State University campus. In "Off the Plate," Merrill notes that Illinois State almost halved its food waste from one ton to 1,300 pounds per day.

Some articles tend to be specific to a certain industry. Robert Spencer and Kenneth Tracy's 1993 article details food waste at a different kind of institution: prisons. The article discusses how the New York Department of Corrections has pioneered food waste recycling at prisons, resulting each month in 400 tons of food waste diverted from landfills to cost-efficient composting operations.

To a lesser extent, writers have considered household composting of food waste. Britt Faucette's 2000 article in *BioCycle* gives an overview of the approaches being made by households but also explains how restaurants and food processors in Georgia are recycling food waste. Danielle Jackson's brief 2002 article in *Waste Age* also discusses Americans rising food waste. It reported researcher Jones' finding that U.S. household food waste had tripled from the 1980s to 2001.

There is a substantial body of work on food waste in school and university settings. Joanne Guthrie and Jean Buzby's 2002 work examines the plate waste in the

federally funded National School Lunch Program. They report that an average of 12 percent of food served to students is not eaten, resulting in an annual loss of more than \$600 million. Not surprisingly, cooked vegetables were the leading food wasted, as 42 percent of all veggies served were scraped into the trash. The authors advocate for a greater amount of student choice in school lunches, recess preceding lunch and implementing nutrition education programs as ways to decrease food loss.

Through interviews and focus groups, Nancy Cotugna and Connie Vickery assessed Delaware children's opinions on the Department of Agriculture's Summer Food Service Program that serves low-income students when school is not in session. Their 2004 work found that plate waste was a result of dislike of certain items' taste, feelings of fullness, and diminished appetite due to hot weather or medications. Bee Wilson's 2002 column in *NewStatesman*, a cultural and current events magazine, bemoans the waste of food and money due to college meal plans. She primarily focuses on the latter, though.

A portion of the literature on the subject of edible food loss is comprised of veritable 'how-to' guides for avoiding food waste. The Environmental Protection Agency advised businesses and institutions on food waste reduction techniques in its 1998 study "Don't Throw Away That Food." The study documented institutions that had revamped their disposal systems to eliminate food waste, realizing significant savings in the process. A 1997 article in *Environmental Nutrition* by Andrea Platzman, a New York nutritionist, is a tip-sheet for avoiding food waste at Thanksgiving. She recommends sending guests home with food and avoiding excess appetizers and desserts—common areas of overkill. Kishi Asako's 2001 article in *Japan Echo* examines how Japanese eating habits like appropriate portion sizes lead to less waste.

Progressive Grocer detailed how Bi-Lo Grocery Stores has an arrangement with the North Carolina Division of Pollution Prevention and Environmental Assistance to divert unusable food to Macon County composting sites. Excess from the deli, bakery, produce and meat departments will be sent to the compost facility. There, the food and other organic material are turned into usable soil.

Jennifer Erickson's 1997 article in *BioCycle* discusses the results of a 1993-1994 survey of food waste by Portland Metro, the regional government of Portland, Ore. Erickson wrote that more than half of wholesale produce waste was edible, but not sellable. A 1997 Department of Agriculture study cited in a 1997 issue of *FoodService Director* found that more than 25 percent of all food produced in the U.S. is wasted. Ironically, the Department of Agriculture study did not take into account food loss on farms. Beatrice Hunter's 1998 article "Minimizing Food Waste" in *Consumers' Research Magazine* provides some useful statistics on food waste. She writes that 5.4 billion pounds of food are lost each year at the retail food level. Hunter attributes the losses to overstocking, improper stock rotation, the removal of food items due to "sell-by" dates and increased trimming for pre-cut, packaged produce.

Jim Johnson's 2003 article "University Research 'Trashes' Fast Food" in *Waste News* cites Jones' research to document a significant distinction between food loss at fast food restaurants and full-service, or sit-down, restaurants. Johnson notes that fast food establishments' loss ratio is two and a half times more than regular restaurants, mostly because the time-sensitive delivery systems which can lead to over-ordering by managers. Johnson, in a 2004 article in *Waste News*, notes how hands-on management correlated with lower loss numbers at restaurants. What is most surprising, said Johnson,

is that smaller and midsize restaurant chains had much higher level of food waste than big chains, mostly as a result of overworked and thinly spread managers.

Amy Zuber's 2001 article in *Nation's Restaurant News* examines the utility of the "Made For You" cooking system at McDonald's. The restaurant chain implemented the custom-order sandwich assembly to eliminate the batch-order cooking system that led to waste. After examining the "Made For You" program's effect on one Manhattan McDonald's franchise, Zuber concludes that the franchise reduced food waste by less than 1 percent.

While a portion of the aforementioned literature evaluates the costs involved with processing food waste, other scholarship focuses on the cost of purchasing and then not using food. In this light, food is a resource, like oil, that isn't cheap. For instance, Jones' work estimates that a family of four throws away almost \$600 in edible food each year.

In addition to quantifying food loss in different sectors, Jones explores food waste as a phenomenon. In his work, he theorizes on the reasons behind the burgeoning amount of food loss on farms, in retail food outlet and in households. For example, he postulates that the "Just-in-Time" delivery system used by many fast food restaurants leads to excess ordering by chain managers just to be safe. Jones also spells out potential actions for minimizing food loss.

Popular Media

Much of the popular literature germane to food waste discusses the topic of food recovery organizations. The majority of work on food recovery centers on specific

programs established to either feed those less fortunate with excess food or find other, non-edible uses for it. For instance, Steven Sherman's 2004 article "Increasing Edible Food Recovery," looks at how growing hunger rates and stalling donations from businesses and individuals have impacted food recovery programs. Sherman details the symbiotic relationship between the Portland Metro waste reduction office and the Oregon Food Bank. On the topic of donating edible food, Sherman conducted a survey of businesses that donated to food rescue agencies and interviewed employees at both donating businesses and rescue operations. Sherman writes that the top barriers to giving were perceptions of inconvenience and liability risk linked with donated food.

Most state and local coverage of food waste centers on food recovery organizations. Treva Jones' 1998 article in Raleigh's *The News & Observer* reported on a summit meeting between the state's food recovery organizations. Jones details the gleaning efforts of organizations like the Society of St. Andrew and the Inter-Faith Food Shuttle, which aim to take excess or unharvested crops from farms to soup kitchens and food pantries. Jones quotes the Society of St. Andrew head as saying that North Carolina is the top gleaning state in the U.S. Paul Bonner's 1997 article in Durham's *The Herald-Sun* provides a detailed history of the work of the Inter-Faith Food Shuttle. The operation collects more than 2 million pounds per year, feeding 4,000 people per day in the Raleigh and Durham area.

In the national popular media, there have been few articles that addressed the waste of food. Elizabeth Glynn's 2005 article in *E*, "Recycling Food Waste: It's Academic," detailed efforts at American universities to separate food waste from other trash and the resulting savings, but she did not focus on edible food waste. In 1986,

William Rathje published an article in *The Atlantic* that answered “Why We Throw Away Food.” Rathje built on that work by co-authoring *Rubbish! The Archaeology of Garbage* with *Atlantic* editor Cullen Murphy in 1992. The book updates Rathje et al.’s 1975 finding that 10 percent of all trash was thrown away in an edible state, upping the number to 10 to 15 percent. The book also offers a thorough explanation of the methodology and conclusions of The Garbage Project at University of Arizona. The project taxonomy included splitting food trash into two categories—edible “food waste” and inedible “food preparation debris.” The authors summarize an intensive food waste study conducted in 1980 and 1981 at the behest of the Department of Agriculture, finding that food waste continued at an impressive level even when subjects knew it would be counted.

Furthermore, Rathje and Murphy compare research participants’ recollections about their habits to their actual trash contents in a “matched study.” They found a “tendency of people to be unreliable sources of quantitative information about their behavior” (Rathje & Murphy, p. 81). Subjects reported not wasting much despite squandering more than two ounces of edible food per person per day. Lance Gay’s 2005 article, which ran on the Scripps Howard News Service wire, examines the impact that food waste has on the U.S. economy. He wrote that America’s misuse of food costs at least \$100 billion annually and over-burdens farm soil and the environment. Gay, quoting Timothy Jones, postulates that the cause of America’s food waste is a national belief that food is plentiful and cheap.

In sum, most writing on food waste addresses the question of how to process food that is in garbage. When there are articles that address the topic of wasting edible food,

they are usually short and focused on a specific aspect of food loss. There are few longer, journalistic works that take in the entire scope of food waste, how it begins on farms and continues through retail and household settings. My work will use a journalistic approach to bring the issue of food waste to the general public in a way that hasn't been done before.

Issues to Explore

This work explores three main questions related to food waste in three specific sectors. First, assesses how and why food loss is happening in America and whether it is increasing or decreasing. Second, my work examines what's being done to prevent food waste in America and whether citizens, policymakers or members of the media are paying attention to this issue. Has state or federal policy increased or decreased food waste? What factors inform farms and retail food outlets decisions on making food donations and minimizing food loss? Finally, this project explores how some organizations limit food waste and what more can be done to minimize food loss.

Method and Limitations

This research took the form of a series of feature-length, magazine-style articles. The research was conducted primarily through interviews with relevant individuals who have a role in the topic of food waste. They were farmers, grocery store employees and members of state and national organizations. In addition to interviews, I conducted

historical research and consult relevant primary sources like studies by the U.S. Department of Agriculture and Comptroller General.

The primary limitation of this project was getting subjects to tell the truth about their food waste. Misreporting food loss was a problem faced, as few people readily admit how much food they waste. University of Arizona researcher Timothy Jones noted that “households report almost no food loss when in actuality they lose about 15 percent of what comes into the household” (Jones, 2004, p. 6)

For that reason, I did some participant observation. I went to two families’ homes to observe their food waste in person. In order to avoid altering their behavior, I did not tell them of the nature of my research beforehand. Instead, I waited until afterwards, when I interviewed participants on their food buying, usage and storing habits. I asked subjects to act as they normally would and to ignore my presence as best they could.

I also avoided references to food loss or waste out of respect for journalistic objectivity. Also, on that same topic, I recognize the limits of objectivity. My being there changed their behavior in some ways. Journalism’s rules on participant observation, however, are less stringent than those in sociology or anthropology. I consulted with academics in those fields, however, in discussing household food waste.

Another limitation was that access to certain sources at the Department of Agriculture and major corporations proved difficult to contact. Using my existing media contacts and plenty of persistence, however, I was able to reach most. Through phone contact, I talked with some of the national figures and groups involved, such as the coordinator of the Department of Agriculture’s Educational Research Service and Joel Berg, the Department of Agriculture food recovery coordinator. Unfortunately I was not

able to reach the former Secretary of the Agriculture Dan Glickman, a major proponent of food recovery efforts during his tenure in the Clinton administration. In general, I tried to use phone interviews whenever possible and travel only if necessary.

I visited California to examine its innovative food recovery strategies and speak with those who see the effects of America's great produce-growing region. I spoke with the operators of a Salinas Valley, Calif., landfill, which receives food waste from the nation's largest lettuce growers. I talked with supermarket operators, like the innovative Trader Joe's and visited with food recovery agencies in the area, many of whom have been rescuing food that would otherwise be thrown away—both from restaurants and retail stores—for more than 20 years.

I focused somewhat on sources in North Carolina because gaining access to them was more feasible. Also I was able to get more context from face-to-face visits rather than phone calls. The majority of in-state sources were in Chapel Hill and the Raleigh area. For example, the N.C. Agriculture Commissioner Britt Cobb was a prime interview target. And I also interviewed Chris Moran, the executive director of the Inter-Faith Council in Chapel Hill, about the role of donated food. I spoke with operators of other food recovery programs like Second Harvest and Inter-Faith Food Shuttle to show that excess food—both from farms and retail food operations—can be put to good use in feeding those less fortunate.

Some sources, however, were scattered throughout the state and even the nation. I visited farms in various locations. I attended the Southeast Vegetable Growers Conference, which allowed me to interview many people in one location and get contact information for many more growers, policy makers and agricultural academics. For all

travel expenses associated with this reporting, I used my allotted Park Fellowship travel funds.

This work provides a national view of food loss. No state has made food waste a particular priority, so focusing on one region or state would not bear fruit. This thesis affords an in-depth look at three areas of food waste through targeted discussions of what's happening throughout the nation. This offers a national snapshot of this issue.

While previous research has touched on different aspects of food waste, no work has synthesized these facets in one article or series of articles. In addition to updating some of the earlier scholarship on the topic, my articles inform readers about the issue of food waste and assess what is being done to prevent it and discuss possible solutions.

Chapter Breakdown

The thesis breaks down thematically into three articles. The first article examines food waste on farms. The second explores food waste in retail food outlets, which includes supermarkets, restaurants and convenience stores, in that order. The third article investigates the topic of food waste in private homes. Finally, the fourth chapter considers why food loss does not receive attention from policymakers or the media and assess the outlook for the issue in the future.

For all articles, my approach was to examine a national issue by focusing on specific examples. That meant either writing about a local example in depth or taking a topical approach by using diverse examples. In addition to the articles, this project includes an appendix listing interview sources.

Chapter 1

American Farms at a Loss

The lines of leafy collard greens are a farmer's dream. The plants' bushy, textured leaves have sucked in sunlight and water and grown to medicine ball proportions.

They're calling out to be eaten.

Growing in bucolic Louisburg, N.C., not far from Raleigh, the greens have flourished against long odds. They have eluded pests, escaped drought and survived through January thanks to an unusually kind Carolina winter.

Yet almost none of the collards here at T & K Farms will be eaten.

The farm's owner, Leo Stallings, will not harvest the crops because he cannot sell them. Stallings, who vends most of his produce at his aunt's farm stand on winding N.C. 56, knows that the greens' appearance is irrelevant. Collard season has come and gone. The truth is, he didn't expect to sell them. "I normally end up with leftover crops because I plant more than I need. I don't want to run out," Stallings said. "That field was a backup in case the demand was high."

There is significant waste at Stallings' farm even though he is among the select few that allow gleaning operations to come and pick his excess crop. Volunteers pick the greens for three hours a few Saturday mornings and disperse the yield to local food pantries and homeless shelters. But the sheer volume of excess greens means that the "waste" is hard to limit.

In part due to farming practices like Stallings', more than 12 percent of American harvests never get eaten, according to a 2003 Department of Agriculture funded study by the University of Arizona's Timothy Jones. While food loss in general amounts to \$100 billion in losses, waste on farms costs an estimated \$20 billion annually.

Walk On By

There are many reasons for food loss on farms, ranging from weather to neglect to deterioration. But the most unnerving factor, in light of America's mounting hunger rate, is when farmers opt not to harvest a field of crops. Known as a "walk by," this conscious waste occurs because the price for that crop will be less than the cost of harvesting, processing and transporting it. When crops are hand picked, as with most fruits and vegetables, labor can account for as much as 65 percent of a farmer's total cost, said N.C. Sweet Potato Commission Director Sue Johnson-Langdon.

There is a significant amount of waste accepted as part of the standard farming operation. Farm waste varies depending on the region and crop. N.C. Sweet Potato Commission's Johnson-Langdon said that about 25 to 30 percent of that crop is not marketed. Many fruits and vegetables are worse. "Farmers, when they pick row crops like tomatoes, squash, green beans zucchini, if they can sell 50 percent of what they farm, that's considered excellent," said Patricia Robbins, co-founder and chairman of Florida rescue project Farm Share.

Produce tends to have higher loss rates than grains and corn, which have alternate uses like animal feed and ethanol, respectively. Yet even in harvesting and transferring

from field to silo to truck, piles of wasted grain accumulate. Storage losses were 4 to 7 percent, according to 1974 Department of Agriculture data. Today, the generally accepted loss estimate for grain storage is 5 to 10 percent, said University of Arizona researcher Jones, who has been studying food loss for more than 10 years.

Crops perish at different rates. For example, strawberries are among the fastest rotting produce. Think about how quickly strawberries go bad in your refrigerator and imagine what happens to them in a sunny field. Then you'll have a decent idea of the amount of overripe strawberries in a large field like The Vollmer Farm in Bunn, N.C. "They ripen quite fast from mid-May to late-May. That's when we get our glut," said John Vollmer, who operates the farm.

Picky, Picky

Another significant cause of agricultural food loss is specificity. There's only a market for crops that look a certain way. Often, only certain sizes, shapes or colors of crops are harvested. Other times, buyers sort through a picked crop, culling those that do not meet their demands. In both cases, the end result is a waste of perfectly edible produce that may be an inch too short. Or too long. Or too round. Or too thin.

This superficial culling can be blamed on wholesale buyers' preferences. Farm Share's Robbins blames the wholesalers for the selective tossing. "The companies that buy the product have a size and look they want," said Robbins. "They do not want a tomato that isn't perfectly shaped. If it has an indentation, that's considered a cull, and it's thrown away."

Acting on orders from store buyers and wholesalers, growers often pick only the crops that fit the desired specifications. Ken Horne, executive director of the Virginia-based national food rescue organization the Society of St. Andrew, has seen some outrageous waste. He cites an example of a grower in Wisconsin from whom the organization used to recover carrots that were too long for the bags used. “This one grower used to throw out 2,000 pounds of carrots per hour,” Horne said. “He worked 10 hours a day, six days a week for the six weeks of shipping season. Before we got to him, he was just chuckin’ ‘em.”

Consumers’ preferences also drive farm waste. Cindy Gentry, who managed Arizona’s Statewide Gleaning Project from 1993 to 2001, witnessed some astounding selectivity in her time. “Americans like cheap, beautiful, all-regular looking produce,” said Gentry, now founding director of Community Food Connections. “If crops don’t have that uniform look, that’s another reason they can’t sell them. It’s cosmetics.”

When today’s modern food facilities get going, the edible waste generated can be impressive. Farm Share’s Robbins said that an average day for the largest food processing plant in Homestead, Fla., produces a glut difficult to fathom. “I can fill a dump truck with 22,000 pounds of tomatoes every 40 minutes,” Robbins said. In other words, Farm Share collects tomatoes equal to the weight of two adult elephants in 40 minutes.

This form of American food loss occurs in part because we can afford to be picky. For the Society of St. Andrew’s Horne, America’s affluence leads to its excessive waste. “We’re rich enough where we can turn down produce based on the way it looks,” Horne

said. “It wasn’t always that way. We produce so much, so cheaply, we can afford to throw it out.”

Often, waste is a result of growers’ impatience. If a farmer doesn’t see a profit in his or her field, he or she would rather “disk in,” or plow under, the perfectly edible crops and move to the next task. Usually, that means either planting the next season’s harvest or cover crops to prevent erosion. “There’s still a sentiment that it’s easier to throw it away than to donate,” said Norm Gold, director of the Arizona Statewide Gleaning Project. “If you donate it, you have to call the food bank, then put the palettes aside and wait for the pickup. It takes time. We’re always fighting that—the convenience.”

While disking in brings some of the crops’ nutrients to the soil, its benefits are minimal. “I don’t think there’s a big loss of nutrients with not disking in fruits and vegetables,” said Steve Troxler, North Carolina agriculture commissioner.

Farm waste also stems from the move to more ‘value added’ products like bagged, washed lettuce or broccoli crowns. This trend means that more edible parts of produce are being trimmed and lost on farms instead of at the wholesale or retail level. “The waste in terms of food is getting further and further upstream,” Jones said. “In the Salinas Valley, half of what’s going to the landfill is food waste. It’s pretty bad.”

Bagged produce also leads to further loss down the line because cut vegetables decay quicker. Oxidation occurs and bacteria arrive sooner than it might otherwise. “The move to higher value products increases food waste by another five percent,” Jones said.

Foreign Affairs

The passage of the North American Free Trade Association (NAFTA) has altered the U.S. agricultural landscape. The abundance of imported crops coming from Mexico causes more food loss. January to April, about 900 trucks cross the border at Nogales, Ariz., each day, said Gentry, the former Arizona Statewide Gleaning Project head.

Considering those figures, it is hardly surprising that agricultural imports increased for the last 4 fiscal years, rising 41 percent from 2002 to 2005. This added competition from a nation with limited pesticide regulation and cheap labor means that most U.S. farmers' are undercut on price and have a shorter period to sell their goods unopposed by cheaper imports. As a result, the conditions exist for more walk bys, unharvested crops and ultimately, food loss.

And then there is the issue of food dumped at places like Nogales, where all imported produce must be inspected by the Arizona Department of Agriculture. Sub par refrigeration in many of these trucks creates some food loss. A sizable amount of waste accumulates at Nogales, because minimal defects in one case cause the entire truckload to be deemed unfit for consumption, said Gentry.

One result of such stringent inspections is that food loss piles up in area landfills. Food waste comprised up to 70 percent of one Nogales dump, researcher Timothy Jones found in 2000. Food recovery organizations like the Arizona Statewide Gleaning Project are now taking advantage of this concentration of rejected produce. The organization recovers vast amounts of produce from refrigerated coolers, despite gleaning less than one third of the coolers.

Alternative Sources

Some farm food loss can be avoided by selling less commercially desirable crops at a bulk rate to puree makers, canneries or soup makers. Those factories often pay too little or are too far from growers to make it profitable for farmers. For example, Ron Pait, who operates Pait Strawberry Farm in Lumberton, N.C., had a record excess in 2004 after an exceptionally productive strawberry crop. He considered selling to a food processor that bought strawberries for 23 cents per pound. “It costs me 20 cents per pound to get ‘em picked, plus I’d have to transport them,” Pait said. “So that doesn’t work economically.”

In some cases it makes perfect economic sense for farmers to eat their losses. Yet when they do, others don’t eat. An alternative is to donate crops through gleaning programs, like Pait did when he had glut of crops he couldn’t sell.

Food Rescue Operations

Food rescue workers are not cape-wearing heroes who swoop in to save tossed tomatoes. Instead, these people work for non-profit organizations that salvage edible food that would otherwise go to waste. This activity is often called gleaning, which breaks into two categories. Field gleaning is the practice of picking forsaken produce on farms. Bulk rescue operations pick up already harvested unwanted crops. Both practices must identify possible donors and convince them not to throw away or disk in excess food.

Gleaning operations vary by state. Because corn and grain tend to dominate in the Midwest, there isn't as much food loss in the Midwest. Food waste is more common in the sunny southern states of the U.S., where the more fragile, hand-picked produce dominates. Human picked fields invariably mean some of the crop is left behind. Former Department of Agriculture Coordinator of Food Recovery and Gleaning Joel Berg lists California, Arizona, Florida and North Carolina as the top gleaning states.

The term 'gleaning' stems from the Old Testament. Deuteronomy 24:21 reads, "When thou gatherest the grapes of thy vineyard, thou shalt not glean it afterward: it shall be for the stranger, for the fatherless, and for the widow." The practice was common in Biblical times, as when the destitute Ruth met her future husband, Boaz, while gleaning in his fields.

In this country, the Society of St. Andrew began 25 years ago in Virginia. "When we started out, nobody salvaged produce and shipped it any distance," said the Society of St. Andrew's Horne. "Now with us, America's Second Harvest, the gleaning operations in Arizona, California, Washington, Oregon, we probably do a quarter billion pounds per year."

While gleaning efforts have increased greatly in the last 25 years, so have crop yields. Better seeds, irrigation and pesticide technology means more production per acre. For the most part, agricultural abundance has become more common. Yet the majority of that plenty does not help those in need.

Time often works against recovery agencies. With bulk food rescue, organizers are racing against decay. Fresh produce not refrigerated rots at a rate of roughly 3 to 5 percent per day. And as mentioned above, growers are usually in a hurry to plant a cover

crop for the winter to avoid erosion, said strawberry grower Vollmer. “Farmers get antsy. They get it in their head that they’re not willing to wait two to three weeks to let volunteers harvest it,” Vollmer said. “They want you to move quickly—in a few days. But volunteers take time to organize.”

Some crops, like pumpkins and watermelons, are too large to be plowed under. And disking in isn’t an option with berries or other vine and bush fruit. With those crops, gleaning both feeds those at food shelters and saves farmers the cost of hauling away and dumping excess crop, which can cost \$400 to \$500 per truckload. Redistributing the edible remains at the Raleigh Farmer’s Market saves the Department of Agriculture more than \$100 million in disposal fees.

Many growers appreciate the idea of their crops going to use and hate to see food wasted. N.C. farmer Stallings said he searched for years for a group to pick his excess crops. After linking with the Society of St. Andrew, he has hosted gleaners the last 10 years and tries to avoid disking in crops. “I hate to just disk it up when it can help someone somewhere,” Stallings said. “I’m pretty sure most growers hate to cut it in when they spent all that time to grow it.”

Vollmer, who often has gleaners at his N.C. strawberry picking farm, appreciates the assistance. “Any help we get from gleaners is helpful, rather than me pay for someone to pick it and dispose of it,” said Vollmer. “There’s a very practical side to gleaning in addition to the moral and philosophical side.”

Farmers volunteer to have their fields gleaned for a variety of reasons. Vollmer says gleaners are helpful during gluts when farmers have more crops than they can sell.

Also, gleaned ripened but unpicked fruit allows the plant to produce more strawberries. The same is true with cabbage, cucumbers and many other crops.

Money Matters

To a certain point, funding determines how much food gets rescued. Less funding means less gas for pickup runs. Transport remains the most expensive part of the recovery equation. It is about 20 to 25 percent of Farm Share's operating costs and the Society of St. Andrews' greatest expense. "It's all a function of how much money you can raise," said the Society of St. Andrews' Horne. "If money was no object, you could easily salvage enough produce to feed everyone in this country who is hungry."

Farm Share's Robbins concurs. "It is not the lack of expertise or generosity of our farmers that is keeping us from feeding hungry people. It is the lack of dollars donated to food rescue programs," Robbins said.

Rising fuel prices further hinder operations at vehicle-heavy food recovery agencies. For Raleigh N.C.'s Inter-Faith Food Shuttle, gas prices led the non-profit to stop collecting from most restaurants, as the food received was not worth the resources to recover it. Increased gas, electricity and heating costs also contributed to a \$250,000 budget shortfall in 2005. The organization's gas spending was \$19,000 more than it had budgeted. "Were gas money easier, we could make more runs and get more food," said Food Shuttle CEO Bullard.

Yet, in more farm-laden areas like California's Salinas Valley, there comes a point after which more money doesn't help. Due to its rural location, California's Ag

Against Hunger has almost reached its distribution peak, said Gleaning Coordinator Patrick Heiman. “We can we can only collect what we can give away,” Heiman said. “At this point if I doubled my intake, I couldn’t give it away.”

Labor is another major limiting factor for gleaning operations. That is partly why field gleaning is not the most effective way to battle waste. “It is more an educational and public relations tool,” said Heiman, who estimates that his organization gets “maybe one-fourth of 1 percent of all the food we get” from field gleaning.

Arizona’s Statewide Gleaning Project got 1 million of its 76 million pounds of rescued food from field gleaning in 2005. “Field gleaning is a sexier thing to do, than recovering food from coolers, but it’s really hard to get people to do that,” said Gentry the group’s former director.

Inmates are used in some field gleaning settings, providing cheap and dependable workers. In Arizona, about 20 female inmates work four days a week on Duncan Family Farms in Litchfield Park, Ariz. “The guys are just pigs. They don’t care, they throw things around,” said Gold, the Arizona Statewide Gleaning Project’s current director. “We only use female inmates because they show pride in their work.”

Florida’s Farm Share has a contract with the state Department of Corrections that brings 24 inmates and two guards to its Florida City, Fla., warehouse five days a week. The inmates are nearing release, and none have been convicted of violent crimes. Volunteers and inmates work together in the sorting facility. “The inmates always say that...they feel good about helping people. They don’t get the same feeling from picking up trash on the side of the road,” said Farm Share’s Robbins.

Recovering harvested and sometimes packaged crops from farms and processors is much more efficient than field gleaning. On a productive day, Farm Share field gleans 5,000 pounds in five hours. “We can get that in 10 minutes from a cull line,” Robbins said. That efficiency means Farm Share recovers food for roughly 5 cents per pound. The Society of St. Andrew rescues food at 4 cents per pound.

Whether it’s through bulk rescue or field gleaning, existing organizations only rescue a fraction of the food wasted on farms. Gentry estimates that the Arizona Gleaning Project salvages just 3 percent of all food being dumped on the state’s farms. In Florida, it is worse. “We’re only able to get .05 percent of what’s not used in the South Miami Dade area,” said Robbins. “I usually tell people 5 percent because .05 is too hard to explain.”

At the end of the January gleaning outing at Stallings’ T & K Farms, the field looked nearly identical to when gleaners arrived—there were collard greens everywhere. “First time gleaners, at the end of the day, they always say, ‘That’s it?’” Heiman said. “It’s always disappointing to know you’re just gathering the proverbial drop in the bucket.”

The State of Food Recovery Funding

California farms have led the nation in farm production for more than 50 years, producing \$27.5 billion in crops in 2002, according to the California Farm Bureau Federation. Specifically, California’s Salinas Valley is known as both “America’s Salad Bowl” and, less humbly, “Salad Bowl to the World.” The region also creates a significant

amount of waste, which Ag Against Hunger and other gleaning operations recover. Yet, they receive no help from the state.

Perhaps because the state has an official gleaning organization—the Arizona Statewide Gleaning Project—Arizona’s state departments are quite accommodating. The Department of Corrections donates 75 percent of the project’s budget by providing inmate labor for gleaning and trucks for transport.

The Arizona Department of Economic Security provides funding for a further 13 percent of the operation. In addition, a state government proclamation orders the Department of Agriculture and all state agencies to work with the Gleaning Project.

Florida is even more generous with its food recovery funding. The Sunshine State has a line item budget in the state Department of Agriculture budget to fund Farm Share. While the organization must lobby for it every year and it fluctuates, the group will receive \$300,000 in fiscal 2006.

The Department of Agriculture also donates a 53,000-square foot site at the Florida City Farmer’s Market that the non-profit uses to house recovered food. What’s more, the Florida Department of Corrections provides inmate labor from Dade Correctional Institute to work packing the rescued produce.

In North Carolina, the Society of St. Andrew is the leading farm food rescue operation, but not the only one. Inter-Faith Food Shuttle, Bread for Life and others also work to feed the hungry. The N.C. chapter of the Society of St. Andrew, however, gleans more than half of the 15 million pounds of food that the national organization recovers annually, and it does so with no state funding. The organization is able to use the N.C. Department of Agriculture’s refrigerated tractor trailers at times. While state Agriculture

Commissioner Troxler has participated in gleaning operations and refers farmers to the Society of St. Andrew, that group funds for itself.

State agricultural research stations donate crops to the cause, too. Denny Thompson, superintendent at the Fletcher, N.C., Mountain Horticultural Crops Research Station, said his outfit donates as much as 40 percent of what they grow to the Society of St. Andrew. Since the research stations have to account for a third of their budget through crop sales, though, they can't give too much.

Thompson has another idea. "If we could convince the state legislature that as a match for our budget we could donate produce as an in-kind contribution, it would be real plus for the stations, we wouldn't have to compete with the farmers and the legislature would see it as a good thing to help the hungry," said Thompson.

Farm Loss and the Feds

In 1996, President Bill Clinton signed the Bill Emerson Good Samaritan Food Donation Act. The law makes farmers and processors not liable for any harm that may occur due to donated food, whether it is already packaged or field gleaned. Under Clinton, the Department of Agriculture pushed to increase food recovery. Agriculture Secretary Dan Glickman appointed a full-time coordinator of food recovery and gleaning, Joel Berg. Food recovery was "a real passion" for Glickman, said Berg.

Prior to the 1969 Tax Reform Act, all growers were able to take a charitable contribution of "fair market value" on any donation. The 1969 Act eliminated that incentive to give. The 1976 Tax Reform Act reintroduced that incentive for corporations,

but not independent farmers. State tax laws on the topic vary, but in most cases, “the average small farmer isn’t getting a tax break,” said Berg, who now is director of the New York City Coalition Against Hunger.

Sen. Richard Lugar, an Indiana Republican, proposed the Good Samaritan Hunger Relief Tax Incentive in January 2005, but it has stalled in the Senate. It was referred to the Senate Finance Committee the same day it was introduced. “It’s going nowhere fast,” said Berg.

The Bush administration has not taken up the cause. The administration has yet to replace Berg after he resigned on the last day of Clinton’s tenure, as Clinton asked all his political appointees to do. The Department of Agriculture has not undertaken a new study on food loss since 1997. Multiple USDA spokespeople did not return phone calls for this chapter.

“The government is ignoring the issue of food loss as hard as they can. Despite the fact that people in their own party—like John McCain—are trying to get them to listen, they ignore the data that’s right in front of their face,” said Jones, who presented his ideas to John Marburger, science adviser to President Bush administration in November, 2001. “Their answer is, ‘market forces will take care of that.’ They say ‘if it isn’t happening, it can’t be true.’”

Despite amounting to an estimated \$20 billion in losses, food loss on farms, the issue seems to escape attention. “I don’t know why people haven’t noticed that this problem exists. It’s pretty easy to see,” Jones said.

Who Cares About Farm Food Waste?

The Bush administration and the politically charged Department of Agriculture have not made reducing loss a priority for several reasons. First, budget cuts have hurt the Department of Agriculture's ability to fund any kind of non-traditional programs, such as gleaning. All government departments have had to cut back 1 percent of their budget.

Agricultural Research Service, a division of the Department of Agriculture that would normally research ways to avoid food loss, has hit hard times as well. One of ARS' four utilization labs is in New Orleans and has cost the organization a lot of money due to flooding following Hurricane Katrina, said Linda Tokarz, an ARS public affairs specialist with an interest in food loss.

Tokarz said that the ARS conducted a great deal of research to reduce storage and transportation losses in the 20th century, but little is done on food loss today. In addition to funding, a philosophical barrier exists. "There are very few people counting what we don't have. They're always counting what we do have," said Tokarz. "It's an inductive process."

In the outlook of Washington policy makers, food loss is not a priority. "This is a marginal area because we have abundance," said Tokarz. "We have so much grain we want to put it in our gas tanks. If we had a year of drought, loss would be a bigger thing."

But what agricultural policy makers don't seem to realize is that it is because of that abundance that the country has so much waste. And it's not that the government has never taken up the issue. A 1977 report to Congress by Elmer Staats, comptroller general

of the United States, saw food loss as an economic problem. The report was titled “Food Waste: An Opportunity to Improve Resource Use.”

The report called food waste “a missed opportunity to feed the hungry” that is “accompanied by unproductive use of resources.” Furthermore, the comptroller general called on then-Agriculture Secretary Robert Bergland to undertake a comprehensive study of food loss. That did not happen.

After he left the Department of the Agriculture, former Coordinator of Food Recovery and Gleaning Berg tried to get the Bush administration to carry the torch. “At the beginning of the Bush administration, I sent memos around saying, ‘Hey, call it ‘faith based’ and let’s go with it,’” said Berg. “They never got back to me.”

Many in the non-profit world feel that American elected officials should do more to promote food rescue. “There ought to be more robust partnerships between the USDA and private charities to maximize salvaging,” Horne said. “If you had partnerships with state and federal muscle behind it, we could do a lot more.”

Political realities, however, get in the way. The current failure to support food recovery is not an objection to the issue, but a result of the partisan politics that both parties play by doing the opposite of the previous administration. In fact, there is nothing more conservative than conserving food. “If the Republicans had proposed gleaning, they would have loved it,” said Berg. “The irony is, in some ways gleaning is a more Republican way of dealing with hunger.”

Outlook

Despite limited government help and shrinking private donations, food recovery agencies have some reason for optimism. With more ‘higher value’ crops being packaged on farms and imported produce entering the U.S. at selected entry points, American agricultural food waste is becoming more concentrated. That creates an opportunity for gleaners. Yet, will food recovery organizations have the funding to effectively collect and spread that excess to those who need it most?

“Is it the overwhelming issue of our times? No,” said Berg. “But it’s just so common sense that we should be doing a lot more.”

Chapter Two

Retail Food Loss: From Farm to Fryer

“Welcome to Salinas, Salad Bowl to the World.” The white wooden sign along Highway 101 greets visitors to Salinas, Calif., with that not-so subtle claim. The temporary note tacked on the sign, “Now growing iceberg lettuce,” seems unnecessary. Evidence of that fact is hard to miss. Driving around the valley, lettuce appears everywhere, sprouting from protective plastic beds. Endless rows of roughage are seen on both sides of 101, blanketing the land from the Diablo Range to the rear of the La-Z-Boy outlet, Salinas Ford and all the other stores along the highway.

You’ll even find lettuce at the Crazy Horse Canyon Landfill. Driving past the glistening plastic-lined fields, the facility’s scale house and the flock of circling gulls, you’ll come to the dumping area. There, an inch of shredded lettuce powders the ground like a dusting of green snow. Atop the mountain of trash, Robert Correa oversees the delivery of 200 tons of agricultural waste every day. That means the equivalent of three M1 Abrams tanks is dumped daily at Crazy Horse. It’s a slow day for ag waste, and Correa is still crunching lettuce with almost every step.

The majority of lettuce that ends up here are “overs and unders,” greens that have been cut too big or too small. Then there are the factory miscues. These are bags of spinach or salad mixes that are cut improperly by the sort line machine, leaving two bags or more connected. Labor costs make it cheaper to toss both bags than to cut them by

hand. Cesar Zuniga, field operations supervisor at Salinas' Sun Street Transfer Station, said it isn't uncommon to see as many as 10 interconnected bags in the trash.

Some produce is thrown away because its bag's vacuum seal doesn't work. When bags of sliced apples—Chiquita Fruit Bites—did not receive the accompanying portion of caramel dip, the whole batch of apples ended up at the Salinas' Sun Street Transfer Station, mixed in with broken tiles, motor oil bottles and rusty chairs. “Ag waste keeps going up and up,” said Zuniga, who has managed the Sun Street facility for 10 years. “Salad processing just took off in the late '90s.”

Finally, there are 'sell-by' casualties. Knowing that they have to ship produce throughout the world and that stores don't like to receive bags with less than a week left before the sell-by date, manufacturers like Salinas-based Fresh Express Inc. often throw away packages as much as three weeks before the recommended sell by date. Instead of grocery shelves, the greens line landfills.

Because of those decisions, the Salinas Valley Solid Waste Authority employs three drivers who do nothing but shuttle dumpster loads of produce waste from producers like Fresh Express and Earthbound Farms. Processing companies spend \$15,000 to \$20,000 per day in landfill fees dumping about eight or nine dumpsters of food waste. They may spend as much as \$1 million for the nine-month growing season.

Zuniga, whose job entails generating revenue from tipping fees, would like to see processors reduce their waste. “We like their money, but it's hard to permit a new landfill,” said Zuniga. “We try to persuade them to cut waste and they do it for a while, but then they go back to their old ways. I think they say, '\$1 million, that's it?’”

Donating the food isn't on the companies' agenda. "You'd think they'd give it to a non-profit—they could use it," Zuniga said. "They're always thinking about liability. They just toss it."

Some distributors are better. A Red Oak, N.C., egg company gives Raleigh, N.C.'s Inter-Faith Food Shuttle 2,140 dozen eggs every Friday. Egg cartons with even one broken egg are set aside for donation. For the company, it's not worth the time and effort to clean up the cartons or redistribute the eggs to other cartons. Instead, they get a tax deduction for donating them.

The retail food industry wastes 35 million tons of food worth \$30 billion, according to University of Arizona researcher Timothy Jones' findings. That figure encompasses supermarkets, restaurants and convenience stores, in ascending order of waste. This chapter will look at all three, in that order.

Yet, the story of retail food loss begins before products enter stores and restaurants. Food waste that begins on the farm continues at farmer's markets and grocery stores' central sorting stations. Those segments will be addressed as well.

Supermarket Food Loss

In a busy Capitola, Calif., strip mall, Trader Joe's specialty grocery store is flanked by Domino's Pizza and Bed Bath & Beyond. In the paved alleyway behind the store, food sits outside under a white awning. This food is the dirty secret of the grocery industry—food that is perfectly edible that the store cannot or chooses not to sell.

Seven crates packed with lowfat milk quarts sit outside behind the Santa Cruz, Calif., Trader Joe's. A shipment waiting to be unpacked? No, the gray crates contain more than 200 pounds of milk the store won't be able to sell before it passes its sell by date, a casualty of poor ordering.

Two volunteers, Don and Mary Musitelli, are there to recover the food to bring to senior citizens as volunteers for the Santa Cruz, Calif.-based non-profit California Grey Bears. They load the crates into the bed of their gray Toyota pickup alongside three crates of eggs, two loaves of bread and a package of three shrink wrapped red peppers where "one is a little squishy," said Mary. There's also a package of artichokes, a partially-ripped bag of penne and what she refers to as a "mystery can," which has lost its label.

The Musitellis have been volunteering for 20 years. Every week, they pick up this much food from the same Trader Joe's. Consider that every grocery store has a similar amount of excess. Now consider that there are about 34,000 grocery stores in the U.S., according to the Food Marketing Institute, and one gets a sense of how much food is wasted at American supermarkets.

Across the country, Warren Shaw is just finishing his volunteer run in North Carolina. Shaw, 79, strides into the Raleigh, N.C., Lowes Foods and approaches the first employee he can find. "Anything for the Food Shuttle?" he asks. In his gray sweatshirt, jeans and yellow gloves, he breezes past the checkout to the waiting truck parked in the fire lane with a cart full of what he'll soon determine is 60 pounds of bread. In the back of the white food shuttle truck, Shaw stands on a gray, metal utility scale while holding the separated bag of each kind of food item. Subtracting his weight, he jots the total on a clipboard.

At a nearby Harris Teeter, Shaw collects 38 pounds of lettuce and carrots, 32 pounds of green beans and 15 pounds of bananas in the produce section. The bakery manager, though, can't find the bag of bread and cakes that he had set aside to donate. "We may have thrown it away. It was a mess back there," the manager says.

After recovering food at three more supermarkets and two Starbucks, Shaw rolls back to Food Shuttle headquarters early. "We're running a little light today," Shaw says. He has amassed more than 400 pounds, most of which will be delivered to soup kitchens and elderly homes that afternoon, in a little more than two hours.

Loaves Aplenty

Bread and baked goods are easily the most commonly wasted foods at supermarkets. According to Jones' study, 9 percent of grains that enter a grocery store are wasted. Despite plenty of preservatives, packaged breads go stale. But much of the wasted bread comes from supermarket bakeries that use fewer preservatives and depend on freshness to lure buyers.

Food Runners, a San Francisco-based food recovery organization, has its pick of bread products in the sourdough-centric city. "Bread and pastry are easy to come by," said Nancy Hahn, Food Runners' CEO. "There's so much excess bread in town that the shelters can't even use it all."

Kae Abel, vice president of the Sacramento-based Senior Gleaners, noted that that her non-profit moves more than 25,000 pounds of bread each week. Senior Gleaners,

whose age 50 and older organization raises money by hosting bingo nights, sends its eight trucks to grocery stores and small bakeries.

Inter-Faith Food Shuttle, of Raleigh, N.C., collects so much bread that it separates it into two categories—soft and hard. The firm bread is dumped into The Pig Room, where a local farmer picks up the stale loaves to feed to his herd. Food Shuttle CEO Jill Bullard says that 18 percent of all items the group recovers are baked goods, ranging from supermarket French bread to Starbucks scones. At the latter, Food Shuttle volunteer Shaw bisects a sizable morning line to receive two dainty shopping bags of day-old bagels and muffins.

Produce Plenty

The banana had started to go bad at the bottom, with the peel taking a noticeable black appearance. At Weaver Street Market, of Carrboro, N.C., produce worker Scott Parker plucked the culprit from the display. With a flick of his fruit knife, Parker lopped the spoiled bit to reveal a banana straight out of a Chiquita advertisement.

At Weaver Street, an independent cooperative, that piece of fruit and most others that are blemished but perfectly edible are placed on a green free food rack in the staff break room. Harris Teeter has a reduced price produce rack. Food Lion Stores used to do the same, but stopped the practice two years ago because it wanted to emphasize freshness. Most grocery stores do what Food Lion does—throw out blemished produce.

The average grocery store wastes just more than 100 pounds of fruit and vegetables every day, according to University of Arizona's Jones' data. In terms of

poundage, no other grocery section creates nearly as much waste as the produce department. While it's a significant amount of food, most in the supermarket business are philosophical about the waste because it is less than 1 percent of all produce they receive.

A hefty amount of waste from rotting produce to damaged cartons is unavoidable—a cost of doing business. “There is a certain amount of waste inherent in the industry,” said Michael Garry, Supermarket News’ logistics editor.

Pretty Produce

Most supermarkets have beautifully arranged, carefully managed produce sections. That aesthetic of produce perfection causes yet more waste. Only crops that look a certain way will be shipped to stores and once there, only the best looking ones stay on display. In its 1,200 stores, Salisbury, N.C.-based Food Lion places visual appeal before produce profits and thrift, said Corporate Communications Manager Jeff Lowrance. “We just want our produce department to look at its peak freshness all the time,” said Lowrance. “We pull everything that doesn’t look that way.”

Lowrance said that both stores and shoppers are to blame for shunning imperfect fruits and vegetables. While shoppers desire the best looking produce, supermarkets certainly encourage those wishes.

As the Atlanta-based South region produce buyer, Alex Rilko is in charge of the fruits and vegetables for 13 Whole Foods stores in three states. In addition to beautiful, homogeneous produce, Whole Foods aims for full, brimming displays, said Rilko. “Psychologically, a customer comes into a store—any store—and if the display is empty

or looks picked through, it turns them off,” said Rilko, who has worked in the grocery business for 23 years. “If there’s an abundant supply of apples, you’re gonna grab one.”

At a Chapel Hill, N.C., Harris Teeter supermarket, the immaculate display idea is taken quite seriously. Every week or so, the produce manager uses a rolling wet/dry vacuum to suck off the unkempt onion peels.

Whole Food’s Rilko, who used to work at a ShopRite supermarket, admitted that grocery stores manipulate shoppers’ senses to augment sales. That’s why virtually every supermarket funnels shoppers through the produce section first, before they’ve grown tired of shopping. “It’s an impulse buy,” Rilko said. “You don’t come and say ‘I want a baby zucchini or a cameo apple.’ It’s the sight, smell or display of produce that gets you.”

With shoppers often buying on a whim, stores aim for dazzling produce displays. Anything overripe or off-color is banished to the donation bin, compost pile or dumpster. Whole Foods attempts to use items elsewhere—sending bruised bananas to the juice bar and imperfect bell peppers to the bakery. But the quest for alluring displays—a form of “food porn,” as one Whole Foods worker called it—results in the 10 percent of all produce going to waste.

Farmer’s Markets and Distribution Centers

Aside from grocery produce sections, farmer’s markets are another area ripe for food recovery. Inter-Faith Food Shuttle rescues 2,000 to 30,000 pounds of produce every day from the Raleigh Farmer’s Market. It should come as no surprise then, that the non-profit gets 46 percent of its donations from that farmer’s market.

At the Raleigh Farmer's Market, it's a game of efficiency. Normally, it isn't cost effective for Lynn Ford, president of Ford's Produce Co., to pay a worker to sort through low-cost items like apples to separate the good from the damaged, especially when things get busy around the loading dock. As a result, he donates a healthy amount to Inter-Faith Food Shuttle, whose volunteers cull the rotten produce. "We buy things hoping to sell them, but sometimes you miss the mark and have a surplus of product starting to break down," said Ford.

Across the country, San Francisco food recovery organization Food Runners collects 600 to 800 pounds every Saturday from the downtown Ferry Plaza Farmer's Market.

Supermarket distribution centers are a concentrated location for food waste. The giant sorting centers for food products serve that chain's stores for an area, state or region. There, any produce that isn't good looking is discarded, said Peter Clarke, co-director of Los Angeles-based food recovery consultants From the Wholesaler to the Hungry. "Once it's discolored, nobody's going to buy it, which is silly, really, because it is perfectly edible and still has the nutritional value," said Clarke. "But they don't want to invest another two days of trucking to ship the summer squash to all of their stores."

Horne, the executive director of the national food recovery organization The Society of St. Andrews, said that supermarket chains distribution centers are great sources of waste and potential recovery. He used Food Lion as an example. "They sort through the produce and throw out everything that doesn't look beautiful," Horne said. "Most of what is discarded is edible. Those kinds of things happen around the country."

Food Lion's Lowrance disagreed, saying the company threw out "very little" at processing centers. Lowrance said most of the loss was due to mishandling like a box dropped from a fork lift. Food Lion declined to grant access to any of its three North Carolina processing facilities, citing Department of Homeland Security regulations to prevent food contamination.

Ordering Issues

Yet some loss does not have to occur. As with farmers, grocers do not like to run out of a product. While they try to be efficient in their ordering and avoid large inventories, "Companies like to avoid out of stocks—they lead to missed sales," said Mark Wiltamuth, retail food analyst at Morgan Stanley who tracks grocers like Albertson's, Krogers, Safeway and Whole Foods.

And like farmers, stores tend to err on the side of abundance. "You tend to order more," said Lance Parchment, Whole Foods' prepared food assistant coordinator. "For example if you're selling five cases of something, you tend to buy seven. You definitely order a little more to maximize sales and allow for sampling."

Misorders happen, as we saw with the excess milk at the Capitola, Calif., Trader Joe's. Store supervisor Steve Keenan explained that the worker doing the ordering mispunched the number of crates desired. The worker hit both the two and three keys, leading to a delivery of 23 crates instead of the usual two. "It's part of the business," said Keenan. "It happens."

Trader Joe's grocery ordering involves quickly entering the desired quantity for item after item. Employees seldom catch their mistakes. Plus, the store orders every section of the store every day, so there's plenty of number punching that can go awry.

That kind of mistake doesn't happen all the time, but it happens more than stores would like. Punching in numbers blindly with no double-checking is bound to lead to many misorders. "There's always going to be human error; it does happen a fair amount," said Supermarket News' Garry.

Yet, difficulty of forecasting customer demand leads to even more waste, Garry said. Imagine trying to predict demand for an entire 100,000-square foot grocery store. Now add the variable that weather greatly affects consumer shopping patterns. Oh, and competitors' promotions, holidays, traffic patterns all influence demand.

On a Monday in February, the Inter-Faith Food Shuttle picked up 70 boxes of lettuce in perfect condition from a store that had overordered. Those kinds of miscalculations are common, as managers struggle to predict demand on days and times.

Skilled managers are essential for cutting down waste. As far back as 1970, Edward McLaughlin, director of Cornell University's Food Industry Management Program, identified managers as the main obstacle to minimizing waste. Most stores, Food Lion included, provide managers with software to study sales patterns from years past in an effort to better predict demand for Thanksgiving turkeys and Fourth of July strawberries. Experienced managers who can utilize that technology and add their own experience to ordering are invaluable.

Poor leadership can easily harm a store's profits. "Skilled management is very important," said Wiltamuth. "If you're having a lot of turnover, that could explain problems with shrink."

Grocery Finances and the Wal-Mart Factor

Supermarkets are in a bit of a quandary these days. With Wal-Mart Stores Inc. and Target Corp. having entered the retail food market, and the competition from discount clubs like Costco Wholesale Corp. and Sam's Club, supermarkets are losing customers. Wal-Mart is a particular threat, growing its food-related revenues by about 17 percent in fiscal year 2005, said Wiltamuth. Wal-Mart is now the largest grocery retailer in the world.

In fiscal 2005, 28 percent, or \$58.8 billion, of Wal-Mart's sales came from food products. During that same period, Wal-Mart created 242 new food-selling Wal-Mart Supercenters through conversion or new construction. In 1988, Wal-Mart opened the first of its Supercenters, which feature entire grocery stores inside. Ten years later, the Bentonville, Ark., company opened the first Wal-Mart Neighborhood Market, all of which are essentially grocery stores a quarter the size of Wal-Mart Supercenters. The number of Neighborhood Markets increased by 33 percent from fiscal 2004 to fiscal 2005, and there are now 88.

There was great consolidation in supermarket land in the late 1990s partly as a result of Wal-Mart's entry, said Mark Hamstra, financial editor of Supermarket News. The big three—Safeway, Albertson's and Kroger—dominated for much of the past 10

years. That consolidation has continued, as Milwaukee, Wis.-based SUPERVALU Inc. stores bought Albertson's grocery stores for \$17.4 billion in January 2006.

Yet consolidation hasn't made grocery stores a solid investment, said Morgan Stanley's Wiltamuth. "We have concerns over the long term future of grocers," Wiltamuth said. "Supermarkets only grow sales 0 to 3 percent per year." And the profit margin at most grocery stores is below 1 percent.

With superstores and discount clubs undercutting supermarkets on prices, grocers have been hesitant to raise prices. That is nothing new, as retail food sellers have historically had small margins due to fierce competition keeping prices low. What has changed is that stores are losing customers to their larger competitors. "Wal-Mart is really affecting supermarkets from headquarter level all the way down to individual products on shelves," Hamstra said.

To counteract that lost revenue, grocers can go in two directions. They can strive to cut costs and losses, or they can go upscale. Safeway chose the latter option, improving the shopping atmosphere with softer lighting and adding more high-quality, high margin offerings like store-made sushi, bakery and floral options. In 2005, Safeway planned to open or remodel 300 "Lifestyle" stores with an eye on making shopping a more pleasurable, though not cheaper, experience. "Stores are gravitating toward more profitable items like their own brand of goods and more prepared foods," Wiltamuth said.

More frequently, Wal-Mart has served as a wake-up call to grocery stores to reduce loss. Food Lion's Lowrance said the store is continually trying to become more efficient and recently purchased new software to help managers achieve that goal. The

software aids managers' ordering decisions by providing previous years' sales data to forecast how much of an item is needed on a particular day and time.

Wal-Mart is able to succeed partly by buying products at low prices due to its incredible buying power and scale of operations. In addition, the company is admired for its efficiency. But the retailing giant still has plenty of food waste. On Jan. 5, 2006, however, the company said that it will stop all food donations of nonsaleable foods. Citing the impossibility of guaranteeing the food safety of the nearly expired or expired food products, Wal-Mart halted a practice it had previously left up to individual stores. The store still gives non-perishable canned goods to local food banks, but Wal-Mart has essentially established a policy of throwing away edible food.

Food recovery agencies on both coasts—North Carolina's Inter-Faith Food Shuttle and California's Senior Gleaners Inc.—have been frustrated by the retail giant's policy. Food Shuttle's Bullard hopes the company will reconsider its position. Senior Gleaners' Abel, who worked at a Wal-Mart for three months, isn't optimistic that it will. Abel said that her organization used to receive 25,000 pounds of bread from Sam's Club in a year. "That may sound like a lot, but I generally move more than that in a week from a bunch of small bakeries," Abel said. "They had to stop because they got word from corporate headquarters that they can't donate food."

Preparing Waste

In addition to being a profitable offering, prepared foods are becoming increasingly popular. Prepared food sales have accelerated in the last five years, said

Food Lion's Lowrance. Work hours are increasing. Kitchen time is decreasing.

Supermarkets have adjusted their offerings to serve their clientele and capitalize on the trend.

“In the grocery business, we found out that nobody really has time to do the cooking. Stores have really honed in on that,” said Whole Food's Parchment. “The amount of prepared foods, it's increasing every year.”

Grocery stores making more baked goods and cooked meals have led to an increase in wasted food. There's more perishable food in stores, which translates to more waste, said Cornell's McLaughlin. At Whole Foods' four Atlanta stores, that means on average 30 pounds of healthy, nutritious prepared foods are thrown out every day. While the stores donate some excess grocery dry goods to non-profits, their prepared foods, from tofu to turkey, go straight to the trash by store policy.

Whole Foods isn't the only store with such a procedure. At Harris Teeter, rotisserie chickens are thrown away if they sit out for three hours. Paul Robichaux, a former Greensboro, N.C., Harris Teeter deli employee, said his department threw away half to two-thirds of all the rotisserie chickens cooked. Robichaux, 26, who now lives in New York, blamed a policy of always having chickens available between 4 p.m. and 6 p.m. for the waste. He also noted that store workers were not allowed to eat the poultry without paying for it, increasing the amount of chicken tossed into the dumpster.

Prepared foods are among the few sections of the supermarket that do not tend to give away their excess. “Almost none of the food retailers give away prepared foods—it's too dangerous,” said McLaughlin.

Fears of a lawsuit are the primary cause cited for lack of giving. The 1996 Good Samaritan Law and, often, state laws protect stores. Ignorance of the law or confusion inhibits donations in many cases. Raleigh supermarket gleaner Shaw said meat donations vary within the same grocery chain. Some stores give away meat on or past its sell-by date and some do not, citing liability fears.

In addition, grocery chains may fear the possible negative publicity more than actual legal trouble. “The donor understands that their name is on the box, and if someone gets sick, they’ve got a public relations problem,” said From the Wholesaler to the Hungry’s Clarke. “There are potential donors who fear being subjected to technically frivolous legal suits, but ones that will be potentially embarrassing.”

Clarke said that grocers also worry that such aggrieved plaintiffs would angle for out-of-court settlements, which isn’t an entirely fictitious fear. The de facto legal system is defeating the letter of the law. “You can have all the Good Samaritan Laws you want, but if you have a donor out there with deep pockets, they can be very timid about donating product for either the public relations problem or the out-of-court settlements,” said Clarke, who has advised more than 150 food recovery groups.

As a result, a category of food product that is increasing rapidly is, for the most part, not being rescued. Most leftover prepared foods are going to dumpsters and landfills. Hence, the required yellow hard hats at the Salinas, Calif., landfill. “The birds pick up then drop bones—they tend to hurt,” said Robert Correa, lead operator at the Crazy Horse Canyon Landfill.

Packaging Produces Waste

In addition to selling more prepared foods, supermarkets are selling more semi-prepared foods. These so-called “higher value” items like washed and cut spinach appeal to the same demographic: the busy American. The options at a Chapel Hill, N.C., Harris Teeter include washed and sliced bliss potatoes, red onions, green beans, broccoli and cauliflower, five kinds of lettuce and more. A mile down the road, Food Lion offers nine kinds of sliced Rawl Brand produce, including diced green onion, sliced yellow squash, squash medley and fajita mix.

The only problem is that cut produce decays quicker, resulting in a shorter shelf life. The adoption of so many higher value items creates 5 percent more waste, said Arizona’s Jones. Furthermore, the demand for packaged produce generates much of the landfill food waste seen in Salinas, Calif., due to the trimmings.

In addition to breaking down faster than non-cut produce, pre cut fruits and vegetables cause more waste due to their strict sell-by dates. Erring on side of caution, the dates mandate pulling bags from shelves five to 10 days before the produce actually goes bad. Given that value-added produce is on the rise, there will only be more waste in the future.

Some chains package regular produce, too. Trader Joe’s sells virtually no unwrapped fruit or vegetables. At its Culver City, Calif., store, the only unpackaged produce in the store was bananas. The bagging and shrink wrapping, not isolated to Trader Joe’s, creates another kind of food loss—waste by association.

With four apples in a clear plastic “clam shell,” if one goes bad, the entire box is pulled from the shelves. Trader Joe’s doesn’t direct its workers to repackage the remaining three apples or even use the good part of the blemished one, said Trader Joe’s Keenan. Sometimes the other three apples are picked up by a food rescue organization, sometimes not.

In addition, shoppers are often forced into purchases—and waste. Those who want a red pepper for a salad will have to settle for two; Trader Joe’s only sells them that way. Sarah Spivack, a Culver City Trader Joe’s shopper, recalled buying a pack of two bell peppers a week before when she’d only wanted one. “It’s funny, I completely forgot about the other one until now. It’s sitting in the refrigerator,” said Spivack.

It’s not just peppers, either. “The packaged produce leads to waste all the time, especially the green beans. The package is like a pound,” said Spivack, a producer at National Public Radio. “But you’re already there and you don’t want to go to Albertson’s. Half of them wither before you get around to eating them.”

Edible, Not Sellable

“Unsaleables” is the label the grocery industry gives for food it is unable to sell that is perfectly edible. The “sell-by” date is a major factor in all types of supermarket waste, not just of packaged produce. Products past that date can’t be sold to shoppers, but that date in no way communicates when something goes bad.

Cautious may be too soft a description of the “sell-by” date. “They give a pretty generous window with the sell-by dates,” said Trader Joe’s Keenan. “I’ve brought home

out-of-code bread, and ten days later, it's fine. It's the lawyers—they've made everything difficult.”

Another kind of unsaleable food product is products whose packaging had been damaged. Often, the contents are perfect but cannot be sold due to their appearance. This often happens when a worker accidentally cuts through a cardboard case and slices into the product packaging. And at the Trader Joe's in Capitola, Calif., volunteers Don and Mary Musitellis picked up a bag of penne that was ripped open.

The most common example is egg cartons with a cracked egg. Grocery stores do not bother repackaging cases with a cracked egg. It's messy and they prefer to put their labor to other uses.

Accounting for Loss

Supermarkets' food loss is difficult to quantify because markets lump waste with theft in the category called 'shrink.' That linkage also makes food loss a less visible problem for stores, said Cornell's McLaughlin. Most stores are constantly trying to reduce shrink to trim losses, but often they focus on foiling theft. Either way, grocery store excess is on the rise, said Michael Halligan, America's Second Harvest senior vice president of food sourcing logistics.

That is especially true when dealing with perishable items. Trader Joe's Keenan said the store loses money at a rapid rate. “We give away thousands every day,” said Keenan. “It's unavoidable. Perishable orders are tough.”

Consider that the Inter-Faith Food Shuttle collects 5 million pounds in 2005 from the Raleigh and Durham, N.C., area. Nationwide, America's Second Harvest recovered more than 2 billion pounds of product in 2005, "a relatively large portion of which comes from grocery stores," said Halligan.

Yet for all of its waste, supermarkets are quite efficient operations compared to most industries. Grocery stores had a 2 percent loss rate in 1974, the U.S. Comptroller General found. Jones' 2004 study estimates that supermarkets have cut losses to less than 1 percent. Even with that minimal waste ratio, the average grocery store loses 120 pounds per day. If an efficient store wastes more than 100 pounds each day, imagine how much food is wasted at the average restaurant, which wastes almost 10 percent of their inventory. Now consider that there are approximately 925,000 restaurants—fast food, conventional and other—in the U.S., according to the National Restaurant Association.

Restaurant Food Loss

On a Sunday in January, Chapel Hill's Ciao Bella II Tavern & Grill was packed with diners, and the kitchen was behind schedule. The manager at the informal Italian restaurant helped waitresses serve the main course, while apologizing for the delay. He served a young couple in a booth eggplant parmesan and spaghetti and meatballs and said, "Eat what you like, we've got trash cans for the rest."

Even at tight-budgeted eateries like Ciao Bella II, the idea of abundance and the resulting waste is commonplace. Brian Wansink, director of the Cornell University Food and Brand Lab, found that diners leave an average of 12 percent of their meals uneaten.

“Partly that’s from the exaggerated serving sizes,” Wansink said. “But you also get some unwanted side dishes. You may want the pork chop but also get the cauliflower.”

Matt Knisley, a second-year medical student at the University of North Carolina, worked as a bus boy at Ruby Tuesday in Birmingham in the late ’90s. “After a few weeks, I realized I was filling up a big trash can with food every hour,” Knisley said. “It really struck me how much food was thrown away.”

Perrin Anderson, Ruby Tuesday’s communications manager, declined to comment on plate waste. While health rules dictate that anything left on a plate must be thrown away and Knisley imagines the company would frown on the practice, he subsisted by eating untouched plates of food.

More than five years later, the memory of those bins full of half-eaten burgers and fries sticks with Knisley. While an undergrad at UNC, he started a free food listserv that prevents food waste by alerting subscribers to catered events on campus. “We’re really wasteful,” Knisley said. “Think about restaurants like that filling up trash barrels all over the world—or at least the first world.”

Plate waste doesn’t just come from not finishing what’s on your plate. It can include ordering too much. At the posh China Grill restaurant in Miami, server Chris Ellis said the largest amount of waste comes when diners’ eyes are bigger than their stomachs. It does not benefit waiters or restaurants to limit that overordering. Quite the opposite.

“Our portions are enormous, and we tell people they’re supposed to be shared. We try to contain the waste,” Ellis said. “But if they want to order another dish, that’s

more money and more tips.” With entrees ranging from \$29 to \$59, one more plate can bolster the gratuity quite handsomely.

What’s more, plate waste is only increasing as portion-sizes swell and people eat out more often. An entrée at some restaurants pushes the limits of daily recommended caloric intake. At 2,020 calories, Chili’s fajita steak quesadillas with guacamole exceeds the recommended *daily* caloric intake for most men and women. A three -course meal at Macaroni Grill is almost certain to push above 2,000 calories, with the chicken parmesan and New York cheesecake with caramel fudge sauce reaching impressive totals of 1,490 and 1,760 calories, respectively.

Today’s 2,000 calorie entrées can trace their existence to the late ’80s. Just before that time, the nouvelle cuisine trend was fashionable. “You had a 12-inch plate with food you had to look for,” said Rupert Spies, senior lecturer at Cornell School of Hotel Administration. That didn’t last.

As the economy turned sour in the early ’90s, restaurants realized that value had become diners’ priority. Competition among restaurants forced many operators to adopt similar portion sizes. More recently, in today’s cutthroat restaurant landscape, the only way to raise prices without losing customers has been to add more food to the plate. “There are certain costs you have to absorb to stay in business,” Spies said. “One of those is having larger portions in order to compete with other businesses. Consumers expect that these days.”

Changing Habits

Eating out used to be a big deal. Growing up in Sioux City, Iowa, Cornell's Wansink, 43, says he remembers eating out twice. Now, 130 million Americans—nearly half the population—are food service patrons in the average day, according to the National Restaurant Association. Every day, American restaurant customers spend \$1.4 billion, more than the Gross Domestic Product of Belize. Americans will spend 48 percent of their food expenditures at restaurants in 2006, according to National Restaurant Association projections. The figure will increase 5 percent from 2000 to 2006, reaching a total of \$511 billion.

The combination of more people eating out and doing so in a manner that wastes more food is bound to make food loss even more of an issue. People tend to waste more when they eat outside their own homes—be it at a friend's or a restaurant—because they don't serve themselves. With no control over the portions, people lose the chance to taste something before taking a significant amount and often end up with much more than they'd want to eat.

One would expect that having more food than desired would simply translate into more leftovers. But Wansink's studies have found that many people don't take home the remaining heaps of meals, creating more waste. More than half of all major leftovers are not taken home. In many cases, taste and preferences cause waste. Whole Foods' Rilko lets his taste buds do the deciding. "If I liked it and couldn't finish it, and I want to have more, I'll bring it home. If not, I'll leave it there," Rilko said.

Carrboro, N.C., resident Mike Hale’s family of six often eats out at local Mexican restaurant El Rodeo. The family never takes leftovers home, though, mainly for aesthetic reasons. “Mexican food isn’t good the next day,” Hale said. “It doesn’t look great on the plate.”

Families, especially rural ones, tend to bring their excess home, while single, city dwellers leave leftovers behind more often. Possibly, the vast portions at reasonable prices diminish the worth diners place on their food. “Huge portions are a good value in the consumer’s eye,” Spies said. “Some take it home and some don’t.”

Minimal Incentive to Cut Waste

Unlike farmers, restaurants don’t have an economic incentive to curb their garbage total. Cutting plate waste and other food loss would not limit their waste removal costs. Most restaurants are charged based on the number of pickups, not on the amount of waste. The waste disposer saves money if restaurants have less trash, because they have less to dump at landfills, where they are charged by the pound. Joe Regenstein, a professor in Cornell University’s Department of Food Science, thinks charging restaurants based on their output would benefit all parties—including restaurants.

Paying for their tonnage would make it financially easier for restaurants to do some good. “Currently, when you look at the economic incentives for restaurants, they are marginal to none at all,” Regenstein said. “Social benefit at a small cost might work. Having social benefits with some economic benefits is a wonderful synergism.”

Reducing waste does take some effort from restaurants. Whether it's preparing and properly storing leftovers for food recovery agencies or training employees to avoid waste, it is more difficult than tossing food in trash cans.

Composting food waste can cut down on trash removal, but only in some locations is it financially advantageous. In San Francisco, city contracted Sunset Scavenger offers a discount for using the green food waste bins, but the discount is only on the cost of having a food waste bin. Paying more to compost and benefit the environment may fly in the liberal Bay Area, but corporate America isn't going to cut food waste without a financial incentive.

Fast Food, Fast Waste

Compared to most restaurants, fast food generates a significant amount of waste. Jones found that fast food establishments waste 10 percent of their food. With their double-digit loss rate, the average fast food restaurant wastes 418 pounds per day.

The need to constantly have food ready leads to great waste. If a sandwich sits too long under the lights, it is tossed. Or, once the designated breakfast cut-off time arrived, restaurants tend to throw out the morning's meal. Raleigh's Inter-Faith Food Shuttle owes its existence to that very occurrence. In 1989, co-founder Bullard was in line at a fast food drive through when she witnessed a worker throwing out a load of sausage and biscuit sandwiches.

Bullard says that the same fast food franchise, which she declined to name, still tosses its breakfast leftovers and has not heeded her appeals for donated food. Few chain

restaurants do. While it would seem like the perfect public relations move, many burger and chicken joints are reluctant to give away their excess. Some cite fear of lawsuits for spoiled food; others say their stores are too busy to set aside extras.

Bullard's least favorite chain wouldn't let her take the discarded food to a soup kitchen because the manager didn't want anyone to see the company's logo-filled packaging there. They still don't. "This regional manager stated that she didn't think that people who paid for her sandwiches would appreciate the fact that people were eating them for free," said Bullard.

Waste On-demand

Some fast food franchises have turned to "on-demand" sandwich assembly, meaning they are making sandwiches to match the customer traffic at a given time. Still, many have not. There is still a significant amount of food being pre-made and eventually tossed.

"At the end of the night, you can't re-use French fries," said Christine Andrews, National Restaurant Association food safety director. "And from a quality standpoint, you don't want fries sitting too long."

While "on-demand" has helped reduce fast food waste, "just-in-time" delivery has not. In the early '90s, fast food stores cut their cold storage space to trim expenses. With less freezer room, restaurants have less room for error. Arizona's Jones said that the savings on electricity vanish due to losses from wasted food. "The V.P.s upstairs underestimated the amount of cold storage needed," Jones said. "The people who

designed it didn't realize that food was incredibly inflexible. You can't just leave it out for a few hours."

The move to "just-in-time" places greater emphasis on skilled management. Managers must predict customer demand near flawlessly. If not, entire cases of meat are tossed. Jones found that managers have found another solution. "What the managers are doing is overordering food intentionally to make sure they always have food," said Jones. "Managers aren't at fault—they're doing the best they can with a bad system."

As with grocery stores, experienced management is essential to minimizing waste. There is a decent amount of waste due to inexperienced or thinly stretched managers. Jones found that some local chains stretch managers between three to five restaurants.

On a Thursday in February at the Food Shuttle's modern Raleigh, N.C., warehouse, a pallet of corn dogs is a casualty of the cold storage squeeze. A local restaurant had overordered and realized it would never use them all. As a result, warehouse manager Laverne Williams was on the phone trying to find takers for 72 boxes of corn-battered hot dogs on a stick.

Convenient Waste

Restaurants offer convenience of uniform taste from opening to closing time. Convenience stores usually offer that same service around the clock. Consumers expect convenience stores, many of which do not close, to have fresh food at all hours. That expectation coupled with the convenience sector's move towards more prepared foods has led to a staggering amount of waste at convenience stores. Arizona's Jones found that

losses at convenience stores were 26 percent, by far the highest of any sector.

Convenience stores nationwide waste more than 5 million pounds of food every day.

Any business promising fresh food and drink at any hour is going to be throwing out a fair amount of product. “If you want to be known for your good coffee, you have to change the pots,” said Jeff Lenard, director of communications at the National Association of Convenience Stores.

Convenience stores are now getting boxed out of their prime business—combining gas with snacks. Convenience stores’ gas sales have slipped due to increased competition from stores like Wal-Mart and Costco. Convenience stores retail real estate is being taken—literally and figuratively. Drug stores and banks are snatching up corner lots. Plus, “Everyone’s selling convenience,” said Lenard. “The front area of any drug store looks like a convenience store.”

In the last five years, convenience stores have begun to focus on increased food offerings to compensate for slumping profits. In addition to rotating hot dogs, convenience stores now serve items like taquitos, fruit, fresh-made subs and breakfast sandwiches. The increased perishable offerings mean more food is wasted, especially when raw fish is involved. “We’re seeing more stores in the West Coast offer sushi. Sushi obviously is either good or not good,” said Lenard.

As with restaurants, convenience stores face stiff competition. That economic reality drives changes that lead to more waste. Convenience stores are transitioning from being gas stations with packaged snacks to being food and drink purveyors that sell gas. Food is prepared on-site at 80 percent of all convenience stores.

The combination of transitioning to food service and the long hours of convenience stores equals waste of more than a quarter of all food. Lenard likens that weighty number to that of a start-up restaurant planning for a full house while figuring out demand.

Still, waste is a decision. Convenience stores accept waste in exchange for growing sales. “Anybody would like to minimize food waste,” said Lenard. “But to sell more stuff—like more fresh fruit—you end up increasing waste. That’s the way it works.”

As with supermarkets and restaurants, knowledgeable management is essential in cutting food waste. If a manager cannot determine how long a prepared item lasts or is a poor judge of demand, their store will throw out an abundance of edible food. Jones found that items like pizza, fried chicken and nachos quickly ended up in the garbage.

Outlook

For the most part, consumers are insulated from food loss. It rarely happens in plain sight. Most produce bins are culled before supermarkets open and products reaching their sell-by dates are pulled the night before the date is reached. Leftovers are tossed after restaurants close. Restaurants’ cooking waste is chucked in the sequestered kitchen and whisked along with plate waste to dumpsters often locked behind fences. Convenience stores undergo the same process.

When food loss is visible, like the periodic culling in a produce section throughout the day, it often looks just like restocking. A select few grocery stores and

restaurants collect food waste and sell the compost materials to farms at a small profit. In San Francisco and Berkeley, Calif., green, rolling yard and food waste bins sit alongside the more familiar blue recyclable containers.

Most grocery stores, restaurants and convenience stores, however, are sending their edible waste to landfills along with other trash. There, in places like Salinas, Calif., that wasted food mingles with the misbagged lettuce and spinach three weeks from the sell-by date. It's all bulldozed and spread out to dry, each food item adding height to the mountain of garbage at the Crazy Horse Canyon Landfill.

Chapter Three

Household Food Waste: From Shopping Cart to Trash Can

It's 6:45 p.m., and it's ice cream time.

Thirteen-year-old Davis Hale rises from the dinner table and places his half-eaten bowl of chicken ravioli on the counter near the sink. He opens the freezer of the gleaming, aluminum refrigerator and pulls out a gallon of Breyer's mint chocolate chip. He fills a white bowl with three scoops and puts it in the microwave for almost a minute—a habit he picked up from his grandfather.

Ten minutes later, the ice cream soup has vanished and Davis' bowl of ravioli is in the garbage disposal.

This occurrence happens nightly. "I'm not real big on forcing them to eat it all," said Amanda Hale, Davis' mother. "But they can't have a bowl of ice cream if they haven't eaten a little of dinner."

The Hales have four children, ranging from age 2 to 16. They eat together most nights, but it's not often that Tae Kwan Doe and piano lessons allow them all to be there. An overturned recycling bin sits at the edge of the driveway next to a family-sized GMC Yukon XL sport utility vehicle.

Amanda spoons the leftover ravioli from the pot to a clear plastic container. Her husband Mike, who works as a curriculum consultant at an education software company,

takes leftovers to work about once a week for lunch. “I’m not big on leftovers,” said Amanda. “I try to get him to take them to work.”

Mike eats out most days at work, but will take food if he’s planning to use his lunch hour to exercise. “We probably waste about what most people do,” said Mike Hale.

Household Food Waste

The Hale family is not excessively wasteful with their food. They make banana bread with their overripe bananas, they save most leftovers, and Amanda even ate 2-year-old Luke’s untouched strawberries. Yet if the Hales are moderate wasters, it’s not difficult to see how the average household of four throws out 1.28 pounds of food each day and 467.2 pounds every year.

Of all food that comes into homes, 15 percent ends up in the trash. That number comes from the Garbage Project, an in-depth trash analysis operated at the University of Arizona and Stanford University by William Rathje. The household food waste rate increases to 25 percent after factoring in food waste put down the garbage disposal, said Rathje, whose project has sorted and catalogued more than 30 million tons of trash since its inception in 1973.

Home food waste comes at a price. America’s household food loss costs \$43 billion annually, with the average family of four tossing nearly \$600 in food, University of Arizona researcher Timothy Jones found. Most of the food thrown away is edible, and all of it is wasted.

It is not easy to assess household food waste. First, it occurs in the private realm of the home. Second, surveys do not accurately capture food wasted. Jones and Rathje have both found that most Americans are not aware of their waste or are embarrassed by their waste and downplay it. Either way, they underreport how much edible food they toss.

For those reasons, researchers have taken a raccoon-like approach to studying the issue. Combing through a household's trash provides an unflinching account of a family's food habits. Rathje, affiliated with the archaeology department at Stanford, combines detailed trash sorting by student "garbologists" with follow-up interviews. He has examined trash mostly in Tucson, Ariz., but also at 15 sites across North America. University of Arizona's Jones uses archaeology in looking at trash and anthropology in spending time with research subjects to understand their thought process, using both contemporary archaeology and ethnography to study household food loss.

These researchers have found that household food waste is increasing. The household loss rate was 10.8 percent in 1974, according to a 1977 Report to Congress by the U.S. Comptroller General. In his 1992 book, *Rubbish!*, Rathje said that American families waste between 10 to 15 percent of the food they buy. By 2005, Rathje said that the average family's waste had reached 25 percent.

In a wider historical view, however, American household food waste was higher at times before World War II, when refrigeration, sanitation, transportation and packaging were lacking. With today's technology, avoiding food waste is much easier. Modern home food loss is usually a result of poor planning, fast lifestyles or negligence.

What Is Wasted

The 25 percent food loss figure does not include produce tops, peels, rinds, bones or fat. What do “garbologists” find in household bags, then?

The most obvious answer is produce. Jones found that Americans waste 24 percent of fruit and 26 percent of vegetables at home. Roughly one of every four bananas brought into the household is thrown out. The Garbage Project’s Rathje concluded that produce totals 35 to 40 percent of edible food discards by weight. While that is partly due to produce being fairly heavy, it’s also wasted at a hefty rate.

Americans throw away bread, cereal and pasta at a steady clip. Of all grains brought into the home, 16 percent are wasted, according to Jones’ calculations. The average household wastes 93 pounds of grain per year, mostly in the form of bread products.

The average household wastes 13 percent of meat, discarding 51 pounds per year. Only about 4 to 5 percent of prepared food is wasted, but as this chapter will discuss later, eating prepared foods often means other items aren’t eaten, creating a ripple-effect waste.

Shopping-Induced Waste

Household food waste starts in the supermarket or wherever people buy groceries. Supermarket sale purchases can bring rapidly rotting food into the home. For example,

the produce department often uses buy-one-get-one-free sales and the meat department will slap orange sale stickers on cuts nearing their use-by dates. When shoppers don't use these purchases promptly, it can push food waste from stores to homes.

Yet, shoppers bring the large majority of household waste upon themselves. Shoppers' choices, often misguided, create waste in the waiting. Just like restaurant managers must forecast customer demand, the household shopper must predict appetites, plan meals and consider how long food will stay good. As the above research illustrates, many do a poor job.

Specialty purchases lead to a great amount of home food loss. In a 1986 article, Rathje wrote that the "First Principle of Edible Food Loss" is that "The more repetitious a family's diet, the less food that family discards."

Rathje's principle still stands today. Any food item not normally purchased is wasted at a higher rate. For example, Americans waste about 10 percent of an average loaf of bread, Rathje found. But when they buy specialty breads like a baguette or hot dog buns, 40 to 50 percent end up in garbage cans. In her Carrboro, N.C., home, Amanda Hale took a cinnamon and sugar dessert pizza out of her cupboard. She bought the item at Super Target because it caught her eye, but she admitted it might not be eaten.

Special occasions and any break from the normal routine causes waste. Buying ingredients for an unusual recipe means a home will have plenty of unfamiliar items in the house unlikely to be used. "Anything a person doesn't regularly purchase leads to waste," said Brian Wansink, director of the Cornell University Food and Brand Lab. "You buy peppermint frosting for Christmas brownies. Or a can of okra bought to impress a guest with that fried okra recipe. But then they don't come over for some

reason.” These new items often are then forgotten and buried at the back of the refrigerator or cabinet.

Impulse buys also lead to waste. For Alicia Ross, a syndicated food columnist who co-authored a book on maximizing budgets and food, poor shopping habits cause much of the \$600 in annual home food waste. She advises making a list and sticking to it. “That’s food marketers’ goal—to tempt you from your list. But that’s where there’s that huge waste,” Ross said.

Amanda Hale said that she usually sticks to a rough list during her bi-weekly shopping runs. But she admits to getting tempted more at Super Target, which often has innovative displays. She pointed to the dessert pizza mentioned earlier as an impulse purchase. She also noted that her husband Mike, an infrequent shopper, is more prone to be swayed by in-store specials. Mike’s children all remembered his recent, unpopular purchase of Seafood Flakes, which, thankfully, is not cereal.

As discussed in chapter two, supermarkets are designed to tempt shoppers into purchases. Staying to one’s list isn’t easy, as the store layout and product displays encourage whim buying. Whole Foods’ South Region Produce Buyer Alex Rilko discussed how the produce section, with its sights, smells and anticipated tastes always is the first section, despite the fact that some produce begins to break down while in shoppers’ carts.

Ross, who lives in Raleigh, N.C, also says that going to the store without eating beforehand creates household waste. “Don’t go hungry—you’ll buy everything because it all looks good,” Ross said. “You’re like Pavlov’s dog wandering through the aisles. Often people buy more food than they could possibly consume before it goes bad.”

Buying in bulk at stores like Costco and Sam's Club can lead to household waste. The large-sizes and multiple containers of particular items often mean a family can't consume the entire purchase before it becomes out of date.

At Trader Joe's, bulk buying happens at a much smaller scale, but with more perishable items. Virtually all of the produce there is packaged, with few single-item options. As a result, shoppers are often forced to buy more than they want. "The green beans package is, like, a pound," Spivack said. "But you're there, and you don't want to go to Albertson's. Half of them wither before you get around to eating them."

Perception Far from Reality

Another supermarket-borne cause of home food waste is the discrepancy between shoppers' intended and true food usage. "People don't match purchasing with actual consumption," said Jones. "They're buying things they don't eat because they see themselves as healthy and environmentally friendly. By the time the weekend comes around you go to make that salad and it's turned to mush."

Hope Smith, an ad salesperson for Los Angeles' KROQ-FM, agreed. "Often I think 'I should buy more fruits and vegetables,' so I buy apples when we have some already," Smith said. "I throw out an apple a week, on average. "

Sometimes shoppers buy fresh food but end up ordering a pizza or picking up take out on the way home from work at 7 p.m. or later. Rathje, citing his Garbage Project findings and interviews, found that other shoppers exhibit a shopping duality. "Knowing

what's healthy, they buy fresh foods, but also knowing their lifestyle, they buy prepared food," Rathje said.

Either way, the fresh food often goes to waste.

Spivack said that she often thinks about health and nutrition at the grocery store. It affects her purchases. "I buy what I think I should eat and often don't end up eating it," Spivack said. "There was a period where I threw out a head of broccoli every week. I finally said 'I'm not going to buy broccoli every time I go shopping.'"

This behavior isn't specific to food purchasing, either. "It's our own best intentions getting the best of us. It's the same reason we buy exercise equipment and end up using it as a clothesline," Cornell's Wansink said.

Busy Lives Lead to Waste

Los Angeles residents Smith and her husband both work, and they have a 10-month-old boy named Ben. Smith said that every week the couple goes out twice, eats prepared foods at home twice and cooks three meals themselves. The prevalence of similar two-working parent families means more restaurant meals and prepared food.

Just down the Santa Monica Freeway from the Smiths, Venice, Calif., resident Spivack is even busier. A single, 29-year-old, Spivack works long hours. The first casualty, often, is home cooking. "This week I worked 11- and 12-hour days," Spivack said in February. "I got groceries, but when I got home I was like, 'Yeah, whatever, I'm not cooking,' and I ordered a pizza. The groceries are still sitting in my fridge."

Rathje has a name for this kind of waste, calling it the “Fast Lane Syndrome.” The too-busy-to-cook lifestyle is currently the most common cause of food waste, said Rathje. The Garbage Project has seen increasing evidence of prepared food, whether it’s take out or heat-and-eat meals. These come in the form of fast food wrappers, take-out containers and microwave packaging. In addition to the waste that the increased demand for prepared food creates at retail stores, eating pre-made food creates waste because of what isn’t eaten.

Anne Bumgardner, a volunteer at the Raleigh, N.C., food recovery organization Inter-Faith Food Shuttle, sees that fast lane experience in her extended family. “My daughters-in-law all work, that’s why people eat out more,” said Bumgardner, 75. “My grandchildren, if it doesn’t come from McDonald’s, they don’t want it.”

The Garbage Project researchers have found that when they see evidence of prepared food, they are more likely to find fresh food waste in the same trash bag. “Everyone in the house is working. They buy prepared food, but they still buy food they think they’re going to cook,” Rathje said. “They keep saying tomorrow, tomorrow. Next thing you know the fresh fruit and veggies are gooey and blue.”

For those who buy ready-to-eat foods, there has been a “huge increase” in food loss “due to the fresh food going to waste,” Rathje said.

Of the Hales’ in-home meals, half are home-cooked and half are prepared foods. One night it will be chicken on the grill, the next a rotisserie chicken from the market. While Amanda Hale is busy juggling the schedules of her four children, she does try to only cook enough food for those who will be there.

The same pattern holds true for single people. Spivack eats out for lunch most days, but cooks every other night. The other dinners, she either eats at a restaurant or takes in prepared food. “I can go out and get an ahi burger with greens for \$10 at a nice restaurant patio and come home and not to do any dishes,” Spivack said.

For Spivack, living alone contributes to less cooking and more waste. “When I was living with someone else, I cooked more,” Spivack said. “Now I don’t want to cook for just myself I tend to buy groceries, but I don’t want to cook because I’m lazy, and it’s a pain in the butt.”

Discrepancy between Words and Deeds

It is difficult to grasp the rationale behind household waste. In interviews and surveys, Jones found that people either aren’t aware of their waste or that they lie. More frequently, it’s the latter, Jones said.

In an attempt to better understand the copious waste he was finding, Jones went into homes to get a better sense of what was happening. “You go in, eat with them, cook with them, do dishes, watch what they actually do,” Jones said. “One woman dumped a whole plate of spaghetti and meatballs into the garbage while telling me they don’t waste food. There’s a disconnect between perception and reality.”

The Garbage Project, which began at the University of Arizona but moved with Rathje to Stanford University, found similar occurrences. According to the Stanford Web site devoted to the project, “The primary finding of the study is simple: What people say

they buy, use, save and discard is different from the material remains that represent what they bought, used, saved and discarded.”

“There’s a huge disconnect,” Rathje said. “People don’t pay attention to their food waste because it goes straight into the garbage or disposal. It’s not like newspapers that stack up in the garage.”

Cookbook author Ross concurs. In corporate speaking engagements and book events, she discusses food waste nationwide. “I think people live in a state of denial about how much food is wasted. No one wants to admit that they waste food. Poor planning leads them to waste but their denial causes them to not admit. As soon as people are aware of how much they’re wasting, they often make a change.”

Affluence Affects Waste

Those shifting values affect Americans while they’re shopping and at home. “We’re rich enough where we can turn down produce based on the way it looks. It wasn’t always that way,” said Ken Horne, executive director of the Society of St. Andrew food recovery organization.

The Garbage Project’s Rathje calls it the “We Rich” theory. ““Hey, I don’t need to worry about this. Food waste was something my parents worried about during the war,” Rathje said. “I’m not gonna worry about it because we’re a rich country, we got everything and we’re on top of the world.”

One explanation for America’s abundant waste is that food is perceived as cheap and plentiful, said the University of Arizona’s Jones. Statistically, that perception is right.

The amount of that Americans spend on food has decreased slightly in the last twenty years. In 2004, the typical American household spent 13.3 percent of it on food, according to a Bureau of Labor Statistics consumer expenditure survey. It was 15.0 percent in 1984 and 13.8 percent in 1994.

It's not that the price of food is decreasing. In fact, the opposite is true. The American Farm Bureau market basket survey, which monitors U.S. retail prices of basic food products, found that food prices during the first quarter of 2004 had increased by 10.5 percent compared to the same period in 2003. But Americans are making and spending more. The consumer expenditure survey found that reported income increased 22 percent from 2000 to 2004.

Compared to other nations, Americans spend little on food. Tom Whitmore, a University of North Carolina professor who studies agricultural geography and teaches a course called "Agriculture, Food and Society," said Americans are fortunate. "Food is relatively cheap here. It's much cheaper as a percent of what we make," Whitmore said. "Incomes are so much lower in Third World countries, they may be spending a third or more of their incomes on food."

Even within the developed world, American food is quite economical. "In Europe, they pay more for their food as well because food is more expensive," Whitmore said. "They value high quality stuff and keep out cheap imports."

Quality and taste come before price in the Carrboro, N.C., Hale household. Amanda Hale said she shops at up to four different grocery stores to get the organic milk, free range eggs, hormone-free meat and other products the family members like. "Quality

is more important than price. I shop at Whole Foods a lot, and I try to have the kids eat the best foods,” she said.

National Public Radio’s Spivack does not let financial concerns affect what she eats. Spivack, who recently received a raise in her salary, does not feel as limited by money as she once did. “I eat out all the time because I can,” Spivack said.

But her increased earnings affect her approach to excess food, like the fresh food sitting in her refrigerator. “I have more money now, so I don’t mind throwing out that 90-cent head of lettuce,” Spivack said.

Culver City, Calif., resident Smith says that a food item’s cost indirectly affects whether she throws it out. She only buys the amount of meat or chicken she knows will be eaten to avoid any excess. But Smith’s side dishes like cornbread and salad are often thrown away. Cornbread is quite inexpensive, and “salad with dressing isn’t good the next day,” said Smith. “I’d feel guilty if our waste meant others didn’t eat, but I’m not gonna feel guilty about wasting my own money.”

Loss of Food Know-how

A few generations past the Great Depression and World War II, Americans are removed from the days when they had to scrimp. Similarly, as fewer Americans cook, those invaluable tips on how to run an efficient kitchen are not being passed down. “The biggest problem is no one has a concept of when food goes bad and how to store it,” Jones said.

Smith's salad waste is a perfect example. Not putting salad dressing on the entire bowl of salad and having individuals apply it themselves would allow the dry lettuce to keep for at least another day. It's less convenient, but more practical.

Food writer Ross, 42, laments her family's lack of continuity with kitchen knowledge. "My mother's generation was the first where a lot of them worked. There wasn't as much being passed to me as a child as there had been," Ross said. "There was a lot of stuff my mom learned from my grandma that she didn't teach me."

The lack of food know-how really comes into play with produce. Rilko, who has worked in the grocery business for 23 years, has seen that ignorance firsthand. "With a little rotten spot on something, people tend to freak out and throw it out, instead of cutting out that spot," Rilko said. "I see that all over the place—in the stores and in people's homes."

"I think people still don't know how to pick produce and when to eat it," Rilko said. "People think that when produce like melons and peaches starts to look bad or wrinkly it's time to throw it out, but that's when it's at its sweetest."

Lack of knowledge also affects behavior leftovers from meals—both at restaurants and at home. As mentioned before, more than half of all restaurant leftovers do not get taken home. Of those that are, 25 percent is not eaten, according to Cornell researcher Wansink's calculations. If you omit pizza, which Wansink said is the one leftover that's almost always eaten, 55 to 60 percent of all leftovers are tossed. That waste often happens as a result of uncertainty over whether the leftovers remain good.

A lack of food storage know-how is a common cause for premature spoilage. As the Web site for "Fight Bac!," the Food and Drug Administration's counter bacteria

campaign, explains, a few frequent mistakes account for refrigerator food waste. Rather than piling a large amount of leftovers into one container, they should be split up to allow quicker cooling. Leftovers should be refrigerated within two hours of use.

Refrigerator temperature should be at least 40 degrees, the threshold for bacteria growth, if not colder. Finally, eggs and milk shouldn't be kept on refrigerator doors, where the temperature varies the most. Given that point, it's odd that many refrigerator doors accommodate milk containers and many have uncovered egg storage units.

Much leftover waste occurs when misinformation combines with good old forgetfulness, as Los Angeles' Smith explained. "The other day, I went to lunch and brought leftovers home," Smith said. "I often forget about my leftovers. Then I haven't eaten it in that three-day window so I have to throw it out."

Excessive Caution Causes Waste

The U.S. Department of Agriculture, in the Refrigeration and Food Safety section of its Web site, advises that "A good rule of thumb for refrigerator storage for cooked leftovers is 4 days." But Angela Fraser, a Food Safety Education Specialist in the Department of Family and Consumer Sciences at N.C. State University, said that seven days is a better guideline, if food is properly stored. "Some items, the quality will deteriorate, but from a food safety perspective, that food is good for seven days," said Fraser, who has taught food safety seminars nationwide for nearly 20 years.

The Department acknowledges that their storage times for refrigerated foods are quite generous. “They’re very conservative guidelines, you bet,” said Jerry Reading, a 35-year Department of Agriculture food safety press officer. “You can’t be too careful.”

For example, the Department advises throwing away an open jar of mayonnaise after two months and raw sausages after one to two days. Reading said the guidelines take into account the many variables to be on the safe side and that guidelines have gotten more cautious during the last 15 years. The threat of E. coli bacteria and the dwindling food knowledge are the primary culprits.

Manufacturers also exhibit excessive vigilance in advising how long a food lasts. Wary of lawsuits, “best by” labels tend to run from cautious to extremely cautious. As an example, Classico Triple Mushroom Tomato Sauce advises consumers to “Refrigerate after opening. Best if used within 5 days.” A month after opening, the contents look fine.

Many people mistake the labels’ usage estimates for food safety decrees, but that’s not the case. “Package dates are indications of quality, not safety,” Fraser said. “You can use food for a week past the sell by times, if you store it properly. There’s a difference between safety and spoilage.”

Prepared food sell-by dates also cause waste. Bumgardner, who has been a volunteer at Raleigh’s Inter-Faith Food Shuttle for 16 years, said that most prepared foods are fine at least five days past the sell-by date. But the loss of knowledge about food means more consumers heed the cautious manufacturers’ advice and toss food items soon after opening them.

Partly because of Americans’ food inexperience, Ross and her cookbook co-author Beverly Mills erred on the side of caution in giving estimates on how long their

recipes will last as leftovers. For example, while Ross knows pizza will last three to seven days in the refrigerator, she wrote that it had a three-day shelf life and found that readers took her quite literally. “People don’t need to freak out and throw things away on the fourth day,” Ross said. “It’s just not gonna have the same taste or texture.”

Older readers often corner Ross at readings, taking issue with her leftover assessments. “Usually the older people ask why we give such cautious estimates. They know from real life experiences that food will last longer than we say,” Ross said.

Generational Value Gap

Partly due to their leftovers savvy, older generations of Americans waste less food. After comparing the trash contents of a Green Valley, Ariz., retirement community to the general population, Rathje concluded that people age 60 and younger are more wasteful.

Those generational differences account for the increased food loss. Rathje places the blame squarely on the last world war. “People born and raised before World War II are much more concerned with waste,” Rathje said. “The war made a real impact on people’s lives—they were told to save this, save that.”

N.C. State’s Fraser sees that trend in the seminars she teaches and her own life. “I’m in my early 40s and food has always been plentiful in my life. I think nothing of throwing out food if it doesn’t look right,” said Fraser. “But people of my parents’ generation are less likely to throw out food because they remember times when it wasn’t plentiful.”

Today, there's much less of a "clean your plate" mentality. This trend is partly a reaction against the experience of being made to finish everything taken. Los Angeles resident Smith's mother wasn't made to eat all her vegetables at dinner; instead, she could choose to eat them the following morning.

One generation later, that had changed. The most prevalent cleaning of the plate is done in the sink, dumping excess food into the garbage disposal. "Cleaning your plate was never a thing for us," said Smith, 29. "I think it's an unhealthy eating habit."

Amanda Hale, 40, does not make her four kids eat all that they take. While she had to at least try everything on her plate during her childhood in Birmingham, Ala., Hale didn't have to finish it all. "I don't have any baggage with cleaning my plate," she said.

Inter-Faith Food Shuttle Chief Executive Jill Bullard, 58, knows all about the generational differences. "I think people my age are very aware of food waste because we were brought up by Depression-era parents. Wasting food was not allowed," Bullard said. "My kids don't even know what leftovers mean. For my parents, you had leftover night."

Bullard says that despite her occupation recovering excess food, she doesn't force the issue of food waste on her children. "It's a changed world," Bullard said "I raised conscientious, good kids. But I didn't make them feel guilty about not eating food. My parents did."

Because Raleigh, N.C., resident Ross is nearly 20 years younger than Bullard, Ross' grandmother filled the role of thrifty relative. "My grandma knew how to pinch pennies because she had to...because she grew up in the Depression in a very poor Southern family. She also was a mother during World War II," Ross said. "She said 'I'm

not gonna throw anything away that could still be used.’ She cut up the heel of the bread and made bread crumbs.”

Those attitudes applied to restaurants as well. Eating out was much less common in past generations—Cornell’s Wansink remembers two restaurant meals from his Sioux City, Iowa, childhood. And the waste generated while eating out was smaller. “I would guess [restaurant] waste is higher than it used to be,” Wansink said. “People used to bring leftovers home no matter what.”

Even with four kids, the Hales eat out once a week. When they do, the excess food doesn’t make it home with them. “We rarely have leftovers. When we do, we never take them home,” said Mike Hale, 41. “We’re certainly less frugal than our parents.”

Rathje, 60, officially missed the baby boomer generation by a year, but considers himself a de facto boomer. “I remember from my upbringing, I never had to eat anything I didn’t want. That was part of the boomer experience,” Rathje said.

Still, some of his parents’ values wore off on Rathje. He has devoted his life to examining America’s waste and he isn’t comfortable with the idea of plate waste. “With things at buffets, if you put it on your plate, you better damn well eat it,” Rathje said. “That’s my opinion, but not America’s.”

Even more than the Boomers and Generation X, Rathje worries about the next generation. “I’m an old man, and when you get old you tend to look back and say that things aren’t what they used to be. I hope I’m not doing that, but when I go to schools to talk about reducing waste and recycling, the kids understand the message, but it just doesn’t stick,” Rathje said.

Social Messages Through Food

Just as it may be required by parents, “cleaning your plate” can be a compliment to the chef. But food’s social meaning can also cause waste. “In some situations, eating all the food offered may be understood as a sign that the amount was insufficient,” wrote Amy Shuman in “The Rhetoric of Portions,” an article in the book *Foodways & Eating Habits*.

Rathje uncovered another social-psychology trend that causes waste. In what he labeled the Good Provider Syndrome, Rathje found that mothers believed they gave their family more food than they actually did. Through interviews, Rathje uncovered a motherly desire to serve plentiful plates of fare. Despite their overestimations, the mothers actually served much more food than was needed. “They’re saying, ‘I give my family enough to eat.’ You give people more than they need because they’re trained to provide more than enough,” Rathje said.

The Thanksgiving table communicates abundance in a way that can’t be called subtle. While that holiday often leads to much waste, it is an exception. Yet that tableau and its resulting food-packed plates are replicated frequently in some homes. While they may lack the variety of the Thanksgiving offerings, many families’ dinners contain the same plentitude. Many families’ meals allow everyone to eat as much as they’d like. The resulting large portions usually lead to waste, unless the family is very conscientious about eating its leftovers.

Portion size is not much of a concern for the Hales. Mike and Amanda Hale often allow their kids to serve themselves and taking too much is not frowned upon because

they worry that their active, growing children don't eat enough calories. To the Hales, the excess that gets put down the garbage disposal is less concerning than their children not eating enough.

Outlook

Will Americans ever stop wasting food? That question is a difficult one.

There is no easy answer to household food loss. It is a problem that lacks a symbiotic solution like gleaning or food rescue for farm and retail waste, respectively. An Arizona inventor has created soggy-free sandwiches that separate filling from bread in a plastic pouch. And backyard gleaning of unharvested fruit trees occurs in California and Arizona.

Mostly, though, home food waste improvement will only come through increased awareness. With farm and retail food loss there seems to be widespread awareness, and sadly, ambivalence. Household food waste, however, has the latter without the former. Increasing Americans' consciousness and illustrating the financial benefits of limiting waste could motivate Americans to cut their household food waste.

As epitomized by Davis Hale's innocent bowl of ice cream, Americans have come to see food as fun, something to enjoy. It is not sustenance, but an event. Citizens are removed from the food chain and don't realize the intense investment of energy and resources that go into growing the food supply. Furthermore, we don't see the waste—it just slips away in the magical garbage disposal. Food and food waste are not seen as

expensive. From that perspective, the more relevant question seems to be: why would Americans strive to cut waste?

If food prices keep rising, Americans may take notice and begin to value food more. Just like oil price increases caused some citizens to be more efficient with their driving, Americans may become more prudent food users. History tells us, however, that it will take a great economic depression or a world war to make a serious impact. Until then, it's ice cream time.

Chapter 4

Wrapping It Up and Bringing It Home (to avoid waste)

Food waste is everywhere. When you start looking for it, it's hard to miss. It's in rows of crops, spinning on rotisseries and at the back of your fridge.

This series of articles detailed the instances and causes of food waste in farm, retail and household settings. That loss costs the U.S. more than \$100 billion each year in squandered food. Yet that loss does not include waste at institutional settings like prisons, schools and universities. There are even more sources, like caterers, that often prepare food in bulk and often prepare excess to be on the safe side.

Despite its prevalence, the problem of food waste doesn't get much attention. The government, namely the U.S. Department of Agriculture, isn't studying food waste, nor do they have any staff members devoted to the topic.

As stated in the introduction, the mainstream media hasn't shown much interest in the topic. And farmers, retailers and individuals show no sign of stopping their waste, despite the mounting costs of that profligacy.

The problem is only worsening, as the percentage of food wasted is increasing. Either we don't notice or we don't care. Maybe it's a little of both. Americans seem immune to the total amount of trash they create. "People say 'out of sight, out of mind.' And that's bullshit," said William Rathje, director of the Garbage Project. "You have

garbage cans in every room—your kitchen, bathroom—in public. You don't notice waste because it's always there. It's 'In sight, out of mind.'"

In addition, Americans aren't likely to notice food waste more than any other kind of trash they create, and they are less likely to notice their excess if they stuff it in the garbage disposal. In fact, most Americans think they're thrifty with their food. "People are absolutely not aware of how much they waste," said Rathje. "Without a doubt, when people say that they don't waste food, they believe it,"

Rathje's studies have illustrated a lack of awareness for food loss. In a 1982 study done for the U.S. Department of Agriculture, the Garbage Project split participants into three groups. Each group tallied their food waste in a different way —either by writing it down, weighing it or both. The researchers then collected all household trash to compare to the participants' recollections. "None of the groups recorded any waste to speak of—virtually none," Rathje said. "But we found 2.5 ounces per person per day of edible food waste."

There's evidence to suggest that some people are aware of waste and aren't bothered by it. Farmers accept that a certain amount of their crop will go to waste. They often grow more than they'd ever be able to sell just to be on the safe side. Grocery and convenience stores have also reconciled that food waste in perishables is part of the cost of doing business. They also know that a large amount of their prepared food items won't be consumed, but forge ahead in offering more and more ready-to-eat offerings.

Consumers may be more prone to waste because they see food as a commodity. Crops are not usually seen as formerly living organisms that took great resources to cultivate.

In part, food waste isn't a public concern because the media hasn't picked up on it. And the media hasn't paid attention to food loss because the public isn't interested. It's not a sexy issue. It won't sell newspapers or make radio listeners sit up in their chair. At least, that's the message the scant media attention communicates. What coverage there is tends to be local in scope.

As mentioned above, the government has not addressed food loss. The Bush administration has shown no inclination to tackle food waste. Five years after President Bush's inauguration, the administration has yet to fill the Coordinator of Food Recovery and Gleaning position that Joel Berg vacated on President Clinton's last day of office. Berg said his attempts to drum up interest as he left office were ignored. "I really made a serious attempt to get them to hear me out," Berg said. "There's a certain belief among most administrations that says, 'Whatever the other side did sucks.'"

Timothy Jones said he was invited into the White House by some administration officials, but the overwhelming anti-science, pro-business policy stifled any action he proposed. "The White House is ignoring food loss as hard as they can despite the fact that people in their own party—like John McCain—are trying to get them to listen," Jones said. "Their answer is: Market forces will take care of that."

But the ball-dropping has been somewhat bipartisan. The Department of Agriculture hasn't issued a report on food waste since 1997. The silence is deafening.

That inaction is surprising, considering a 1977 report to Congress from the Comptroller General that called food loss a waste of U.S. resources. And the problem has only grown worse. That report called on the Department of Agriculture to undertake a

comprehensive study on food waste. That never happened. In fact, there hasn't been a report to Congress since.

Food waste was and is a sink hole in the U.S. economy and a bad use of resources. The question now is: what will it take to get the American citizens, media and government to pay attention?

Agricultural imports to the U.S. increased in each of the last four fiscal years, causing the balance of trade to shrink each year. That trend is only likely to continue, as the Central American Free Trade Agreement takes effect. As more imports arrive, more domestic crops will be plowed under or hauled to landfills, priced out of the market and into waste.

Is this problem of food waste the end of the world? Maybe not the entire world, but Jones thinks it points to the decline of American civilization. "I really think America is a civilization in decline," Jones said. "Money's flying into the hands of fewer and fewer, which always happens at the end of a civilization."

That may be overstating it slightly, but food loss, in tandem with other waste, does highlight a culture of carelessness.

What farmer would neglect to reap the benefits of his or her hard work? Why would a company write off millions of dollars in waste? What family would simply throw away \$600 of food?

This waste presents a real opportunity. Farmers, retailers and families could easily cut their food loss. America has a chance to make a dent in waste through gleaning, food recovery and better household awareness. But it won't happen magically—it will take money and effort.

A lack of funding hinders the rate of food recovery. The Society of St. Andrew Executive Director Ken Horne estimates that all U.S. food recovery organizations rescue a quarter billion pounds of food every year, but they could do much more. “We’re barely scratching the surface. If money was no object, you could easily salvage enough produce to feed everyone in this country who is hungry,” Horne said. “There’s no end in sight.”

With gas bills, truck maintenance and overhead costs, the amount of retail food rescued is a function of how much money an organization can raise. Jill Bullard, the head of the Raleigh, N.C., Inter-Faith Food Shuttle, estimates that her non-profit salvages less than 10 percent of all potential food available from supermarkets and restaurants. “We could do a lot more,” Bullard said. “But there’s a cost for it. You can’t do it for free. I see that as ‘what an opportunity.’”

The rising price of gas has made waste more expensive, considering the amount of fuel used in planting, fertilization and harvesting crops. It has also made food collection pricier for food rescue organizations. According to the Department of Energy, the average retail gas price in 2005 was 70 percent higher than the average cost per gallon in 2002. “We are always desperate for money,” Bullard said. “2005 almost killed us with the gas prices. We almost went out of business.”

The Department of Agriculture could implement an awareness program to better educate Americans to their food waste. Then again, environmental changes or market forces could push America to waste less. If global warming continues and water becomes more of a resource, the waste of crops may become more noticeable. Likewise, an economic recession or worse could force Americans to be more resourceful with their food.

In the meantime, farmers will continue to leave entire fields unharvested, stores will discard perfectly edible produce and rotisserie chickens and households will toss as much as one quarter of all the food that enters their home.

What a waste.

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