# TABLE OF CONTENTS

**Almeida, John R.**  Analysis of Transportation Efficiency in Hartford County: An Estimate of the Maximum Number of Vehicles Allowable at Constraint Interchange, With a Proposal of How to Decrease This Number  

3

**Button, Charles E.**  Transition to Sustainable Agriculture and Settlement Practices in the Chesapeake Bay Region During the Woodland Period  

28

**Cabiya, Melissa and DeLauretis, Christopher.**  Why Choose Organic?  

39

**Godway, Eleanor.**  The Meaning of the River Cube “Human civilization haunts the waterways”  

49

**Johns-Galvin, Katherine.**  A Green Oasis in a Food Desert: Increasing the Accessibility of Affordable Healthy Foods in an Urban Neighborhood in Hartford, CT  

56
Analysis of Transportation Efficiency in Hartford County: An Estimate of the Maximum Number of Vehicles Allowable at Constraint Interchange, With a Proposal of How to Decrease This Number

John R. Almeida, Graduate Student
Department of Technology Management/Data Mining
Central Connecticut State University Sustainability Forum
Email: jryan.almeida@gmail.com

Abstract

Hartford County CT, with approximately 490,000 commuters, is 12th on the list of "Top 101 cities that people commute into." Even though many commuting times are tolerable, the burden of a commute is projected to worsen as the population increases and as gasoline becomes more expensive. The current system is inefficient and unsustainable, therefore alternatives must be considered.

Although drivers have always seen financial incentives to ride-share, the real or perceived inconvenience of sharing a vehicle with another commuter has discouraged this behavior. It is possible that increases in gas prices, social media awareness, and the advent of usage-based auto insurance provides an overwhelming incentive for many drivers to save money by sharing rides with co-workers. State policies that favor transportation efficiency could provide a catalyst to remove/eliminate congestion throughout central Connecticut.

There is some percentage of vehicular traffic that, when removed from the road during rush hour, would eliminate traffic congestion, possibly as low as 20%. Any policy that reaches this goal at substantially less than $2 billion should be a preferred course of action. Given Connecticut will need to fund a construction project worth billions if demand for the interchange at I-84 and I-91 continues to increase, Connecticut needs to seriously consider the possibility of demand reduction rather than seeking another major construction project. The decrease of vehicular emissions, commute time, public/private expenditure on transportation would have a significant impact on the quality of life in central Connecticut.
Inefficiency of Current Transportation System

In the USA, our cultures and our lives revolve around our ability to transport ourselves via car. There are numerous, broad factors that indicate the inefficiency and unfeasibility of the automobile-centric American transportation network:

1) The US’ ability to improve transportation first represents the ability for each household to increase its discretionary income. Americans pay a substantial amount of household income to transportation expenses: vehicle purchase, gas, maintenance, insurance, and parking (Burchell et al, 1998).

2) Americans experience a longer time to commute to work than nearly any other country (Economist, 2011).

3) In addition to the large amount of spent transportation time is wasted transportation time- Americans experience per capita more wasted time in transportation than residents of any other country (Economist, 2011). As a result of poor transportation efficiency, Americans spend approximately 80 billion hours traveling, 4 Billion of which are spent waiting in traffic (AASHTO, 2010). While European citizens can check e-mail or read a magazine while waiting for a train, drivers in America should realize their commute must be limited to driving.

4) Individual procedures and funding notwithstanding, the American traffic system of rush “hour” (in fact 5-10 hours of the day in large cities) certainly decreases the response capability of police, fire, and medical crews (Lambert & Meyer, 2006). The result of these delays is less crime prevention, less fire protection, and less medical response.

5) It is also worth noting that Americans suffer disproportionately unsafe roads (Economist, 2011). America’s roads are considerably more unsafe due to the presence of drivers who are distracted, risk-tolerant, or impaired (Frumkin, 2002). These people not only cause direct hazard to themselves and others, but represent an external and indirect source of hazard to neighboring motorists.

6) Air pollution causes significant health risks, and automobiles are the leading contributor to air pollution in the US (Kennedy, 1989). Water quality over suburban
area is adversely affected, as water runoff increases and the runoff increasingly includes chemicals associated with automobile usage (Frumkin, 2002).

7) Land Usage - The US has more land dedicated to streets and highways than any other country (11th per capita globally, per the IEA’s 2003 data), choking out much-needed agricultural space, walking/biking space, and preserved open space (Burchell et al, 1998).

8) Excessive commute times are linked to degraded mental and physical health. Congested traffic is a significant cause of stress, and is linked to cardiovascular disease and rage (McCann & Ewing, 2003). Research shows that areas that have lower population density are correlated many common health problems (McCann & Ewing, 2003).

9) Households with low annual incomes are often unable to afford adequate transportation, and therefore are frequently unable to reach adequate employment. Those who have no privately owned vehicle are forced to take public transportation, which can take an inordinately long time. This decreases a family’s ability to spend time with each other and provide for each other’s needs. Although high-income citizens can also spend a great deal of time traveling to high-income jobs, at least these people have the option to either relocate their residence closer to a place of work or to outsource common domestic services such as cooking, childcare, and laundry (or to insource these responsibilities to a spouse). In any case, low-income workers disproportionately suffer the burden of an inefficient transportation network as their increasing transportation costs are subtracted from their diminishing wages (Stoll, 2005).

10) The US is utterly dependent on foreign oil. American transportation equates to 110 trillion gallons of fuel burnt in the US yearly for transportation purposes (AASHTO, 2010). The US has one of the highest rates of fuel consumption per capita (IEA, 2003) and the highest expenditures on transportation expenses per capita of any industrialized country (IEA, 2003). Every recent American president has spoken out against reliance on foreign oil, but the US has yet to see any reduction in demand (Greene, 2007).
Unsustainability of Current System

A system could be very inefficient but sustainable given the condition that the system had some plan for improved efficiency. It barely requires mentioning that America, nor its states, nor its cities has any plan for sustaining transportation growth (AASHTO, 2010). Even if fuel was free and each vehicle on the road produced no pollution, Americans would still have no relief from either the purchase price of vehicles/insurance or the resultant congestion--a fact which seems to escape most proponents of electric cars. Data show that Hartford County residents, like the rest of Americans, are increasingly becoming less efficient and therefore less sustainable as evidenced by the percentage of single-occupant vehicle commuters, especially those who commuter into the metro area (column 3, Figure 2).

The results of inefficient and unsustainable transportation create a multiplier effect. Explicitly, sprawl (i.e. residential areas further from places of employment) necessitates more cars, which creates congestion, which necessitates more roads. The roads create more sprawl, which continues the vicious cycle that describes American transportation (Burchell et al, 1998). To confound the problem: this extra transportation creates additional public and private transportation expenditures and extra pollution (Norman et al, 2006). The additional drivers on overcrowded roads create a disproportionate amount of traffic accidents, which further exacerbates traffic (Lambert and Meyer, 2006). Accidents on heavily trafficked roads disproportionately increase the amount that drivers pay for insurance. Any attempt governments
make to correct congestion by widening roads causes immediate delays as traffic attempts to negotiate construction areas (AASHTO, 2010). The over-complexity of the system necessarily yields a complex, costly, unhealthy, and unsustainable product in that the system increasingly becomes less efficient.

<table>
<thead>
<tr>
<th>2010 Urban Mobility</th>
<th>Hours of Delay</th>
<th>Excess Fuel Consumed</th>
<th>Congestion Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hartford</td>
<td>14,128,000</td>
<td>11,731,000</td>
<td>$264,000,000</td>
</tr>
</tbody>
</table>

In order to do allow people to commute effectively, Connecticut must create a transportation network in which supply (transportation network capacity, primarily in terms of interstate highway lanes) exceeds demand while allowing most citizens to commute at reasonable prices. Although the conventional method for American transportation is increasing highway supply (long after the problem has started to occur), the preferred solution to this problem is demand reduction (CRCOG, 2011). Connecticut has taken several laudable steps toward both efficiency/sustainability to include HOV lanes and bus transit (CRCOG, 2011), but there is further work to be done to ensure that our society’s costs of transportation match up with the benefits that residents receive from our transportation network.

Environmental Incentive to Identify People with Program Interest & Ability to Participate

Environmentally, society is quite interested in increasing the efficiency of commuters. In order to achieve efficiency, Hartford would need to make a decisive separation from the single-occupant-driver model that Hartford and the rest of the US is seemingly reliant on (Burchell et al, 1998). A successful effort to improve transportation efficiency would undoubtedly improve the region’s fuel consumption per commuter (and therefore cost per commuter), its transit time and a very difficult-to-track number: number of residents who are unemployed/under-employed due to transportation issues (Stoll, 2005).
This is not to say that transportation efficiency will never be achievable simply because Americans are unaccustomed to transportation efficiency. As wages stagnate, fuel costs rise, transportation times lengthen, commuters become less fixated on single-occupancy vehicles and more interested in money-saving programs (Elrich, 2011). The state can certainly support this effort by strengthening existing programs that incentivize ride-sharing (Hirte & Tscharaktschiew, 2012). Such an effort that allows relief from the most congested points throughout the city could possibly save a substantial amount of money from the state’s budget.

Description of Program Interest in Transportation Efficiency

Since any participant clearly has an inherent interest to save money, a naïve observer might assume that all citizens would be seeking ways to join a ride-sharing program. This clearly isn’t the case (Tri Cities Transportation Campaign, 2010). Every person has the interest to participate only so far as the perceived benefits of participating in such a program outweigh the perceived costs of participating in the program. Most citizens can state that the perceived costs should be greater than the benefit: the approximate annual fuel savings, maintenance savings, parking savings of sharing a ride in the Hartford area. Factors that might increase costs include the time/distance which a participant might incur in the process of sharing a ride. Additionally there is a cost of discomfort associated with sharing a vehicle with another passenger that is real but difficult to quantify (Amey, 2010).

There are several major benefits of participating in such a ride-sharing program: individual cost savings, time savings, and environmental benevolence (CDC, 2010). Cost savings can be calculated in terms of dollars, but it is most important to note that the dollars should represent an increase to the household’s discretionary income (the amount of money left over after all household expenses are met) rather than an increase to their overall household income (Kamakura & Du, 2008). For the purposes of this research I assumed that households at the median income have a discretionary income worth 13% of the household’s total income (US Department of Labor, 2006), while the ratio of discretionary income to overall household income increases with income. A proposed cost savings of $1,000 for a household that earns $68,000 would therefore not be a 1.47% increase, but a 14.7% increase as the household has significantly more money to save or spend (Kamakura & Du, 2008).
Time savings is a critical factor in many ride-sharing programs—notably the informal carpooling community in Washington DC shows a real time savings for participants (Oliphant, 2008). Since individual transit times in the Washington DC area are quite high, participants save a great deal of time by participating in the ride-share program. This time-saving opportunity is certainly present in Hartford, CT, where the HOV lane allows commuters a distinctive time-savings over other traffic lanes (Connecticut Department of Transportation, 2009). Specifically, drivers with higher incomes who waste more time in traffic will have a higher interest in saving time. Intriguingly, Hartford commuters from the Enfield area and Vernon area have largely not capitalized on the HOV lane’s ability to provide a time savings as shown by the relatively low usage of the lane (Figure 3; Connecticut Department of Transportation, 2009), but this is not to say that demand for time savings does not exist.

Lastly and least quantitatively, I assumed that all citizens are somewhat interested in environmental sustainability to some degree. For the purposes of developing a reasonable model this is assumed to be a very small amount, greatly overshadowed by an individual’s desire to save time and money.

Description of the Ability to Participate

A ride-sharing program clearly works most efficiently when co-workers are both neighbors and co-workers (Amey, 2010). This is easily achieved amongst large and medium-sized companies, but may be rather difficult for employees of smaller companies (Amey, 2010). For example, an employee of a small 4-employee business may not have any co-workers with which to share a ride with, but may be fortunate enough to find a shared ride with an employee of a neighboring company. Aside from the job population density, another factor which greatly influences the ability to share rides is the employee’s work schedule. An employee works a schedule other than standard day shift will have a more difficulty finding a shared ride, especially if this schedule is different than co-workers’ schedules. An MIT study estimated the percentage of the workforce who was able to participate in a ride-sharing program to be a number to be no less than 0.55 (Amey, 2010).
Estimation of Intersection of Program Interest and Ability to Participate

The community will see less congestion, less pollution, and fewer accidents by helping to maximize the number of citizens who are interested in the program and who also are able to share a ride with a co-worker. This number of commuters can be estimated with data from the Integrated Public Use Microdata Series (IPUMS), which is composed of data that represents every person in the US (Ruggles et al, 2010). These records are aggregated by common characteristics: an individual record for the purposes of Hartford County transportation data represents approximately 100 workers.

Thus, from approximately 5,000 records representing approximately 490,000 workers in Hartford County (Ruggles et al, 2010), one can ascertain many facts about each household, including discretionary income. Considering discretionary income, time saved and environmental benevolence, I estimated each record’s transportation efficiency program interest as a probability. I created a Weibull distribution in which probability of interest increases as the cost savings increases:

\[ P_{\text{trans}} = W \sim [x; A, B] \text{ where: } W \sim [x; A, B] \text{ indicates a Weibull distribution with parameters } A \text{ and } B. \]

\[ A = 1 \]
\[ B = 0.6, \text{ representing the idea that low-income commuters are more responsive to financial incentives than high-income commuters} \]

And: \[ x= \text{cost savings}/(\text{discretionary income} * \text{high_commute_time} * \text{env}) \]

Where: \[ \text{discretionary income} = 0.13 * \text{household income} * \text{standard variance of household income} \]

\[ \text{High_commute_time is a binary variable, either 1 or 1.2 for records in the top 20\% of commute times} \]

\[ \text{Env} = 1.1, \text{ the small preference that people exhibit for environmentally friendly practices} \]

I made broad assumptions about each person’s ability to participate in a transportation efficiency program based on job densities (jobs per square mile) for each area. For the purpose of simplicity, this paper has assumed an even possibility of sharing a ride across all employees who work within each census-defined region.
Arithmetically, the total success of any attempt to increase efficiency within the central Connecticut transportation network could be estimated as the probability of a random commuter of given demographics to be interested in seeking efficient transportation (any mode other than single-occupancy vehicle) multiplied by the probability that the same commuter would actually be able to participate in such program. The result of this is an estimated probability that each person would participate in a transportation efficiency program. This probability increases as the cost savings increases, as each commuter is more interested in saving more money.

Financial Incentive to Define Constraint of Time and Place

Financially, the state of Connecticut is very interested in finding a cost-effective way to allow people to move from their place of residence to their place of employment. Connecticut’s transportation budget is facing a crippling blow as the interchange of I-84 and I-91 grows more congested yearly (McGee, 2012). Having financed the “Q” bridge in New Haven at approximately $2.2 billion dollars (Tri State Transportation Campaign, 2010), a recent State of Connecticut transportation planning forum raised many questions but provided few answers (McGee, 2012). How would the state pay for such a massive new interchange given that revenue from gasoline taxes might be declining due to more fuel-efficient vehicles?

A superficial analysis of the problem would indicate that an improved interchange at the critical juncture is absolutely necessary given steadily increasing traffic, but consideration of the distribution of road usage gives much more information than “large average daily traffic.” As most residents of Hartford County (or any other county in the US, for that matter) implicitly understand, traffic experiences a rush hour at the start of the working day and at the end of the working day. For Hartford, this time period is 7:30 am – 9:30 am and 4:00 pm – 6:00 pm.
(Connecticut Department of Transportation, 2009). Aside from these time periods, there appears to be no capacity problem at the critical juncture of the two interstates.

**Description of the Constraint Place**

Due to the fluid nature of vehicular traffic, I stated that the constraint area should include not only the critical interchange of I-91 and I-84, but also any section of interstate within 2 miles of the interchange on the idea that during periods of heavy traffic a disturbance 2 miles away can create a backlog of vehicles.

**Description of the Constraint Time**

Using a traffic overlay with Google maps provides a good overview of whether or not traffic is flowing properly (Google, 2012). After monitoring the critical interchange regularly (alternately, the overall daily traffic summary), one can rather subjectively see that the corners of the interchange regularly slow about 7:30 am. After this, the interchange and surrounding areas routinely become congested by any objective measure, with the congestion clearing approximately 9:30 am. For the sake of simplicity, I assumed that evening commute constraints are a mirror image of morning commutes and that there was no additional information to be gleaned from analyzing evening traffic.
Estimation of Intersection of Constraint Time and Constraint Place

Identifying the single-occupant commuters driving during the constraint time was easy - I selected the records in the IPUMS database who arrived at work between 7:30 am and 9:30 am.

Estimating how many of these commuters utilized the critical intersection was more difficult. To accomplish this, I created a matrix that showed how many commuters drove from each region to each region, utilizing Hartford County’s 7 US census-defined PUMA’s (Public Micro Data Sample Area – each roughly 100,000 residents; Figure 9). These results are shown in Figure 10. Next, I created a matrix to estimate of what percentage of commuters from one PUMA of residence might use the constraint area (any interstate space within 2 miles of interchange of I-91 and I-84) as they traveled to a place of work PUMA. This is Figure 11. I multiplied the two matrices cell by cell (not a cross-product) and summed (“Grand Total” columns and rows) to create a total estimate of commuters who use the resource at the constraint time and place for the top 9 PUMA’s of residence. This is Figure 12.

Thus, given the records listed in the IPUMS database, I estimated that each weekday hour approximately 30,000 commuter vehicles driving to work in Hartford County occupy the constraint time (2 morning rush hours and 2 evening rush hours) and place (I-84 and I-91 interchange). Adjusting to include school traffic and non-commuter traffic, I estimated the total volume of traffic per hour at the constraint time and place to be approximately 40,000 vehicles. This is Figure 13.
Checking the Estimate of the Intersection of the Constraint Time and Constraint Place

I thought it important to verify that the values obtained from the IPUMS database produced estimates consistent with observed traffic. Based on several observations I made of interstate traffic inbound to Hartford and Connecticut Department of Transportation surveys, a good estimate for one lane of interstate freeway lane is 37 vehicles per minute during peak travel times. My observations matched official data provided by the Connecticut Department of Transportation (2009, Figure 14). Considering the 17 interstate lanes coming into the constraint place, I estimated 38,000 vehicles per hour entering the constraint location, which demonstrates that observed traffic per hour roughly matches the number of commuters vehicles per hour estimated via the IPUMS database.
Quantifying the Reduction in Vehicular Traffic Necessary to Eliminate Congestion

If traffic flows freely through Hartford from 6:00 am to 7:30 am 95% of work-days, I assumed that our infrastructure can support this maximum rate of traffic. Using the same logic as described in the sections above, both using IPUMS data and actual traffic observations, I estimated that the maximum number of vehicles per hour the constraint location can support is 35,000. However, traffic at peak time regularly flows into the critical intersection at a rate of 40,000 vehicles per hour. Based on these values, Hartford County would need a 13% reduction in vehicular traffic in order to eliminate congestion.

Calculating the Net Sum of Money Required to Incentivize Commuters to Forgo Driving by Quantifying the Intersection of Drivers who are Interested in Transportation Efficiency Programs, Able to Participate, Currently Driving at the Constraint Place and Time

At the outset, this four-way intersection of factors seems unlikely and intimidating. Given that financial incentives can influence each individual’s choice to consume resources (drive his/her vehicle at the constrained location during the constraint time), how much money would be needed to convince each person not to drive? Given cost-savings due to gasoline consumption and possibly usage-based insurance: if all residents had perfect information about co-workers, how many citizens of Hartford County would share a ride with a co-worker who happened to work the same hours and live in the same neighborhood? In addition to the inherent savings on variable costs, how much extra money would be necessary in order to convince each resident to a share a ride? What is the smallest aggregate amount of money that would be required (in excess of inherent financial incentives) to remove a critical amount of drivers from the interchange of I-91 and I-84 in order to regain a continual flow of traffic, even during peak demand times?

Graphically, this can be represented as a circle for each factor. The four-way intersection represents those commuters who currently utilize transportation efficiency- assuming 2 persons per vehicle, I represented this space in terms of vehicular traffic by un-shading the area of the commuters who are now non-drivers (Figure 15). The intersection of the constraint time and place represents a diagram of those commuters who are currently causing congestion (Figure 17). By increasing the degree to which program interest overlaps with the other factors (Figure 16),
the number of people who are utilizing transportation efficiency programs increases. Thus, the number of vehicles at the constraint time and place sees a corresponding decrease (Figure 18).

Figure 13 (above): 4-way intersection represents commuters who are participating in transportation efficiency. White area in the center represents resultant vehicle reductions.
Figure 17 (below): Shaded area represents traffic at constraint time and location.

Results

By selecting only those records that were arriving at work during the constraint time (Figure 19) and driving through the constraint place, my calculations of the intersection of program interest and ability to participate estimated 20% of the commuting population interested in a ride-sharing program given a payout of $1500. The payout of $1500 could plausibly be reached by most commuters in cost savings of gasoline, parking, maintenance, and possibly usage-based auto insurance. However, this theoretical group of new non-Single Occupant Drivers would most likely not be enough to eliminate congestion - 20% of commuters would yield only a 10% reduction in vehicles, assuming 2 passengers per vehicle. Based on these data, I would conclude that Hartford area commuters would need to see more than $2000 in savings or some combination of time and money savings in order to see a greater than 15% decrease in vehicular traffic at the constraint.
Incentivizing Program Interest

Of the four factors that describe transportation efficiency Hartford County (program interest, ability to participate, usage of resource at constraint location, and usage of resource at constraint time) the easiest factor to influence is individual interest in transportation efficiency programs. The two largest components of this are money saved and time saved (Oliphant, 2007).

The Ability to Create a Critical Mass of Commuters via “Perfect Information”

Imperfect information about pertinent data is a significant barrier to transportation efficiency (Amey, 2010). For example, a worker who knew that a neighbor was a co-worker could calculate a decrease in variable costs of operating his/her vehicle by creating a shared ride, but an employee who wanted to share a ride but didn’t know of any co-worker/neighbors might assume that no co-workers were actually neighbors and therefore calculate no savings in a transportation efficiency program. If a comprehensive list of co-worker addresses was available (temporarily setting aside privacy concerns), I hypothesized that all employees would calculate a cost savings and therefore be more likely to share a ride. Low-tech solutions, e.g. a physical bulletin board or assigned program coordinator would certainly help. Public web sites such as “nu-ride” (http://www.nuride.com) and “icarpool” (www.icarpool.com) are free and simple, but the implicit incentives of gas savings and receiving “special” advertising offers aren’t enough to convince commuters to volunteer their information and seek out co-worker/neighbors with whom to share rides (US Census, 2012). This raises the idea that there is some amount of money that the state could possibly offer to each commuter in order to create a “critical mass” of interested personnel; wherein any employee from a medium or large-sized company who signed up to an information-sharing site could easily find a co-worker/neighbor willing to share a ride.
Proposal: Conditional Tax Rebate Lottery Proposal to Incentivize Information-Sharing

However, if a small tax rebate (effectively, a government subsidy to encourage people to research ride-sharing and public transportation) was available to a large number of people, there is also the possibility of a large tax rebate being advertised to all commuters but only offered to a few commuters randomly selected from a small pool (effectively, a government subsidy structured as a lottery to encourage people to research ride-sharing and public transportation). The state’s traditional lotteries raise a substantial amount of money on the idea that each participant places a large benefit on winning a large amount of money, but only a small cost in losing a small amount of money. As a result the state enjoys nearly a 2200% return for its investment: in this case, the huge amount of money collected from lottery entrants compared to the small payout and cost of running the lottery (Connecticut Lottery Corporation, 2010). Thus if the state were to offer a large amount tax rebate to a few random residents on the condition that each entrant had logged his/her household into the non-profit transportation database of choice (currently www.nuride.com), it is conceivable that the state could encourage commuters to share information about living/working locations, realize the implicit cost savings and start forming car-pools, and create a substantial savings (reduction in vehicular traffic at the constraint time and constraint location) with comparatively little cost. What if, in order to qualify for the tax rebate lottery, a certain percentage of employees at an employer had to register on a ride-sharing web-site? Under these circumstances, it would be likely that each employee would advertise the web-site to fellow employees to qualify for the potential to win a tax rebate.

Rebates: Government-Generated Program Interest

If one accepts the idea that a toll efficiently taxes drivers in direct proportion to how much they use the bridge, one should also accept the idea that rebates could be equally efficient if the rebates succeeded in keeping away drivers who would have otherwise used the interchange in question. Whereas congestion pricing would be difficult to implement, rebates might be easy to implement considering the frequency with which states implement tax rebates. It might be possible to create a tax rebate lottery where the only entrants to the lottery were employees of large/medium-sized businesses near the constraint place who succeeded in reaching a pre-defined business-wide transportation efficiency goal. Although advertising the campaign through the companies would certainly help, it wouldn’t seem mandatory to get managerial
approval in order to convince employees to participate in the program and advertise the campaign to co-workers. Thus the entire campaign could be conducted at the cost of revenue “given out” in the form of a tax rebate, while any benefits would be reduction of vehicle emissions seen from commuters who participated in transportation efficiency in addition to any reduction in state transportation expenses. This tax rebate has an added advantage over a toll: in the first instance, money remains with wage-earners as discretionary income; in the second instance money is removed from the local economy and re-allocated by the government.

**Market-Generated Program Interest: Usage-Based Auto Insurance**

Of the factors that influence commuting costs, the most significant contributing components have been: the cost of the vehicle, insurance, tolls and/or parking, all of which are fixed costs; gasoline and maintenance, both of which are variable costs. The primary cost incentive to share a ride is reduction in gasoline consumption. One of the most promising recent developments that could positively influence commuter behavior is the introduction of usage-based auto insurance, which would change insurance from a fixed cost to a variable cost.

The implications are self-evident. The less mileage driven, the fewer “high risk” hours driven, the less the insurance costs (Lachnit, 2011). The rationale is quite simple for insurance companies- drivers who drive fewer miles, drive with safer habits, and drive at off-peak hours are less likely to have an accident, which cuts down on premiums that the insurance company must pay. If the company is able to prove that the driver is a low risk, the company can offer a significant discount. Commuters have another powerful incentive to share a ride with a co-worker- the savings on insurance can add up to hundreds of dollars yearly (Hemenway, 2012).

**Company-Generated Program Interest: Beyond Self-Promotion**

In the first place, company’s can notify all personnel of transportation initiatives via mass e-mail or weekly meetings. Simply advertising the idea of ride-sharing and promoting a coordinated effort to share rides would help. Also placing corporate emphasis on such an initiative would ensure that supervisors and managers helped out by allowing (somewhat) flexible hours to allow personnel to engage in such an initiative. Companies could also create an incentive by reserving choice parking spots for ride-sharing personnel.
There is an inherent incentive for companies to support such programs beyond the narrow focus of positive publicity. Ultimately a successful program that reduces travel time will allow employees to engage in more physical fitness activities and spend more time with family (Frumkin, 2002). A successful program will help employees reduce stress, promote a healthy lifestyle, reduce corporate-subsidized medication, reduce stress-induced medical events, reduce lost time due to auto accidents, reduce the likelihood of an auto accident on company property, while simultaneously increasing the company’s total benefit to employees by reducing the employees’ costs. There is much reason for corporations to support such a transportation initiative and little reason for them to oppose it.

Program Efficiency: Generating a Large Result from a Focused Effort

<table>
<thead>
<tr>
<th>Employees</th>
<th>Employers</th>
<th>Total Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>7500</td>
<td>7</td>
<td>52500</td>
</tr>
<tr>
<td>3000</td>
<td>22</td>
<td>66000</td>
</tr>
<tr>
<td>750</td>
<td>70</td>
<td>52500</td>
</tr>
<tr>
<td>375</td>
<td>140</td>
<td>52500</td>
</tr>
<tr>
<td>150</td>
<td>350</td>
<td>52500</td>
</tr>
<tr>
<td>60</td>
<td>875</td>
<td>52500</td>
</tr>
<tr>
<td>24</td>
<td>2190</td>
<td>52500</td>
</tr>
<tr>
<td>40</td>
<td>5480</td>
<td>54800</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>490660</td>
</tr>
</tbody>
</table>

Program Efficiency: Generating a Large Result from a Focused Effort

Considering that commuters from central Connecticut’s largest employers are most able to share rides with co-workers and that these commuters are disproportionately consuming the constraint time and place due to the large companies’ proximities to the critical interchange, it seems most efficient to generate transportation efficiency interest amongst this group (Amey, 2010). Seeking just a 20% efficiency increase from large/medium-sized (greater than 375 personnel) employers and a 10% efficiency increase from smaller employers, it seems possible that Hartford could keep enough vehicles off the road so as to routinely avoid congested traffic.
Applying the aforementioned constraint usage matrix (Figure 11) to a chart of the locations for large or medium-sized employers with the number of employees, I concluded that the total number of employees from large companies disproportionately consume the critical intersection at its constrained time. This situation is potentially advantageous, since it allows for the possibility of a significant rate of return for any improvement that is created amongst the group of large and medium-sized employers.

**Proof of Concept: Lottery-Style Incentives to Reduce Traffic Congestion in India**

Although the idea of a conditional transportation lottery is unique and untested (to my knowledge), the lottery-style incentive is a proven method of reducing congestion. In 2008-2009, commuters in Bangalore, India, responded to financial incentives to adjust their commuting habits away from peak travel times. This experiment was funded by a single company, Infosys, who found that participants responded disproportionately to large incentives with a small probability of success. The decrease in company transportation expenses (reduced diesel consumption, driver costs) generated by the experiment directly offset the cost of the lottery payout to employees. Moreover, this created a positive externality for all commuters.
using this road into Bangalore— even though the experiment was exclusively funded by Infosys, transit times for all commuters dropped 24% (Merugu et al, 2009)! The results were considered a win-win-win-win: the employees won by getting shorter commutes and more money, the company won by lowering its overall costs, other commuters won by experiencing less traffic, and the environment won by experiencing less pollution.

Given two equivalent expected values: large payout and small probability compared to small payout and large probability, commuters change their habits disproportionately to the possibility of a large payout (Merugu et al, 2009). Just as the Connecticut Lottery successfully collects a great deal of revenue in exchange for the small probability of a large payout, the Connecticut Department of Transportation could expect to see a great shift in commuter preference with a lottery-style reward system based on results from a subsidy system enacted in Bangalore, India.

**Proof of Concept: Washington State Commute Trip Reduction Program**

Although the specific proposal to create a conditional tax rebate lottery are unique to this paper (again, as best my research indicates), as is the specific method for attempting to quantify the total investment necessary to ensure free-flowing traffic (thus obviating a major construction project), many of the basic ideas influencing transportation policy proposed in the paper are in currently in place around the US. Specifically, Washington State’s Commuter Trip Reduction (CTR) demonstrates a model that could provide significant benefit to Connecticut.

Government subsidies to efficient commuters may seem unusual or unjustified, but Washington state has realized that these subsidies are far less costly than major construction projects such as new bridges and lane-widening efforts (Washington State Commute Trip Reduction Board, 2011). Washington has shown that coordination with employers is critical, and coordination with large employers provides a significant return on investment. Additionally, Washington has shown that both employers and employees realize the inherent value of efficiency and sustainability. To this effort, employer contribution to government contribution currently sits at a surprising 16 to 1 ratio (Washington State Commute Trip Reduction Board, 2011).
Summary of Analysis

This paper has attempted to quantify the traffic problems that Hartford County experiences, particularly at the critical interchange of Interstates 84 and 91. It is not my primary concern that the values I found were greatly accurate. It is my opinion that although much thought goes into public transportation policy, little thought goes into achieving efficiency and sustainability. It was my intent to demonstrate that once research is conducted that concludes: 1) where the traffic is going from/to 2) who are the primary contributors to this traffic 3) what reduction of rate of traffic would be necessary in order to prevent congestion 4) how much (or little) incentive commuters need to change their habits; it seems possible to create public policy that achieves goals that are very beneficial to residents, employers, the government, and the environment.

Eliminating congestion would be a good start to making Connecticut traffic efficient and unsustainable. This could be done by reducing vehicular traffic approximately 13% during 4 peak travel hours at the constraint place; this equates to approximately 5000 vehicles per hour through the constrained intersection. Although declining real wages, rising fuel costs, tax subsidies, and the advent of usage based auto-insurance all play a role in encouraging commuters to seek more efficient transportation methods, it does not seem likely that the real cost savings central Connecticut commuters could expect would be large enough to compel drivers to avoid single-occupant driving in numbers large enough to eliminate congestion. A lottery-style campaign targeting large businesses around downtown, built around the condition that the target
company achieve some moderate, designated transportation efficiency level would not only induce people to over-estimate their financial rewards from ride-sharing, but would encourage information sharing amongst target commuters. There are notable precedents establishing both transportation lotteries (Merugu et al, 2009) and government/large employer co-operation (Washington State Commute Trip Reduction Board, 2009) as valid and cost-effective methods of reducing vehicular traffic. A coordinated campaign, focused on large and medium-sized companies, demonstrating significant cost savings and time savings, tracking and reporting progress metrics would most likely be able to create a significant reduction in vehicular traffic in return for a small investment. Upon receiving both widespread personal cost savings, corporate cost savings, and government cost savings, not to mention time savings and pollution reduction, transportation efficiency policies could experience increased political support, providing the sustainability that could support future growth in central Connecticut.

**Recommendations for Further Study**

To better define how households make financial choices, I would be most interested in performing a regression of refinances on interest rates. This would adequately model how responsive households were to offers of cost savings, and could greatly refine how to model different commuters’ response to a monetary program incentive. Also, it seems that given the upper-class status of many Hartford area commuters, I would be very interested in seeing how commuters respond to the opportunity to save time. Lastly, I think it is important to understand how employees at large companies utilized Washington’s CTR, and what sort of rates of participation Connecticut might expect from such a joint government-business endeavor.

**References:**


Transition to Sustainable Agriculture and Settlement Practices in the Chesapeake Bay Region During the Woodland Period

Charles E. Button, Ph.D., Associate Professor
Department of Geography
Central Connecticut State University
Email: Buttonche@ccsu.edu

Abstract

During the Woodland Period, Native Americans in the Chesapeake Bay region adopted sustainable agriculture practices and settlement designs. This manuscript discusses the evolution of these sustainable practices through the early, middle and late woodland subperiods.

Introduction

Today, society faces challenges related to the methods and technologies being used to produce the food needed to feed all the people of the world. Are the modern mechanisms being applied in agriculture (e.g., genetically modified organisms, pesticide, herbicides, monoculture, mega corporate farms) best for sustainable crop yield and production? Perhaps some lessons could be learned from the agricultural and subsistence practices of the Native Americans that met the European settlers when they first set foot on North America. It is during the Woodland Period that Native Americans transitioned to sustainable agriculture that was in harmony with the environment and promoted equitable economies and social structure (Englebrecht 2003; Kraft 1986; Wallace 1981).

These sustainable agricultural practices were demonstrated in the Chesapeake Bay region during the Woodland Period. The Woodland period is typically described as extending from circa 3,000 years ago to the end of prehistory, the time of early European contact. It is during this time that formal agricultural practices appear and more complex settlement patterns and social structure are established (Wallace 1981; Weslager 1972). Also, the Woodland period was a time of increased social interaction between local Chesapeake native settlements and with other native groups external to the region.

This examination will provide a geo-archaeological overview of how the settlement practices and agricultural approaches applied by Native Americans during the Woodland period in the Chesapeake Bay region transitioned to become more sustainable. For the purposes of this
analysis, the Woodland period is subdivided into three chronological intervals of time: (1) Early Woodland subperiod, between circa 3,000 to 2,300 years ago, (2) Middle Woodland subperiod, between circa 2,300 to 1,050 years ago, and (3) Late Woodland, between circa 1,050 to 500 years ago.

The Chesapeake Bay Region

The Chesapeake Bay region is located along the Middle Atlantic coast of the United States (Figure 1). The region’s primary physical feature is the great estuary known as the Chesapeake Bay. The Chesapeake Bay is a large inlet of the Atlantic Ocean, bounded by eastern Maryland and eastern Virginia. It is about 320 km (about 200 miles) long and varies in width between 6 to 64 km (4 to 40 miles). A substantial, relatively low-lying area of land surrounds the Bay that is known as the Coastal Plain physiographic province. The Coastal Plain extends (east to west) from the Atlantic coast of what is called the Eastern Shore of the Chesapeake Bay to the western fall line of the Bay’s tributaries on the opposite shore. The fall line, generally arcing from present day Baltimore to Washington D.C. to Richmond, Virginia, marks the edge of the Piedmont physiographic province (Figure 2). The area of land between the Atlantic coast to the east and the Piedmont physiographic province to the west, as it runs the length of the Chesapeake Bay, is the focus of this report.

Figure 1: Satellite Image of Chesapeake Bay region with fall line
Figure 2: Cross Section Showing Coastal Plain, Piedmont Province and Fall Line
Source: Office of the Maryland Secretary of State, September 29, 1998.

Geomorphology Of The Chesapeake Bay

The Chesapeake Bay is a relatively recent post-Pleistocene phenomenon. The Bay only began to form circa 10,000 years ago. It was not complete until approximately 3,000 years ago. Before this time, an earlier Pleistocene estuary had been drained by the marine regression associated with that epoch’s last glacial advance. During that period, instead of the Chesapeake Bay, an extension of the Susquehanna River flowed through the region until it emptied directly into the Atlantic Ocean.

The actual landmass of this area of the Coastal Plain was nearly one-third larger than it is today. Land under water now, was exposed in the past. This region was going through some dynamic physiographic changes leading into the Woodland period. Over a period of approximately 7,000 years, the region’s configuration changed from one of an ancestral riverine-dominated landscape into one covered by an estuary.

Early Woodland

The Early Woodland subperiod in the Chesapeake Bay region is highlighted by evidence of increased immobilization. It is argued that sedentary life had fully emerged in the Piedmont zone in this period of time (Mouer, 1991). This began to alter settlement practices during the Early Woodland subperiod.

Evidence of subsurface storage features begin to appear on archaeological sites in the Piedmont zone (Manson, 1948; Mouer, 1991; Slattery 1946). Subsurface storage features also
appear at sites on the outer Coastal Plain of the Chesapeake Bay region (McNett, 1985). The appearance of these small cists indicates increased storage of food, and many of them were later used as trash receptacles. Thick midden deposits along with dense and extensive occupational debris begin to appear on sites along the James River (Mouer, 1991). Formal hearths are also common on Early Woodland sites along with substantial deposits of fire-cracked rock. The White Oak Point site on the outer Coastal Plain of the Potomac River yielded substantial shell midden deposits (Custer, 1986). Together these features indicate an increasing duration of site use and the intensification of on-site activities.

No literature was found that placed domestic structures in the Chesapeake Bay region during the Early Woodland subperiod. However, there is evidence of a pit house in the Delaware portion of the Eastern Shore of the Bay at the Clyde Farm site (Custer, 1989). Also, at a site just outside of the study area on the North Fork of the Shenandoah River near Fort Royal, Virginia there is evidence of Early Woodland structures and associated features (Custer, 1989). At this site, eight domestic structures were unearthed. This evidence seems to point to the likelihood that the people of this region may have begun to occupy areas of this region for extended periods of time.

Settlement systems in the Coastal Plain seem to have been centered around major base camps linked to more transient, limited-purpose, interior sites during the Early Woodland subperiod (Gardner, 1982). At more interior locations further west, Gardner sees a similar settlement model focused around freshwater versus estuarine locations. A similar settlement model has been proposed for the James River area as well (Mouer, 1991). Here individual Early Woodland groups occupied large sites on either the outer Coastal Plain or at interior locations beyond the fall line described earlier. The inner Coastal Plain, between the two zones, served as a buffer zone that was shared by both groups. Outer Coastal Plain groups tended to use this area during the fall and early winter, while interior groups visited it during late winter and early spring. Visits by either group were dictated by periods of resource scarcity in home areas. It is surmised that some group interaction may have occurred within the buffer zone.

It is thought that a similar settlement system occurred with groups on the Eastern Shore of the Bay as well (Custer, 1989). This settlement system focused on the occupation of what Custer (1989) calls macroband base camps supported by numerous microband base camps and associated procurement sites.
Early Woodland subsistence practices in the Piedmont zone seem to indicate they practiced hunting, fishing and nut gathering. Carbonized hickory shells were recovered at the Selden Island site along the Potomac River and remains of these and other nut bearing species have been reported at a number of other Early Woodland sites (Slattery, 1946).

On the outer Coastal Plain, remains of hickory nut, various species of shellfish, crabs, fish, and deer were excavated at the White Oak Point site (Custer, 1986). Increased exploitation of oyster to the exclusion of other shellfish species appears to have started during the Early Woodland. In addition, some evidence of intensive exploitation of seed plants by the Early Woodland groups has been uncovered (Custer, 1989).

**Middle Woodland**

The Middle Woodland subperiod is dated between circa 2300 and 1,050 years ago. Middle Woodland settlement features are similar to those of the Early Woodland, including dense midden debris along subterranean storage cists, storage cists that became trash receptacles, hearths, roasting pits, and concentrations of fire-cracked rock.

Settlement sites during this subperiod, and also in the Early Woodland subperiod, ranged in size from rather extensive to quite small. The largest single site for the Middle Woodland that was mentioned in available literature was the Boathouse Pond site that is approximately five hectares, while some nearby intermediate sites were only 1,000 meters² (Potter, 1993).

Information about Middle Woodland domestic structures is scarce. Excavation of postmolds at the Boathouse Pond site have been reported (Potter, 1993). A house appears to have been located at a site along a tributary of the Patuxent River (Gardner, 1982).

Broader settlement patterns within the context of the broader landscape are defined fairly well. Groups making Popes Creek ware in the Potomac Valley seem to have focused on the inner Coastal Plain in ecotonal settings (Potter, 1993). Potter suggests that the Popes Creek site was a major settlement during the fall and winter with satellite procurement sites for specialized hunting and foraging activities. During the spring, some of these occupants traveled upriver to constricted areas near the fall line mentioned earlier to exploit anadromous fish runs. Anadromous fish are fish that swim upstream from the ocean to breed. In the summer a similar move was made to other nearby locales to collect freshwater shellfish and to hunt. Populations would then congregate again at the major settlement in the fall.
Middle Woodland subsistence practices are what would be expected for settlements located in a temperate forest, estuarine ecosystem, with some freshwater environment. The large-scale exploitation of oysters from the Bay and its tributaries is well documented for this subperiod. A host of other shellfish, both estuarine and freshwater species, was exploited to a lesser degree. Most available species of animal were being exploited as well. There is documentation of remains from deer, wapiti, waterfowl, and turkey at settlements of the Middle Woodland.

Exploitation of flora of the region seems to have become an established means of subsistence. Hickory nuts, walnut, and acorn are especially prevalent at sites. Many other seed types are also recovered at Middle Woodland sites (Potter, 1993). It appears that intensive harvesting and storage of these resources were taking place. Great numbers of amaranth and chenopod seeds were recovered from the middens at the Wilgus site (Custer, 1989).

It appears the people of the Bay region were more sedentary and were midway between a shift from mainly a hunting and foraging subsistence to more of an agriculturally based subsistence approach during the Middle Woodland subperiod. This is supported by the rich carbohydrate-rich diet that is indicated by higher frequency of dental caries in the population and the increased exploitation of amaranth, chenopod, and possibly wild rice (Custer et al., 1990).

Late Woodland

The Late Woodland subperiod begins at approximately 1,050 years ago and ends around 500 years ago. Evidence from time shows that most groups of people were becoming increasingly sedentary. Shell middens were laid down on many sites near the Bay and its tributaries. Refuse middens are common on larger sites. Often substantial amounts of earth were moved to create ditches and trenches for various purposes. All the site features mentioned on Early and Middle Woodland sites are present as well. Subterranean storage cists still appear. There is also evidence that groups were beginning to use aboveground storage in domestic structures, special warehouses, and granaries.

Unlike the Early and Middle Woodland subperiods, there is ample evidence of Late Woodland domestic structures. During the 1930s a partially exposed longhouse was excavated at the Patawomeke site along the Potomac River (Stewart, 1992). Another well-preserved
longhouse with internal partitioning is reported at the Great Neck site (Hodges, 1993). Some of the domestic structures that have been excavated appear to be parts of villages or hamlets.

Some of the Late Woodland sites that have been discovered were fortified with substantial stockades. Some of these stockades appear to have circled small parts of larger villages, perhaps chiefly residences or sacred areas, and others may have enclosed much of the settlement (Potter, 1993). It is certainly evident that palisades on Chesapeake Bay sites predate European contact and that warfare among native groups was endemic throughout the later portions of the Late Woodland subperiod (Potter, 1993).

It is during this subperiod that unique features called ossuaries appear at some settlement sites. Ossuaries are large pits where the many dead individuals were buried together. They were both small and large. Some containing only ten to twenty individuals and others containing the remains of hundreds of individuals. One of the more detailed analyses of ossuaries was conducted at the Juhle site off a tributary of the Potomac River (Ubelaker, 1974). At this site, three ossuaries were excavated this site containing the remains of 188 individuals. Radiocarbon dates of some of the bones dated to 435 AD (Ubelaker, 1974). Ubelaker sees these ossuaries as containing a relatively complete representation of the local population. Based on laboratory analysis, the highest frequency of death of the individuals in the ossuaries at this site occurred during the first years of life (Ubelaker, 1974). This was then followed by a decline in mortality through childhood into early adolescence. Maximum adult death frequency was between thirty and thirty-five years of age, followed by a steady decline after age thirty-five. The oldest individual represented was between sixty-five to seventy years old. This ossuary appears to represent a three-year accumulation of the dead. Literature about other ossuaries that have been excavated in the Chesapeake Bay region was available, but none were as carefully analyzed as the ones at the Juhle site.

By the end of the Late Woodland subperiod, most of the intermediate-size sites decrease in number, with those remaining perhaps representing small outlying house clusters or favored extraction locations (Potter, 1993). The rest of the population appears to have coalesced into large, dispersed villages. Many of these larger sites appear to have had associated outlying hamlets. It is believed that the proximity to suitable soils for agriculture may have been a major factor in large village location (Potter, 1993).
The subsistence practices during the Late Woodland were similar to the Middle Woodland with an increase in agriculture. The people of this subperiod were exploiting faunal, aquatic, and floral resources offered by the temperate biome and its associated estuaries and rivers. A variety of faunal remains have been recovered at Late Woodland sites including deer, elk, bear, turkey, squirrel, duck, bobcat, raccoon, rabbit, skunk, turtle, passenger pigeon, and wolf. Evidence suggests that deer was a staple for the people of this time. At the Accokeek site, deer represented 80 percent of the faunal remains recovered (Stephenson and Ferguson, 1963).

Aquatic resources were also heavily exploited. Oyster remained a favored resource along with other species of shellfish. Harvesting of oysters seems to have been very intense towards the end of the Late Woodland subperiod (Custer, 1986). Fish, especially anadromous species, were also heavily exploited (Custer, 1986). Immense amounts of sturgeon, gar, and other unidentified fish species were recovered at the Accokeek Creek site (Stephenson and Ferguson, 1963).

Floral resources were also exploited in significant quantities. Almost every variety of nut available in the Chesapeake Bay region, many starchy and oily seeds, and tuberous plants have been recovered on Late Woodland sites. Exploitation of amaranth and chenopod appear to have been used intensively (Custer, 1989).

Archaeological evidence points to a shift to a greater use of agriculture as a means of subsistence. The earliest agricultural communities using tropical cultigens appear to have been located west of the fall line described earlier (Potter, 1993). For example, sites in the Piedmont have yielded the earliest evidence of maize (Potter, 1993). Potter cites numerous radiocarbon assays on cultigens from the Piedmont region with dates ranging between 825-1000 AD. Evidence of maize in the Chesapeake Bay region during the Late Woodland appeared in floatation samples at the White Oak Point site in Virginia (Custer, 1986) and on the eastern Shore at the Ritter site (Custer, 1989).

There is a debate as to the impact of agriculture on the Coastal Plain of the Chesapeake Bay region. Some feel it was not a major component of subsistence until a demand was created by early European colonists (Custer, 1989). However, others feel it may have represented around 50-75 percent of the subsistence base (Turner, 1992).
Conclusion

An evolution of settlement patterns and subsistence towards sustainable practices can be seen in the Chesapeake Bay region from the Early to Middle to Late Woodland subperiods. It is during the Woodland period that the native peoples of the Chesapeake Bay region became more sedentary and introduced agriculture into their culture. During Early Woodland times, the first signs of an increase duration of site use occurs. It is during this subperiod that subsurface storage features appear, indicating a change in settlement practices. Also, the first signs of increased exploitation of oysters appears during this time. As the people of this region entered the Middle Woodland subperiod, more domestic structures appear, suggesting the trend towards a more sedentary settlement approach continued. It is during this time that the exploitation of flora became a more integral part of their foodstuffs. Also, the first signs of sustainable agriculture appear. The Late Woodland subperiod is when a domesticated, sedentary lifestyle became the norm for the people of the Bay region. Ample amounts of literature depict group settlements occupied by large groups of people. It is also, during this time that some unique settlement structures and agricultural practices appear. Some of the sites were fortified with palisades and large burial pits called ossuaries become part of the settlement sites. Agriculture became an established subsistence practice as well.

The importance of sustainable agriculture practices by the Native Americans during the Woodland Period in the Chesapeake Bay region played a vital role in their sustenance. Research continues to clarify how productive native sustainable agriculture was during the Woodland Period. Perhaps the secret to a future of sustainable agriculture lies in the past.

References


Custer, J.F., 1986, Late Woodland Cultures of the Middle Atlantic Region. Newark, University of Delaware Press.


Ubelaker, D.H., 1974, *Reconstruction of demographic profiles from ossuary skeletal samples: A case study from the Tidewater Potomac*. Smithsonian Contributions to Anthropology, Number 18

Abstract

Over the past decade, organic farming has become popular. For instance, society has demanded a new nutritional diet and is looking towards organic farms for support. The government has stepped in and has given federal money to organic farms to keep the farms going. This demand has caused many to look at organic foods as a way to promote a healthier lifestyle. Many studies have shown that organic foods contain more vitamins and minerals than foods grown on conventional farms (Crinnion, 2010). Studies have also shown that organic foods contain less harmful chemicals that food grown on conventional farms (Pearlstein, 2008).

The purpose of this study is to see how perceptions towards organic food affect a person’s choice to choose organic foods. Cost, pesticide use, and socioeconomic status are just a few reasons that affect people’s choice in choosing organic food (Hughner, et al, 2007). To support these findings, we surveyed a group of educators with a bachelor’s degree or higher, ranging from 23 to 70 years of age. Combining the results from the survey with current research, we will be able to 1) determine if a targeted group has the same attitudes as the general public regarding the organic food market; 2) identify perceptions towards this can help educate today’s youth and, 3) discuss sustainable practices economically by providing and promoting organic foods to all socioeconomic groups.

Background

Contrary to common perceptions, there is a difference between organic foods and conventional foods. The “National Organics Program” which is part of the Food Marketing Institute holds farmers to strict standards to consider food organic. According to the “National Organics Program, “crops must be grown without using synthetic pesticides, bioengineered genes, petroleum-based fertilizers and sewage sludge-based fertilizers. Organic livestock must have access to the outdoors and be given no antibiotics or growth hormones” (Food Marketing Institute, 2005).
Sales of organic foods have increased over the past 20 years—growing by 2000% (Crinnion, 2010). This increase in sales demonstrates how society’s perception toward organic food is changing. One particular study found that organic food has 29% more magnesium than regular foods. This spike in nutrients is also found in many other organic fruits and vegetables (Crinnion, 2010).

Even though organic foods contain more vitamins are they really organic? Crinnion reviewed a study where there was a concern that pesticides were still present on organic farms (Harner, 2006). The reasoning for this was that there were other farms nearby that used chemicals and it was found that the pesticides traveled through the air to the organic farms. This is known as pesticide drift (Crinnion, 2010).

Hughner et al. (2007) presents fifteen reasons consumers prefer organic foods. The themes associated with this analysis were themes one, two and ten (Figure 1).

I. Consumers’ purchasing motives
   
   Theme 1. Health and nutritional concern
   Theme 2. Superior taste
   Theme 3. Concern for the environment
   Theme 4. Food safety, lack of confidence in the conventional food industry
   Theme 5. Concern over animal welfare
   Theme 6. Support of local economy
   Theme 7. More wholesome
   Theme 8. Nostalgia
   Theme 9. Fashionable/Curiosity

   II. Deterrents
   
   Theme 10. High price premiums
   Theme 11. Lack of organic food availability, poor merchandising
   Theme 12. Skepticism of certification boards and organic labels
   Theme 13. Insufficient marketing
   Theme 14. Satisfaction with current food source
   Theme 15. Sensory defects

Figure 1: Themes Identified Among Buyers and Non-buyers of Organic Food

Theme one dealt with the idea that people chose to buy organic foods because it was healthier. Theme two focused on tasted and used a taste test to back up the idea juice and milk tasted better than non-organic juice and milk. Theme ten dealt with higher prices for organic foods are an obstacle for buying organic food. This has been a major theme in our research (Hughner, et al, 2007).

The following definitions clarify and elaborate on the 15 themes illustrated in the table above. Health consciousness, food safety concern and ethical self-identity were other factors influencing one to choose organic foods. Health consciousness refers to intentionally participating in activities that promote a healthy life-style. A food safety concern brings attention to pesticides, chemicals, and unintentional
harmful bacteria growth found in produce. Ethical self-identity refers to the choices one makes that are influenced by one’s own views (Michaelidou & Hassan, 2007).

Methods
To connect and solidify our research, we created a survey that used major themes found in our research and asked participants about their attitudes towards organic foods. A group of teachers and school administrators from both private and public schools were surveyed about their perceptions of organic foods. Questions one and two dealt with the demographics of our participants. Out of the 71 participants asked to take to the survey, 49 or 69% completed the survey. The participants had two weeks to complete the survey at their leisure. The demographic information showed 87.8% of the participants were female and 12.2% were male. The highest percentage concerning age was 30.6%. Participants in this category were between the ages 51 and 60.

The survey was emailed to teachers and school administrators where it was taken at their leisure. The survey was modeled off of a survey found in the article called Organic Foods: Do Eco-Friendly Attitudes Predict Eco-Friendly Behaviors? The survey began with a few demographic questions in order to gain background knowledge of the participants. The rest of the questions focused the participant’s perception of the topic (Dahm, Samonte, & Shows, 2009). Our survey consisted of 10 questions. The first two were questions related to demographic information and the rest consisted of two open-ended questions while the others focused on focused on their personal preference of organic foods. For complete survey, see Appendix A.

Findings
The remaining eight questions in our survey focused on the objective of our study: to see how perceptions towards organic food affect a person’s choice to choose organic foods.

Question three began asking about the participant’s views on whether or not one is a healthy eater. The survey showed that 65.3% of the participants considered themselves healthy eaters while the other 34.7% did not consider themselves at healthy eaters.

Question four was one of two open-ended questions. The participants were asked to define organic food. Most of the participants stated that organic food has no chemicals, is natural, and is not genetically modified. One participant stated that, “Food that is grown without the use of pesticides and chemicals. Food that has not been altered unnaturally. If additives are used, such as food coloring, they come from a natural source, like a plant.” Another stated, “Food that has no chemical preservatives. It does not have to come from an ‘organic’ farm as labeled by the Department of Agriculture, but it should come from a place that uses minimal chemicals.” These two statements are very close to the definition of
organic food from the National Organic Program: “crops must be grown without using synthetic pesticides, bioengineered genes, petroleum-based fertilizers and sewage sludge-based fertilizers. Organic livestock must have access to the outdoors and be given no antibiotics or growth hormones” (Food Marketing Institute, p. 1).

Question five focused on the amount of fruit and vegetable servings consumed in a week (Figure 2). 81.6% percent of the participants said that they eat four of more servings of fruits and vegetables per week. 12.2 % of participants eat three servings of fruits and vegetables per week and 6.1% of the participants eat two servings per week.

![Figure 2: Responses to Question 5 – What is your amount of servings of fruit and vegetables per week?](image)

Question 6 was created to gather initial perception about what may be deceiving about organic foods (Figure 3). Question six discussed what could be deceiving about organic foods. Over half the participants, 53.1% felt the cost was the most deceptive while 36.7% felt genetically modified chemicals were deceptive, pesticides were 8.2 % deceptive, and 1 % felt taste was deceptive.

Question seven asked if they base their decision on whether or not a restaurant has organic food. Overwhelmingly 95.9% stated that they did not use that factor to decide whether they would dine at a particular restaurant. 4.1% of the participants said they choose a restaurant based on organic food availability.
Question eight allowed us to identify the main location as to where the participants shopped for groceries (Figure 4). Based on the data that was gathered, 67.3% of the people surveyed shop at Stop and Shop while 4.1% shop at Price Chopper. 2.0% of the participants shop at Whole Foods, 4.1% shop at Trader Joes and 22.4% shop somewhere else.

Question nine helped identify the participants’ perception of why it is beneficial to eat organic foods (Figure 5). The majority of the participants, 87.8%, feel it is beneficial to eat organic foods because they are healthier. The data also shows that 4.1% believe organic foods taste better and 8.2% did not know enough about organic foods to answer the question.
The last question was an open-ended question. The questions asked participants to share their own views on the organic food trend. The answers from the survey varied; very extreme and very moderate answers. Out of the 49 responses to the survey, 55% had a more positive outlook on the organic food trend. Here are a couple of responses from the survey that see the organic food trend as having a positive impact on health and society:

**Respondent A:** It is allowing the homeowner to grow their own fruits and vegetables. During WWII the public, to aid in the war effort, was encouraged to have "victory gardens" in their own backyard. Some towns encouraged this effort by allowing families to use public gardens near their home. Towns would plow the plot and assign spaces to any family who requested them. This trend is returning.

**Respondent B:** I think that the organic food trend makes a lot of sense. Chemicals aren't meant to be put into our bodies. I find it interesting that people try to discredit organic foods by saying that they have been proven to be no healthier than general foods. These quick news bites are ridiculous because they don't define what kind of healthy we are talking about. Organic foods aren't necessarily less fatty, for example, but it is still better to put less chemicals and more real produce and food into your body.
The survey results for the last questions show that 45% of the participants had a more negative outlook on the organic food trend. Here are a couple of responses that see the organic food trend as a financial motivator over health:

**Respondent C:** I think it's over hyped. I always ate local farm food growing up in the 80s. Suddenly, it's expensive. I think our societal problem has more to do with processed foods and less to do with organic/non-organic foods. I know several farms in upstate NY that have tried to become certified as "organic farms", but the cost to apply is very high. Most small town farmers cannot afford to bother. Some of these farms are obviously organic, but do not receive the federal label. So...I think it's a good idea, but people should use their heads. Organic or not, buy from a farmers market, buy local, buy real food.

**Respondent D:** They are expensive and I often wonder if this food really has no chemicals added to it or they are just saying that to get more money from me. Why should we have to pay more for healthy food?

**Conclusions and Discussions**

The objective of our study was to 1) determine if a targeted group has the same attitudes as the general public regarding the organic food market; 2) identify perceptions towards this can help educate today’s youth and, 3) discuss sustainable practices economically by providing and promoting organic foods to all socioeconomic groups. From the current research and our survey, there was a clear connection between the general public’s attitude towards organic foods and our targeted group.

Organic food consumers feel that organic foods are a healthier choice. Organic foods taste better and look better because they contain a significantly less amount of chemicals, pesticides, dyes, and bacteria. Organic farmers try to follow organic farming practices outlined in the “National Organics Program,” yet small amounts of pesticides and chemicals may be present due to environmental factors that are beyond their control such as contaminated air, water, and soil, weather patterns, and natural disasters (Crinnion, 2010). Even though organic farming has many benefits, the monetary cost still deters most consumers from purchasing organic foods.

In our survey we found that the majority of the participants considered themselves as healthier eaters because they eat four or more servings of fruits and vegetables each week. The participants in our survey also felt that the main reason to purchase organic foods was because it was healthier for them.
support this, Crinnion’s reviews of past research state that organic foods contain more vitamin C, iron, prosperous, and magnesium than conventional foods. Also organically raised cattle yielded higher levels of omega-3.

Surprisingly, even though our participants felt that organic foods were a healthy choice, the majority chose to shop at Stop and Shop and not a specialized organic food store. Stop and Shop has an organic food section but does not have the same variety and quantity of organic foods that are found at specialty stores such as Whole Foods. By this meaning that Stop and Shop has a few organic sections within its store while the entire Whole Foods store is dedicated to organic food. This evidence is supported by personal observation from actually visiting both Stop and Shop and Whole Foods.

Similar to the current research, our participants felt that cost played a major role in deciding whether or not to purchase organic foods. The majority of both groups see the organic food trend as a positive step towards a healthier lifestyle without question. The real question is can the general public afford to pay for this lifestyle?

References


Appendix A: Organic Food Survey

1. Do you consider yourself a healthy eater?
   a. Yes
   b. No

2. Define: “organic food” (open ended)

3. What is your amount of servings of vegetables per week?
   a. 1 serving per week
   b. 2 servings per week
   c. 3 servings per week
   d. 4 or more servings per week

4. What is your amount of servings of fruit per week?
   a. 1 serving per week
   b. 2 servings per week
   c. 3 servings per week
   d. 4 or more servings per week

5. What can be deceiving about organic fruits and vegetables?
   a. Taste
   b. Cost
   c. Pesticides
   d. Genetically modified chemicals

6. Where do you primarily shop for groceries?
   a. Stop and Shop
   b. Price Chopper
   c. Stew Leonard's
   d. Whole Foods
   e. Trader Joe’s
   f. Other

7. When going to a restaurant, do you make your decision based on whether the restaurant offers organic food?
   a. Yes
   b. No

8. Why could it be beneficial to eat organic foods?
   a. They taste better.
   b. It is healthier for me.
   c. My friends and family eat it.
   d. I don’t know enough about organic foods

9. In your own words, what is your opinion about the “organic food” trend? (open-ended)
The Meaning of the River Cube
“Human civilization haunts the waterways” (Whitehead.)

Eleanor Godway, Ph.D., Professor
Department of Philosophy
Central Connecticut State University
Email: Godway@ccsu.edu

The river cube – a compacted lump of all the unrecyclable trash collected by local residents from a stream and its banks, supposedly to be set up beside the waterway with a plaque explaining what it is and how it comes to be there. (Ours has been sitting outside the CCSU art gallery.) When I had a chance to join in this activity I found myself confronted with the darkness, the specter that our civilization projects: all that unsightly junk which we try to ignore (what we throw “away”) was brought to consciousness, met again in a literal “return of the repressed”. If I can convey this to you, perhaps in time (just in time) more of us may be able to face the danger we are in, if we can truly see the (side)effects of how we live today. Through our treatment of the earth and her riches as an endless source of stuff waiting to be used (indeed, used up) – in Heidegger’s phrase as “standing reserve” (1977, pp 14-19) we generate unspeakable amounts of what can only be described as unusable dregs.

Is “sustainability” even possible as long as we continue to go on this way?

This essay is an unpacking of my experience with the river cube in the context of ideas mainly of Martin Heidegger which I wish to bring to bear on how the way we live and think pertain to “sustainability”. The other voice echoing in my mind is that of Howard Richards, who has commented that he suspects “that art is an ethnocentric concept proper to a culture that is not sustainable.”(1992, p 161) He was reflecting on such “art objects” as were originally intended for places of worship, or, indeed, afforded occasions for worship, which have ended up in museums or banks.

Heidegger wrote of the “essence of technology” (1977, pp 3-35, almost passim) and, in his discussion of art, of the ancient connection between technē and poiēsis before art was identified as a separate sector of cultural activity. For Heidegger art can be a source of revelation, of alethēia. He interpreted this Greek word for truth in the light of a possible derivation from a lēthe, referring to Lethe: in Greek mythology, when the souls of the dead cross the river Lethe, they forget all they knew in life, So, by alethēia he means something like the
reversal of this, a kind of “unforgetting.” Not however a simple recalling, but a breakthrough, what he describes as a “happening of truth” an “unconcealedness” (1971, pp 54-5, and elsewhere), when for a moment we recognize a dimension of Being which addresses us, but which is almost immediately covered over by everyday experience. I found, somewhat to my surprise that the river cube did something like this for me – though not perhaps in a way that Heidegger could have imagined; I haven’t yet had feedback from Howard Richards.

In a number of ways the river cube resists being called “art” but it may just be what is needed for us to glimpse, by its very absence, something of the old essence of technology and wake up to a sense of our relationship with water before it became a “resource,” an element of “economic activity,” Heidegger’s standing reserve. For Heidegger, today’s technology needs to be thought about in terms of what it does to us: if we think of it merely as a means, we think of ourselves as wielding a tool over which we have control, and which empowers us. He suggests that, rather, it has begun to have power over us, and that we are delivered over to it in the worst possible way when we regard it as something neutral. Then we too, human beings, are apt to become “standing reserve,” or, as it is so vividly expressed in current terminology, “human resources.” Are we now, ourselves, to be regarded merely as material to be used or, worse still, do we think of ourselves this way? And what is it that so uses us? Some great machine or monstrous all-consuming organism called the “economy”? I do not want to go so far as Heidegger seems to, and bemoan industrial development as such, nostalgic for simpler times when the river was not “used up” by hydro-electric power, when our relationship with it allowed it to continue to be itself, even as it helped us, as in the case of the saw mill. Yet now, it seems as if we are no longer merely consuming the water, but are on the way to poisoning and destroying more than the waterways with processes such as “fracking” and exploiting the Tar Sands.

Bob Johnson came to campus a couple of years ago, to take part in the first CCSU “Sustainability” conference. He gave a presentation (much of which can be seen on the relevant website – rivercubes.net), and invited members of the community to participate in our own river cube project which took place after the conference was over. We met beside the stream on the edge of campus and collected all the trash we found there – in the water and scattered on the banks. Actually picking it up, foul though the stuff was, was somehow a joyous thing to be doing: we felt a really positive energy, as we helped the stream to recover its vitality and its
natural setting. Afterwards, Johnson sorted it all and took what could not be recycled to a junk yard where he had it compacted into a more or less cube-like shape. It has been for some time outside the campus art gallery, about a mile from the place where the material had accumulated.

What Johnson plans to do, if possible, what he has done with such cubes in a number of sites in the U.S.A. and other countries, is set it up, next to where all that stuff had been, with an explanation of what it is, who participated, and how it comes to be there. For him it illustrates that quotation from Whitehead: “Human civilization haunts the waterways.” But what sort of haunting is this? What traces of our culture are still apparent here? From what specter do we try to avert our eyes? Johnson calls these cubes “urban watershed signatures.”

What exactly is this thing? Heidegger aside, is it art? It has been after all on view next to the art gallery. Where else would one find such a thing? I described Johnson as an artist/philosopher, and he is engaged in the artistic community. He has been offered thousands of dollars for one of these cubes if he would allow it to be installed in an art gallery. But he has always refused to let one go in this way. (He asks instead that money be contributed to the River Cube Project – it costs money to accomplish its goals). A number of artists have made a reasonable living from creating objects almost indistinguishable from these cubes, and which appear in contemporary exhibits and art galleries around the world. I do not want to imply that this is inappropriate. (In fact this essay might offer an explanation of sorts for such a practice.) But I would suggest that Johnson’s refusal has particular significance (though he would not necessarily agree with my interpretation). When he was originally approached by the curator of those sustainability events and asked to set up a river cube in the art gallery, he originally said, “No. They are meant to stay where they belong.” When he heard more about the message of the events he relented, and allowed that he could arrange for one that at least belonged in Connecticut (so it need not cross a state line!), and would also constitute an invitation to participate in the project. (An invitation which, as you see, I for one felt moved to accept). What is lost when the cube is taken away from its “birth place”?

The meaning it can have in its own landscape is in a way the opposite of what Heidegger discusses in another essay, “Building Dwelling Thinking” (1971, pp. 141-159), being a kind of anti-construction, indeed clear evidence of our failure to dwell in the way which should inform our building. When we truly dwell, we build in such a way as to honor our relationship with both what limits us and what sustains us in our brief time on this earth. He gives the examples of a
Greek temple (1971, pp. 41-43) and a farm house in the Black Forest (pp. 157-8). In his essay “The Origin of the Work of Art” (1971, pp 17-86), Heidegger explains that the object is called a work because of the work it can do. There are mere “things”, with the sort of status accorded to objects with little or no meaning for us, that get in our way, but the work of art has to be a thing in its own right so to speak, as opposed to equipment valued for its usefulness. When a work is appreciated as art, it is not as a means to any end, but because its very “thingliness” can bring something about. It is able to do this because it makes us pay attention to both its materiality and the human component of making/creating (poiēsis) for its own sake. This is how I interpret what he says of the “striving between earth and world”, “earth” being what is distinguished from and resistant to the human “world” of making and using. If this striving is what gives birth to the work as a work then its work is to open a rift, a space, which he says “lets the earth be an earth” (1971, p. 45). It is this opening which allows for alethēia. And the colors in the painting, the sounds of the music or the poem, the gleam of the metal, the smooth solidity of the marble are not used up in the art object, but are somehow more present than ever. However, unlike the beauty that Heidegger celebrates, the trash of the river cube is revealed as more horribly trashy, even as it enables us to recognize at the same moment the ways we are failing – at letting the earth be the earth, the river be the river. It comes across as an unconcealedness, a happening of truth we would rather ignore, the return of the repressed, a very haunting, a physical, tangible ghost of what we would like to imagine as relegated to the past, over and done with, “away.” But are we ready to try to come to terms with the unusable dregs of the standing reserve, those discarded “side effects” of our civilization? The temple and the farmhouse that Heidegger described had meaning in their landscapes because they let the mountain be a mountain, the valley be a valley (and traditional farming let the earth be the earth – see Christopher Lind’s “When the System Farms the Farmers” (1994.)) To build as they did then, people felt able to express awe in the face of what transcended them, care for and dependence on their “environment”, and thanks for what had been granted in that place that enabled them to live for the time allotted to them. Our river cube says something very different. But it is important I think to recognize that we are heirs to that older way of dwelling and the river cube has to be understood as a needed part of a conversation we have been avoiding.

If a work of art is not to be a means to an end, then wondering about what it says will not be a concern with getting a (or the) message across. Certainly, any work can be used to send
messages, and the river cube can be employed for a number of purposes, so as to make valid points relevant to biology, especially ecology, chemistry, etc., and to sociology, economics, politics, and so on, as well as in efforts to change people’s attitudes, whether regarded as education or propaganda for “environmentalism,” (though it might be worth recalling the older theological meaning of propaganda – i.e. without the negative connotation it has today.) So I am not worrying about any message that might not come across if it were put elsewhere, or bought and sold. I have already indicated I was more focused on the process than the product.

Participation in collecting the trash with the other members of the group was an extraordinary experience. It was so much more that a contribution towards “improving the environment.” I felt engaged in what I can only describe as a ritual which involved participation in something far more serious than a “clean-up;” it was a reconnection with the natural world: water as the source of life, and a restoration of the holy properties of this particular stream, finally being honored again. And it has to be done by the community that lives in its neighborhood. “Holy properties”? Even an expression of repentance?

I have recently been in Australia, and have a sharp sense of the imposition of the foreigners’ religion which was to replace the traditional spiritual relationship to the landscape. And I began to think about what happened long ago in my own country (England). The “conversion” of the inhabitants to Christianity was not entirely successful. Wells and springs which had been honored as sacred to local deities continued to be treated as holy sites, usually by associating them with some saint who was then credited with miraculous healing. And carvings of the fertility goddess continued to appear in and on churches through the Middle Ages, though their presence was certainly unofficial. (They have recently attracted some interest and have acquired the name of “Sheela-na-gigs.”) People living close to the land did not want to abandon entirely the sense of a connection to the reality that had helped make sense of their relationship to life, and wanted the familiar symbol at hand. I feel something of the same need, a hunger, an ache I did not know was there until it was brought to consciousness and at the same time addressed by the river cube. The collection of rubbish from the water way was, yes, a restoration, a movement towards healing in which I too was being healed, a kind of communion, an act of piety. That the creation of the river cube needs a group working together reminded me something told about Aboriginal dance ritual performances which were only possible when members of different nations could gather in one specific holy place to participate. Our “ritual”
in comparison was crude and almost formless; perhaps one might hope it could be the beginning of a new tradition. If the performance of these rites amounts to the celebration of our dependence on the source of life and our relationship to each other, the cube itself is an offering to the river goddess, an acknowledgement of guilt and a commitment to live differently. And the ritual will be complete when the river cube is erected in the landscape where it belongs. It will be what the Germans call a Denkmal, something between a monument and a memorial, a public installation meant to make us think and remember, to draw attention to what has happened there, and what must not happen again.

What I have learned of the Aboriginal “dreaming” which imbued their environment with meaning has colored my sense of why the river cube experience affected me the way it did, and why I want to participate again. This project offers a chance to recover that sense of gift (Heidegger’s Es gibt) that so much of modern life covers over – the appreciation of what we have, which nature has so freely bestowed on us, which we have squandered so thoughtlessly. I called it an act of piety, and Heidegger referred to the piety of thinking, in particular the task of recovering thinking as thanking (1966.) It is an interruption of business as usual, a breakthrough, a reminder of the inherent abundance of Nature’s gifts to us – quite outside the everyday world of economics – and also an opening into the world of poetry, of dreams. Audre Lorde wrote: “The white fathers told us: I think therefore I am. The Black Mother within each of us – the poet – whispers in our dreams: I feel, therefore I can be free” (1984, p. 38.) And if some of the feelings aroused by the river cube have the aspect of nightmare, it is even clearer that we must pay attention. And we need to be set free from the calculative thinking of means and ends, market forces, conspicuous consumption, planned obsolescence, the mindless promotion of economic growth, etc. Heidegger’s other kind of thinking is meditative and responsive. It allows for what he called Gelassenheit, a “letting be” (1966.) In his version it can seem like something otherworldly, a kind of self-restraining, even passive, whereas I think I have discovered an active, joyful version which is forward looking and hopeful. If as Heidegger says; “only a god can save us now” (1981), we must – and can – relearn to invoke the ancient gods, so that we may be reconnected to the spiritual dimension of the earth/world.

The reference to sustainability in Howard Richards’ comment (that he has come to suspect that art is an ethnocentric concept proper to a culture which is no longer sustainable) takes on a new resonance in relation to this practice, as it is far from being an example of the art
he was talking about. Surely it could be that this new thing does something that what we call art (and nowadays put in galleries) used to do: express a meaning that transcends the individual, helps to bind the community, celebrates and makes sense of life and promises a future. (An idea developed in more detail by Godway, 2011.) If we are to have a culture that can be sustained, we must somehow change our perspective, break with the unlivable past, and work towards restoring our relationship with the earth. Indeed, while I have been interpreting the river cube project in terms of confession and repentance, we might also think of all that trash as “laudable pus”, toxic matter that has to be expelled from the diseased body, brought to the light of day, before healing can begin.

References


A Green Oasis in a Food Desert: 
Increasing the Accessibility of Affordable Healthy Foods in an Urban Neighborhood 
in Hartford, CT

Katherine Johns-Galvin, Graduate Student 
Department of Anthropology 
Central Connecticut State University 
Email: johnskaj@my.ccsu.edu

“Let thy food be thy medicine
and thy medicine be thy food”
Hippocrates (460-370B.C.)

“You are what you eat”
Victor Lindlahr (1895 – 1969)

Introduction

Over the last three decades, a problem has been growing in both urban and rural areas of the United States where access to fresh, affordable and nutritious foods has been severely diminished, while access to cheap, high-calorie, low-nutritional value food has increased. Although this is not specifically an urban issue, the research presented here is focused on an urban neighborhood in Hartford, CT. The proliferation of convenience food, as well as fast-food chain restaurants, in neighborhoods around the country coupled with a sedentary lifestyle has contributed to an epidemic of diet-related diseases such as heart disease, obesity, diabetes and cancer. Particularly alarming is the impact this convenience food diet has on children. As former Surgeon General Richard Carmona states, “Because of the increasing rates of obesity, unhealthy eating habits and physical inactivity [of children], we may see the first generation that will be less healthy and have a shorter life expectancy than their parents” (American Heart Association 2012). Dr. Francine Ratner Kaufman, president of The American Diabetes Foundation, reported a 33% increase in Type 2 diabetes (formerly referred to as ‘adult onset’ diabetes) in the pediatric population between 1992 and 2002 alone (Kaufman 2002:217). What is the number one risk factor for Type 2 diabetes? Obesity. Risk factors for obesity include a sedentary lifestyle and diets high in calories and refined sugars like those found in convenience foods.

*Community Food Security*, a concept used by the Connecticut Food Policy Council, examines the food resources of a community including: availability & affordability, community resources such as food banks & soup kitchens, access to WIC and Food Stamp offices, accessibility of food outlets and community food production (Lopez, et al 2005:1). According to a study released by the Council in 2005, Hartford, Connecticut ranked 166 out of 169 towns in food security, making it one of the least food
secure towns in Connecticut. The absence of quality foods in various communities that contribute to poor diets is also referred to as a Food Desert. The Food, Conservation, and Energy Act of 2008 defines a food desert as an “area in the United States with limited access to affordable and nutritious food, particularly such an area composed of predominantly lower income neighborhoods and communities” (H.R. 6124 2008:§7527). Based on this definition, large rural and urban populations throughout the United States reside in food deserts. In fact, the United States Department of Agriculture (USDA) reports on their Food Desert Locator website that in 2009 there were at least 6,500 food deserts within the United States with a total of approximately 13.5 million people living in them.

This research will examine how a cycle of poor nutrition has been created in the Frog Hollow neighborhood, an urban food desert, in Hartford, Connecticut and was undertaken in an attempt to ascertain whether or not issues of food desertification and food oppression exist in Frog Hollow. By answering the following questions: 1) What is the cost of a healthy food basket in Frog Hollow vs. West Hartford?, and 2) What types of food outlets exist in Frog Hollow?, this research will support an argument that these issues do indeed exist in Frog Hollow. The absence of large chain grocery stores and the ubiquity of fast, high-fat, high-calorie convenience food found at neighborhood markets (bodegas), drug-stores, liquor and convenience stores in Hartford have left a nutritional vacuum in neighborhoods where access to affordable, healthy foods has been severely curtailed. Farmers’ Markets, community-supported agriculture and community gardens have grown over the past three decades throughout Hartford’s neighborhoods to fill this gap. I argue that a renewed interest in community gardens and gardening, as well as expanded services at farmers’ markets has reintroduced affordable, attainable healthy foods to the Frog Hollow neighborhood and allowed the neighborhood to take the first steps towards battling food insecurity. This research will address three topics related to urban food deserts; access, affordability and health. The research is significant because it highlights the problem of food oppression faced by a poor and predominately minority community living in a food desert in Hartford, Connecticut and explores how this issue can be fought and overcome with the introduction of locally grown produce at affordable prices.

Frog Hollow History and Demographics

The Frog Hollow section of Hartford is an area measuring 1.691 square miles that is bounded by Interstate 84 to the North and West, Hamilton and Lincoln Streets to the South, and Washington Street to the East (City-Data.com 2011). The name “Frog Hollow” was inspired by a large population of frogs that inhabited a marsh in the late 1700s near the corner of Ward and Broad Streets. The area has a long
history as a neighborhood primarily made up of working class citizens. Originally settled by farmers, the area did not develop as quickly as other areas of Hartford for the first 200 hundred years of its inhabitation. In the mid-1800s change started as factories began to spring up in Hartford both in and along the outskirts of Frog Hollow where small textile mills had previously been established. The neighborhood’s prime setting along the Park River and the New York - New Haven - Hartford Railway made it an attractive location for manufacturing. In 1852, the Sharps Rifle Manufacturing Company opened its factory on Rifle Road (now Capitol Avenue). When that company moved to Bridgeport in 1870, the factory was taken over and enlarged by the Weed Sewing Machine Company.

![Figure 1: The Weed Sewing Machine Company (c1889). Note the close proximity to the railroad and Park river (directly behind the factory).](image)

Other factories soon followed. In 1873, Charles Billings and Christopher Spencer started the Billings & Spencer Company which opened its facilities at the corner of Lawrence and Russ Streets in Frog Hollow and manufactured drop-forged tools (Historic Buildings of Connecticut 2009). In 1876, Hartford Machine Screw set up in a space leased from Weed Sewing Machines and grew steadily until 1948. In 1878, Albert Augustus Pope founded the Pope Manufacturing Company at 436 Capitol Avenue which produced Columbia Bicycles initially, and later Pope Automobiles.
At its peak, Pope Manufacturing occupied 18 acres of factory space and employed nearly 4,000 people (Grant 2004). The Pope Park website notes that in 1895, Albert Pope turned over 90.5 acres to the city of Hartford for the creation of Pope Park.

Companies sprang up all over Hartford in the mid- and late-1800’s representing industries as diverse as textiles, electro-plating, engine manufacturing, machinery manufacturing, iron works, asbestos manufacturing, and many other trade goods. By the turn of the century, Capitol Avenue was lined with factories producing a myriad of goods. In 1889, the Hartford Board of Trade reported that “the manufacturing establishments of Hartford employ approximately 4,979 men and 1,329 girls, disburse $3,156,600 annually in wages, and turn out an annual product of twelve millions” (1889:155).

The boom in factory building was matched by the development of the Frog Hollow neighborhood. The Weed Sewing Machine Company sponsored two housing developments in Frog Hollow across from their factory – the Columbia Street and Park Terrace Row Houses – to house workers. Additionally, developers bought up neglected farm land in the area to build housing for factory workers. Due to the condensed area around the sprawling factories, the most common type of house built in Frog Hollow is known as the “perfect-six”. Perfect-sixes are three-story houses with two apartments on each floor, with each house accommodating six families. This type of housing adequately accommodated Hartford’s growing citizenry which had swelled to 79,850 by 1900, a 50% increase over the population total from 1800.

In the early 1900s, Hartford also saw a rise in the insurance industry. Life insurance companies incorporated in the 1800s began to grow as disasters such as the Great San Francisco earthquake of 1906 pushed citizens to consider insuring their lives and property. The Hartford Board of Trade reported
in its 1907 annual meeting that “the life insurance interest located in our city has grown to immense proportions and is of very great importance. It has become one of the principal factors in this business community and there seems to be no limits to its attainments” (1907:12).

Throughout the early 1900s, manufacturing industries continued to grow in Hartford. The two world wars provided opportunities for companies to expand their production lines into the defense industry. Between 1917 and 1918, four-fifths of Connecticut industry was involved in defense contracting. This time period represents the heyday as well as the beginning of the decline of Hartford manufacturing. Between 1905 and 1913, the Pope Manufacturing Company moved its manufacturing operations to Westfield, MA. In 1914, they moved their office operations out of Hartford to Westfield. This shift was just one of several which closed or moved large factories out of Hartford in the mid-1900s. In 1925, the Pratt & Whitney Aircraft Company on Capitol Avenue in Hartford developed their first aircraft engine designed by Frederick Rentschler, called the Wasp. By 1938, just after the start of World War II, the company had moved out of Hartford and into West Hartford (Pratt and Whitney Measurement Systems, Inc. 2011). In 1962, the Billings and Spencer Company was acquired by the Crescent Niagara Corporation of Buffalo, New York and operations were moved out of Hartford to Jamestown, NY shortly thereafter. In 1979, the Royal Typewriter factory on New Park Avenue was shut down, and the manufacturing operations were moved overseas.

As factories began to close their doors in Hartford those citizens who had means to leave the city and follow the work did. Those who could not were left to endure a new culture of divestment. In the 1960s, a shift in the population demographics can be seen. For the first time since census statistics were first recorded for Hartford in 1790, the population decreased. From the 1950 to the 1960 census, the population of Hartford declined by 15,000 or 8.6% (US Bureau of the Census 1963). This is a trend that has continued to the present. In fact, the census data over the last 50 years show a steady decline in both the populations of Hartford and Frog Hollow. Over the same time period, evidence of “white flight” can also be seen in the population demographics. In 1950, 99.8% of the population was classified as white on the census, by the 2000 census, whites accounted for only 11.1% of the population of Frog Hollow. In contrast, in 1960, non-whites
accounted for 0.65% of the population. By 2000, the last year neighborhood statistics are available for, this number had climbed to 86.6%. The graph below illustrates this population shift as white citizens left the neighborhood, and minority groups (mainly Puerto Rican) moved in.

![Frog Hollow Population 1950-2000](image)

**Current Day Frog Hollow**

A ride through Frog Hollow today reveals the neighborhood’s eclectic soul. The neighborhood’s main thoroughfare, Park Street, is lined with storefronts that have been added to the first floors of the neighborhood’s iconic ‘perfect sixes’. Spanish American markets called ‘bodegas’, restaurants and cafés cater to the neighborhood’s mixed heritages. There are Greek Cafés, Caribbean Restaurants, Puerto Rican bakeries and Mexican Eateries. The area’s strong Hispanic influence can be seen in shop names like El Mercado and Viva Mexico Spanish Grocery.

Many of the former factory buildings have been repurposed. The Billings & Spencer Company at the corner of Lawrence and Russ Streets is now owned by the Melville Charitable Trust and is home to Billings Forge Community Works. According to the trust’s website, the work of Billings Forge Community Works is “designed to replace disinvestment with investment in Frog Hollow, create a shared sense of mission, offer education and training, and underscore the idea that a good place to live is more than just
four walls and a roof” (Melville Charitable Trust 2010). The Billings Forge complex now includes 98 mixed income apartments, a restaurant and a café where residents can receive free job training, community art space, a community garden where children from the neighborhood learn about healthy eating and a year-round weekly farmer’s market.

Government and city buildings are interspersed with typical signs of urban blight and divestment: boarded up factory buildings, houses and storefronts line Capitol Avenue and the surrounding roads.

Figure 3 - Capitol Archives and Record Storage

These signs of urban blight extend into the neighborhoods that border Frog Hollow such as Behind the Rocks and Barry Square.

One such vacant storefront is the Mega Foods supermarket on New Britain Avenue near Trinity College which was the closest supermarket for many Frog Hollow residents. Notably, in their 2004 Hartford Area Food Stores Price Survey, the City of Hartford Food Policy Commission ranked this store number one for price competitiveness in Hartford (Hartford Food Policy Commission 2004). The Mega Foods chain of mid-sized supermarkets had three stores in Hartford when it filed for bankruptcy in 1994, the New Britain Avenue location closed in the Fall of 2006 (O’Connell 2007), and still sits vacant five years later. Grocery storefronts that are nonexistent or vacated are a trend that can be seen in poor and minority neighborhoods all over the United States. A study led by Dr. Kimberly Morland of the United States Environmental Protection Agency Office of Research and Development looked at trends across several states (Mississippi, North Carolina, Maryland, and Minnesota) and found that there are four
times more supermarkets in white neighborhoods than black neighborhoods, and wealthy neighborhoods have over three times as many supermarkets as poor neighborhoods (Morland et al 2002:23-29). A similar study found that wealthy (middle- and upper-income) communities in Los Angeles County have over twice as many supermarkets per capita as low-income communities, and that predominantly white communities have over three times as many supermarkets than predominantly black communities, and almost twice as many as predominantly Latino communities (Shaffer 2002).

The 2000 census reported that the population of Frog Hollow was 9,323 people. This represents a population decline of 22% over the 30 year period from 1970 to 2000. The 2000 population was predominately minority with Hispanic residents making up 71.7% of the population, Black, non-Hispanic residents at 12.7%, and Other non-Hispanic residents at 5.1%. The following graphs depict the racial makeup of Frog Hollow vs. Hartford City.

Do Food Deserts Exist in the U.S?

Currently, there is much debate about whether or not food deserts even exist in the United States. This is partly due to the fact that there is no clear definition of the term ‘Food Desert’. The Centers for Disease Control and Prevention (CDC) acknowledge this on their website by noting that “estimates of how much of the U.S. population is affected can vary greatly because there is no standard definition of a food desert” (CDC 2010). By contrast, the USDA has created an online ‘Food Desert Locator’ (http://www.ers.usda.gov/data/fooddesert/) where users can enter any U.S. address and view
food deserts by tract based on census data. The USDA borrows the definition used by the Healthy Food Financing Initiative (HFFI) to define a food desert as:

A low-income census tract where a substantial number or share of residents has low access to a supermarket or large grocery store:

- To qualify as a “low-income community,” a census tract must have either: 1) a poverty rate of 20 percent or higher, OR 2) a median family income at or below 80 percent of the area's median family income;
- To qualify as a “low-access community,” at least 500 people and/or at least 33 percent of the census tract's population must reside more than one mile from a supermarket or large grocery store (for rural census tracts, the distance is more than 10 miles). [USDA Food Desert Locator 2011]

The language in the Food, Conservation, and Energy Act of 2008 (commonly referred to as the 2008 Farm Bill) similarly defines a food desert as an “area in the United States with limited access to affordable and nutritious food, particularly such an area composed of predominantly lower income neighborhoods and communities” (H.R. 6124. 2008:§7527). In his 2008 article, The Sprawl of Food Deserts, M. Nathaniel Mead defines urban food deserts as “areas within city centers where low-income people have poor access to vegetables, fruits, and other whole foods” (Mead 2008:A335).

While most definitions focus on some aspect of income (i.e. low income) as well as proximity to affordable and nutritious food, few also take into consideration vehicle access. The USDA mandates that for an area to be considered a food desert, “at least 500 people and/or at least 33 percent of the census tract’s population must reside more than one mile from a supermarket or large grocery store” (USDA ERS 2011). This definition, however, does not take into consideration the fact that many low income people do not own cars. Additionally, while a mile walk may not be difficult for some, for the old and infirm, a mile walk may be nearly impossible. Seniors living on fixed incomes and unable to arrange for transportation to a supermarket may be spending a disproportionate amount of their income on convenience foods available at small corner markets or bodegas that are more accessible to them.

The USDA definition also does not take into consideration the availability of healthy foods in low-income census tracts. Nor does it define the terms ‘supermarket’ or ‘large grocery store’. This represents a gap in the definition due to the fact that a measure of access to healthy foods is a critical element of food desert classification. Many mid-size supermarkets that exist within urban areas do not stock the freshest of fruits and vegetables while many small grocers have started stocking fruits and vegetables from local farms. Generalizations about supermarket size corresponding to healthy food
access should be replaced with market data on sales of fresh fruits and vegetables in markets, as well as farmer’s markets, located within urban and rural areas.

What is Food Oppression?

In her 2007 article *Fast Food: Oppression Through Poor Nutrition*, Andrea Freeman defines food oppression as:

A form of structural subordination that builds on and deepens pre-existing disparities along race and class lines. Food oppression is difficult both to identify as a social wrong and to redress, because it stems from a combination of market forces and government policy. Conventional wisdom holds that food consumption is a matter of private choice and free will, but blaming individuals for their own health problems obscures the structural nature of food oppression. Despite substantial obstacles to change, racial and class progressives must demand accountability from those responsible for the institutionalization of poor health and lower life expectancy for groups already facing multiple sites of oppression. [2007: 2245-2246]

Similarly, in their report for the FoodFirst Information and Action Network, *The Right to Food: A Resource Manual for NGOs*, Rolf Künnemann and Sandra Epal-Ratjen, define oppression as “pushing people down to a point below the minimum human standard and/or keeping them there”. They further define food-related oppression as coming “in two different categories. The first category concerns acts that destroy peoples’ access to food or food-producing resources. The second category refers to acts or omissions that keep people excluded from food or food-producing resources” (Kunnemann & Epal-Ratjen 2004:18). Both Freeman and Künnemann & Epal-Ratjen’s definitions accurately capture the essence of food oppression as using food to subjugate an already oppressed population. Food oppression is more likely to occur in areas where the population is made up of predominantly low-income and minority people. In addition, any review of food oppression must include a look at the U.S. Government’s involvement and perpetuation of food oppression. The government has been a party to this type of oppression mainly through its inaction and unwillingness to enact meaningful legislation towards ending food oppression.
There is a clear connection between food, politics and economics. As Jules Pretty, from the University of Essex wrote in a 2005 report published in the journal Food Policy, “the most political act we do on a daily basis is to eat, as our actions affect farms, landscapes and food businesses.” In fact, local food movements can be seen as a type of political resistance. Because capitalism is an economic and a political force, buying locally produced foods rather than mass produced convenience foods allows low-income consumers to use their food dollars to opt for small market rather than mass market. In the capitalist marketplace, dollars equate to actions, and these actions can move the market. However, the reverse is also true. Capitalism allows corporations to dictate what and how the poor eat. Companies like Coca-Cola, Pepsi and McDonald’s routinely go into schools in poor neighborhoods and provide funding (or “sponsorship”) for big ticket items such as playgrounds, computer labs, A/V equipment and gymnasiums in return for becoming the school’s preferred vendor. In other words, these companies are placing underfunded schools in the unusual position of introducing soft drinks and fast food into school lunches because they cannot find other ways of raising money for education (Freeman 2007:2234-2235). This is a marketing campaign aimed at creating food and drink preferences in children from a young age.

In political economic theory, this represents a conflict. There is an ongoing conflict between low-income people and the corporate giants that conspire to control the caloric intake of consumers. In the United States, the political system supports the growth of industry to the point of refusing to regulate corporations taking aim at low-income families in order to sell them cheap, low-nutrition, high-calorie foods. Similar to Eric Wolf’s peasants, low-income residents of cities are “not merely a productive organization constituted of so many hands ready to labor in the fields; it is also a unit of consumption, containing as many mouths as there are workers” (Wolf 1966:318). In a capitalist society this equates to corporate dollars. Dollars spent by food companies to lobby government for subsidies to make cheap food, to keep the FDA from regulating the cheap foods, and keep a steady supply of low-income population as consumers through targeted advertising. These factors combined with the U.S. capitalist idea of rugged individualism create an environment where low-income people are often blamed and ostracized for their perceived poor food choices and resulting health issues (Freeman 2007).

Health Consequences of Life in a Food Desert

In their 2010 report published in the International Journal of Health Geographics, Akihiko Michimi and Michael Wimberly show that a relationship exists between the distance to supermarkets, consumption of fruit and vegetables and obesity. Their research found that “obesity prevalence
increased and fruit and vegetable consumption decreased with increasing distance to supermarkets in metropolitan areas” (Michimi and Wimberly 2010:1). Additionally, the 1999-2002 National Health and Nutrition Examination Survey (NHANES) survey found that nationally, 16% of children ages 6-19 years are overweight, and that obesity disproportionately affects certain minority children - African American adolescents ages 12-19 were more likely to be overweight at 21% than non-Hispanic White adolescents at 14% (U.S. Department of Health and Human Services 2011). Between 1999 and 2008, in the city of Hartford, the obesity rates for children ages 2-5 were 23%, and for children ages 6-11 the obesity rates were 24% (Pachter 2009:5). Taken together, these studies are significant considering the fact that most children living in Frog Hollow are minorities and live some distance from a supermarket.

Obesity in childhood can increase the risk of diseases commonly associated with adulthood including high cholesterol, Type 2 diabetes and hypertension. The 1999-2002 NHANES survey also reported that “overweight adolescents have a 70 percent chance of becoming overweight or obese adults, which increases to 80 percent if one or more parent is overweight or obese” (U.S. Department of Health and Human Services 2011). In 2008, the Centers for Disease Control and Prevention (CDC) estimated that 22.6% of adults (20 years and older) in Hartford County were obese, 7.9% had been diagnosed with Diabetes, and 22% were physically inactive. Furthermore, the leading cause of death in Connecticut in 2008 was heart disease (Poulin and Hynes 2011:5). These diet related diseases can be attributed in part to lack of access to healthy foods, and are ultimately a symptom of poverty. In its 2011 report, *The Burden of Diabetes in Connecticut*, the Connecticut Department of Public Health determined that there is a link between income level and the prevalence of diabetes in the state. The report states that:

12.3% of Connecticut adults with annual household incomes of less than $25,000 have diabetes compared to 4.7% of Connecticut adults with annual household incomes of $75,000 or greater. The increased prevalence of diabetes among low-income persons is attributed to the decreased likelihood of low-income persons having adequate diets, sufficient physical activity, and access to medical care – all factors known to affect the progression of pre-diabetes to diabetes. [Poulin and Hynes 2011:3]

These studies suggest a pattern where poor access to healthy and affordable foods leads to overweight and obesity which can further lead to life-threatening obesity related diseases not just in adults, but in children as well. When convenience food is the norm at home, whether it is due to lack of time, lack of access, or lack of funds to purchase healthy foods, the research shows that children suffer medically as much as, if not more than, adults.
Is Frog Hollow a Food Desert?

In June 2011, First Lady Michelle Obama joined the Surgeon General, Dr. Regina Benjamin and U.S. Department of Agriculture Secretary, Tom Vilsack, to unveil the Department of Agriculture’s replacement for its then much recognized and ridiculed Food Pyramid, MyPlate. As part of the First Lady’s call to fight childhood obesity, the Let’s Move! Campaign, MyPlate, offers consumers an easy visual aid to the USDA’s 2010 Dietary Guidelines to Americans for healthier, more balanced eating. The press release for the updated guidelines state that the goals are to: “promote health, reduce the risk of chronic diseases, and reduce the prevalence of overweight and obesity through improved nutrition and physical activity” (USDA 2008). However, for many people living in areas such as the Frog Hollow neighborhood in Hartford, Connecticut where there is little access to affordable healthy foods, “improved nutrition” is not so easily achieved.

In Frog Hollow there is one mid-size, discount-type supermarket, Save-A-Lot, which is located at the very outer-limits of the neighborhood on the boundary of the Parkville section of Hartford. In order to keep its prices low, the supermarket reduces overhead by limiting selection to a few exclusive brands and selling bulk items from boxes rather than store shelves. In the city of Hartford, over 36% of households do not have access to a vehicle (United States Bureau of the Census 2001:4). To get to the Save-A-Lot supermarket by bus from Washington Street, on the opposite end of the neighborhood, you would have to walk almost a half mile to a bus stop by Trinity College, take a 3 minute ride on the 61 bus, and then walk another half mile from Broad Street to Park Street. A total of two miles round trip walking, of which one mile would be with the added burden of carrying bags of groceries.

In addition to the lack of large supermarkets to choose from, Frog Hollow residents also have the problem of persistent poverty. In 2000, census data showed that the median household income in Frog Hollow was $17,333, whereas the median household income for the city of Hartford was almost $8,000 higher at $25,150. In 2000, the US Census Bureau Poverty Threshold for a family of four was $17,463. There are 3,675 housing units in Frog Hollow, 82.3% of them are rental units. Only 232 units are owner occupied, and the average values of these units have decreased by 57% between 1990 and 2000. The unemployment level in Frog Hollow was 16%, while Hartford’s unemployment level was 9.1%. Based on the US Census Bureau Poverty Thresholds, over 57% of children under the age of 18 and 45%...
of the total population of Frog Hollow live in poverty. Fifty-one percent of adults over the age of 25 do not have a high school diploma, and half of these have not progressed beyond the ninth grade. Forty-two percent of households in Frog Hollow receive public assistance (not including SNAP benefits). In 2008, the Connecticut State Department of Education reported that of the four schools serving Frog Hollow, on average, 91% of the students were eligible for free or reduced lunch. Overall, 10% of the population of Hartford County received Supplemental Nutrition Assistance Program (SNAP formerly known as the Food Stamp Program) benefits in 2008 (FRAC 2011).

These facts indicate that Frog Hollow residents have been largely impacted by economic forces such as corporate divestment. In capitalism, business follows the money, and in urban communities like Frog Hollow, where the income levels hover somewhere around the poverty line, there is not much incentive from a business standpoint to invest in the area. Large, publically owned companies such as chain grocery stores that are responsible to shareholders (in terms of making returns in the form of dividends), do not see the wisdom in opening stores in neighborhoods where the profit margins would be low. The money a large company would need to invest in building a new store, or rehabilitating an existing store, plus the added ongoing costs of security in a low-income neighborhood do not inspire companies to invest in neighborhoods with demographics like Frog Hollow’s. This is where small vendors can step in to fill the grocery void.

Frog Hollow’s “Green” Thumb

The bright spot in Frog Hollow’s otherwise dismal food landscape is the introduction of fresh, locally grown produce and healthy foods made available at affordable prices. The first farmer’s market opened in the city in 1977 (The Hartford Courant, 1980:30). Since then, several more have appeared. The aforementioned Billings Forge complex hosts a weekly year-round farmer’s market in Frog Hollow that began in 2007. My visits to the market revealed a pulsating, electric atmosphere where farmers, residents, friends, musicians, artists and white collar workers from the neighboring insurance companies mingle. Live music is played, and, in my experience, a sense of hope and community pervades. I witnessed many instances where residents and neighbors stopped by the organizers’ stall at the market to get assistance with their market vouchers or to just say hello.
The market has the added benefit of accepting Supplemental Nutrition Assistance Program (SNAP), Electronic Benefit Transfer (EBT) cards, and Special Supplemental Nutrition Program for Women, Infants and Children (WIC) benefits for payment. Additionally, thanks to the efforts of the market’s creator, Rita Decker-Parry, a partnership with the Wholesome Wave organization was formed in 2008 that allows the Billings Forge Farmer’s Market to participate in the Double Value Coupon Program (DVCP). The DVCP provides matching funds when shoppers at participating farmer’s markets pay for locally grown fruits and vegetables with federal nutrition benefits, thereby doubling the value of shopper’s benefits. These federal nutritional benefits include the U.S. Department of Agriculture’s Farmers Market Nutrition Program (FMNP) checks which are issued to seniors and participants of the WIC and SNAP programs. According to a survey conducted by Wholesome Wave in 2010, “87% of DVCP consumers increased or greatly increased their consumption of fresh fruits and vegetables...and over 90% of DVCP consumers agreed or strongly agreed that the amount of fresh vegetables they bought at the market made a big difference in their or their family’s diet” (Wholesome Wave 2011:2).

Farmer’s markets are not the only source for fresh local produce in Frog Hollow either. The Knoxs Parks Foundation in Hartford has supported community gardening in the city since the establishment of their first garden in 1972. The Community Gardens allow individuals and families to rent garden plots ranging in size from 300-625 sq. ft. for the growing season for $25-$30 in order to grow their own food. This is a particularly inviting option as many of the city’s residents can grow foods that represent their own ethnic tastes and heritage. There are a total of sixteen community gardens in Hartford, two of which are located in Frog Hollow (Knoxs Parks Foundation 2011).

One final source of healthy produce in Hartford is Community Supported Agriculture (CSAs). Grow Hartford, a project of the non-profit Hartford Food System, operates three organic farms within the city. Two are in Frog Hollow, and the third is in the nearby Behind the Rocks neighborhood. The farms allow residents and community organizations such as churches and food pantries to purchase low-cost “shares” of the farm’s output each growing season. For low-income families, the cost of a share (approx. 140lbs. of
produce) is $75. For a 12-week growing season, that amounts to about $6.25 a week for almost twelve pounds of fresh, local, organic produce. The money from the shares is used to purchase seeds, fertilizer, labor, etc. to keep the farm operating. Throughout the growing season, members are provided fresh vegetables, herbs, flowers and fruits weekly.

In addition to providing healthy alternative food sources, the Grow Hartford project also provides job training to at-risk youth from the neighborhood. Youth are hired by the farms for a summer to work in the gardens and receive work skills training. Not only do they learn all aspects of urban farming, they are also taught real-world skills such as marketing and sales (they run a farmstand, and booths at farmers’ markets), cooking, menu planning, resume writing and leadership.

**Methodology**

To determine the cost of a healthy food basket, the United States Department of Agriculture (USDA) Center for Nutrition Policy and Promotion 2006 Thrifty Food Plan was used to develop a list of healthy foods for a family of four for a week. The Thrifty Food Plan (TFP) was last updated in 2006, and is the standard used for determining food stamp allocations. The plan incorporates the latest nutritional guidelines available at the time, the 2005 MyPyramid Food Guidance System, as well as data sets from the Federal Government’s 2001-2002 National Health and Nutrition Examination Survey (NHANES) and the 2001-2002 Food Price Database updated to 2006 dollars (Carlson et al 2007:2-3). The resulting market basket is “based upon data of individuals ages 1 year old and older in households with income at or below 130 percent of the U.S. poverty threshold, an income level that represents the upper threshold for eligibility in the Food Stamp Program” (Carlson et al 2007:3).

Once the items for the healthy food basket were determined, prices were gathered from El Mercado, a small 13,000 sq. ft. grocery store on Park Street in Frog Hollow. Item prices for the same grocery list also were gathered at Super Stop & Shop, a larger 38,000 sq. ft. chain supermarket on Newington Avenue in the neighboring town of West Hartford (Podsada 2010). The town of West Hartford was selected for its close proximity to Frog Hollow, as well as its increased median household income of $79,500 (about $62,200 higher than that of Frog Hollow). The following table itemizes the market basket used in the research.
<table>
<thead>
<tr>
<th>Grains</th>
<th>Vegetables</th>
<th>Other Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown Rice</td>
<td>Potatoes</td>
<td>Butter</td>
</tr>
<tr>
<td>Oatmeal Cookies</td>
<td>Pringles potato chips</td>
<td>Ortega Salsa</td>
</tr>
<tr>
<td>Honey Nut</td>
<td>Potato Sticks</td>
<td>Coffee</td>
</tr>
<tr>
<td>Cheerios</td>
<td>Potato Chips</td>
<td>Tea</td>
</tr>
<tr>
<td>Cookie Crisp</td>
<td>Broccoli (fresh)</td>
<td>Hawaiian Punch</td>
</tr>
<tr>
<td>cereal</td>
<td>Broccoli (frozen)</td>
<td>Coca-Cola</td>
</tr>
<tr>
<td>Special K cereal</td>
<td>Carrots</td>
<td>Molasses</td>
</tr>
<tr>
<td>Quaker Oatmeal</td>
<td>Squash</td>
<td>Syrup</td>
</tr>
<tr>
<td>Multigrain</td>
<td>Beets (canned)</td>
<td>Brown Sugar</td>
</tr>
<tr>
<td>Pringles</td>
<td>Corn</td>
<td>Sugar</td>
</tr>
<tr>
<td>Popcorn</td>
<td>Peas</td>
<td>Honey</td>
</tr>
<tr>
<td>Corn Flakes</td>
<td>Beets - fresh</td>
<td>Strawberry Jelly</td>
</tr>
<tr>
<td>White Rice</td>
<td>Black Beans (canned)</td>
<td>Chunky Soup</td>
</tr>
<tr>
<td>Spaghetti</td>
<td>Red Beans (canned)</td>
<td>Dinty Moore Soup</td>
</tr>
<tr>
<td>(noodles)</td>
<td>Garbanzo (canned)</td>
<td>Campbells Soup</td>
</tr>
<tr>
<td>Frosted Flakes</td>
<td>Peas (dry)</td>
<td>Progresso Soup</td>
</tr>
<tr>
<td>Saltines</td>
<td>Black (dry)</td>
<td>Fish Sticks (frozen)</td>
</tr>
<tr>
<td>Ritz Crackers</td>
<td>Red (dry)</td>
<td>Hot Wings (frozen)</td>
</tr>
<tr>
<td>White Bread</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tortillas</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Milk products</th>
<th>Meats and Beans</th>
<th>Fruits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat Free Milk</td>
<td>Chop Steak</td>
<td>Navel Oranges</td>
</tr>
<tr>
<td>Borden Singles</td>
<td>Roast</td>
<td>Grapefruit</td>
</tr>
<tr>
<td>(cheese product)</td>
<td>Pork Chops (w/bone)</td>
<td>Red Delicious</td>
</tr>
<tr>
<td>Shredded</td>
<td></td>
<td>Apples</td>
</tr>
<tr>
<td>Cheddar</td>
<td>Pork Chops (boneless)</td>
<td>Cantaloupe</td>
</tr>
<tr>
<td>Chocolate Milk</td>
<td></td>
<td>Apple Juice</td>
</tr>
<tr>
<td>Eggnog</td>
<td>Whole Chickens</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pollack Fillets</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For each item, the price recorded was per unit, and the same unit was priced at both stores when available. For example, where canned items were priced, the same size container was compared. Where meat and fresh vegetables were compared, the per pound price was used. If the same size container was not available at both stores, the per ounce price was determined. Additionally, where multiple brands were available for the same item, the cheapest price for the item was recorded. This included store brands as well as “loyalty” prices offered on some items when shoppers used their free store-loyalty cards. Some items were priced and noted for a specific well-known brand (e.g. Coca-Cola, Kellogg’s Corn Flakes, etc.) in order to show the pricing differences for a few brand-name products.

To determine the various types of food outlets that exist in Frog Hollow, a visual surveillance of the neighborhood was conducted. This included driving each block of the neighborhood and documenting the locations and types of food outlets. For the purpose of the research, a food outlet was defined as any business that sold any type of food product and included convenience stores, markets, bodegas and farmers markets as well as any establishment that sold prepared meals (e.g. restaurants, cafés or fast food). The survey did not include locations where food can be obtained for free such as food pantries and soup kitchens. The locations of the food outlets were then overlaid on a map of the neighborhood so that an overall picture of locations and types of food outlets could be developed.
Findings and Recommendations

The first stage of the research surveyed the Frog Hollow neighborhood in an attempt to document the types and locations of food sources. The following map is the result of this survey.

There are at a minimum 20 different bodegas within the 1.691 square miles comprising the Frog Hollow neighborhood. There is one mid-size supermarket, the aforementioned Save-a-Lot. There are two fast-food restaurants, a Subway and a McDonald’s. Both fast food restaurants are on the outer boundaries of the neighborhood closer to Hartford’s municipal and medical office districts. The McDonald’s restaurant is located on Washington Street near the Hartford Hospital complex, and the Subway restaurant is located on the corner of Broad and Capitol Streets. There are twelve restaurants and cafés, and three bakeries that mainly cater to the various ethnic tastes within the community. There is one large drug store (Walgreens) that also sells convenience type foods.
Finally, there are eleven farmers markets, community gardens and CSA gardens in the neighborhood. As indicated on the map, the majority of the food establishments are concentrated along the neighborhood’s main thoroughfare, Park Street.

The second stage of the research involved pricing a healthy food basket at a Frog Hollow market and comparing that to the price for the same food basket purchased at a supermarket in neighboring West Hartford. The research showed that a healthy 75-item food basket in Frog Hollow costs $29 more than the same basket in West Hartford. Additionally, Frog Hollow residents shopping at this bodega for their weekly grocery list are paying prices that are on average 26% higher than those charged in the West Hartford supermarket.

Although the bodega did sell some fruit and vegetables, and their prices were generally lower than the West Hartford supermarket, the quality of the produce was also much lower. Produce in the Frog Hollow market was discolored, wilted or overripe and generally unappealing. Additionally, the bodega did not sell any whole grain breads and only had a limited selection of whole grain snacks. They did, however, have an extensive selection of meats, and offered bulk packages of meat at reduced prices perhaps suggesting that meat is a more desirable food item to clients of this market than fresh fruits and vegetables.

Future research on this topic should incorporate price comparisons of more stores in both low- and higher-income neighborhoods in order to complete a more comprehensive view of the pricing differences between neighborhoods. This research would illustrate the food gap that exists between large urban metro areas like Hartford and their suburban counterparts.

Conclusion

Food, like shelter, is a basic human need. When easy access to healthy, nutritious and affordable foods is reserved for wealthy citizens, while low-income citizens lack the same access, a food gap exists. This research shows that one such food gap exists in Hartford. Like many urban environments throughout the country, access to fresh, nutritious foods is severely limited for those living in the low-income neighborhood of Frog Hollow.

In Frog Hollow, one mid-size supermarket has been established at the farthest reaches of the neighborhood in the least populated section. A walk to the store from the closest housing or
bus stop will take you through a section of town that is one of the most unsafe. In fact, while conducting this research, a purse snatching was witnessed in the public park that sits across the street from the supermarket. The parking lot of the store is filled with potholes, broken glass and debris. Once inside the store, a shopper has a section of approximately 30 sq. ft. from which to select all their fresh fruits and vegetables. Compare that to the 100-200 sq. ft. in a typical large size grocery store. There is very little shelving in the store, and most of the grocery items are piled up on the floor in boxes for shoppers to go through...and this is the good store. Other than this store, the grocery options for residents of Frog Hollow include, travelling to large-size supermarket in another neighborhood, or shopping at one of the many bodegas within the community.

Both of these options present their own set of challenges however. Traveling to another neighborhood is difficult if you don’t have a car. Walking or traveling by bus are other options, although getting back to Frog Hollow by foot or by bus with loaded bags of groceries is a challenge, particularly if you have frozen items in your grocery order, or bulk items which are generally cheaper, but heavier. On the other hand, staying in the neighborhood and shopping at one of the many bodegas presents its own disadvantages due to the fact that it is difficult to obtain the quality vegetables, fruits and whole grain foods that make up a healthy diet.

All over the country in urban neighborhoods like Frog Hollow more and more healthy food options are being offered in the forms of Farmer’s Markets, Community Gardening and Community Supported Agriculture. All of these options give community members choices for their food procurement. Whether they grow their own food, or support local farmers by buying shares of seasonal crops, community members are being offered the chance to become directly involved in how their food is produced and acquired. Opportunities to meet and discuss food with local farmers and neighbors at farmer’s markets are giving residents new insight into a world of food and a myriad of food choices that perhaps they did not realize existed. Farmer’s markets have expanded from just selling fruits and vegetables to offering local meats, cheeses and whole grain breads, as well as other locally made goods for the home. These “green” options do more than promote healthy food choices, they beautify the landscape by clearing blighted vacant lots and turning them into green gardens or markets where neighbors can come together and create community through shared common spaces and goals.
References


Carlson, Andrea PhD, Mark Lino, PhD, WenYen Juan, PhD, Kenneth Hanson, PhD and P. Peter Basiotis, PhD, 2007. Thrifty Food Plan, 2006. Washington DC: Center for Nutrition Policy and Promotion, U.S. Department of Agriculture.


Appendix A – Store Price Comparison

<table>
<thead>
<tr>
<th>Food category</th>
<th>Description</th>
<th>Item</th>
<th>Size</th>
<th>El Mercado</th>
<th>Stop &amp; Shop</th>
<th>% Diff</th>
<th>S&amp;S Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains</td>
<td></td>
<td>Carolina Brown Rice</td>
<td>5 lbs</td>
<td>$5.69</td>
<td>$4.48</td>
<td>27%</td>
<td>Store brand $1.79/2 lbs</td>
</tr>
</tbody>
</table>
| Whole grain breads, rice, pasta, and pastries (including whole grain flours) | - Whole wheat, multigrain, or pumpernickel breads, rolls, bagels, scones, English muffins, biscuits, tortillas, and pancakes—all with 50% or more of ounce equivalents from whole grain  
- Brown rice, wild rice, whole wheat pasta (e.g., macaroni, spaghetti, and noodles)—all with 50% or more of ounce equivalents from whole grain  
- Oatmeal cookies, granola cookies, whole wheat doughnuts, granola bars, and graham crackers—all with 50% or more of ounce equivalents from whole grain | Oatmeal Cookies | 8.4oz | $1.79 | $1.00 | 79% |
<p>| Whole grain cereals (including hot cereal) | Cooked cereals (e.g., oatmeal and bulgur) with sugars, fat, and whole milk or 2% milk added; sweetened ready-to-eat cereals (e.g., frosted wheats and granola)—all with 50% or more of ounce equivalents from whole grain | Honey Nut Cheerios | 12.25oz | $4.79 | $3.79 | 26% |
| Cookie Crisp | 11.25oz | $5.19 | $3.99 | 30% |
| Special K | 12oz | $5.19 | $3.99 | 30% |
| Quaker Oatmeal | 18oz | $4.59 | $2.59 | 77% |</p>
<table>
<thead>
<tr>
<th>Food category</th>
<th>Description</th>
<th>Item</th>
<th>Size</th>
<th>El Mercado Cost</th>
<th>Stop &amp; Shop Cost</th>
<th>% Diff</th>
<th>S&amp;S Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>mixes)</td>
<td>ounce equivalents from whole grain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Popcorn and other whole grain snacks</td>
<td>Popcorn, salty snacks, crackers, multigrain pretzels, and puffed wheat cakes—all with 50% or more of ounce equivalents from whole grain</td>
<td>Multigrain Pringles</td>
<td>6.34oz</td>
<td>$2.19</td>
<td>$1.99</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Popcorn, salty snacks, crackers, multigrain pretzels, and puffed wheat cakes—all with 50% or more of ounce equivalents from whole grain</td>
<td>Popcorn</td>
<td>3-3.3oz bags</td>
<td>$2.39</td>
<td>$1.85</td>
<td>29%</td>
<td></td>
</tr>
<tr>
<td>Non-whole grain breads, cereals, rice, ...</td>
<td>Corn Flakes</td>
<td></td>
<td>12oz</td>
<td>$3.89</td>
<td>$3.19</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- White, French, potato, bran, or rye breads and rolls; muffins, English muffins, bagels, waffles, corn tortillas, taco shells, cornbread, and pancakes—all with less than 50% of ounce equivalents from whole grain</td>
<td>White Rice</td>
<td>5 lbs</td>
<td>$5.19</td>
<td>$4.25</td>
<td>22%</td>
<td>Store brand</td>
</tr>
<tr>
<td></td>
<td>- Cooked cereal (e.g., cream of wheat, grits, and oat bran); sweetened or non-sweetened ready-to-eat cereals (e.g., frosted cornflakes and puffed rice)—all with less than 50% of ounce equivalents from whole grain</td>
<td>Spaghetti (noodles)</td>
<td>1 lb</td>
<td>$1.29</td>
<td>$1.00</td>
<td>29%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Long or short white rice, sweet rice, rice noodles and pasta (e.g., macaroni, spaghetti, and noodles)—all with less than 50% of ounce equivalents from whole grain</td>
<td>Frosted Flakes</td>
<td>14oz</td>
<td>$5.49</td>
<td>$3.79</td>
<td>45%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Pies, cookies, pastries, doughnuts, shortbread; all cakes (e.g., white, yellow, shortcake, sponge, pound, and angel food); croissants; and sweet rolls—all with less than 50% of ounce equivalents from whole grain</td>
<td>Saltines</td>
<td>16oz</td>
<td>$3.39</td>
<td>$2.00</td>
<td>70%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Crackers (e.g., soda, oyster, cheese, and rice); hard or soft pretzels; and salty snacks (e.g., tortilla chips)—all with less than 50% of ounce equivalents from whole grain</td>
<td>Ritz</td>
<td>15.1oz</td>
<td>$4.59</td>
<td>$2.50</td>
<td>84%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- French-fried potatoes, potato chips, hash browns, potato puffs, potato patty; and potato salads and mashed potatoes with added fat, eggs, or cheese</td>
<td>White Bread</td>
<td>1 lb</td>
<td>$1.69</td>
<td>$1.00</td>
<td>69%</td>
<td>Store brand</td>
</tr>
<tr>
<td></td>
<td>- French-fried potatoes, potato chips, hash browns, potato puffs, potato patty; and potato salads and mashed potatoes with added fat, eggs, or cheese</td>
<td>Tortillas</td>
<td>25oz</td>
<td>$1.49</td>
<td>$3.15</td>
<td>-53%</td>
<td></td>
</tr>
<tr>
<td>Vegetables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All potato products</td>
<td></td>
<td>Potatoes</td>
<td>lb</td>
<td>$0.79</td>
<td>$1.29</td>
<td>-39%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pringles potato chips</td>
<td>6.41oz</td>
<td>$2.19</td>
<td>$1.99</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Food Category</td>
<td>Description</td>
<td>Item</td>
<td>Size</td>
<td>El Mercado Cost</td>
<td>Stop &amp; Shop Cost</td>
<td>% Diff</td>
<td>S&amp;S Notes</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------------</td>
<td>-------</td>
<td>-----------------</td>
<td>------------------</td>
<td>--------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td>- Boiled, baked, scalloped, mashed, and stuffed potatoes; and potato salad, German style</td>
<td>Potato Sticks</td>
<td>7oz</td>
<td>$2.29</td>
<td>$1.99</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Dark-green vegetables</td>
<td>All dark-green vegetables such as broccoli, spinach, chard, collard greens, mustard greens, and kale—with or without fat added</td>
<td>Broccoli (fresh)</td>
<td>lb</td>
<td>$1.12</td>
<td>$2.99</td>
<td>-63%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Broccoli (frozen)</td>
<td>lb</td>
<td>$3.39</td>
<td>$0.67</td>
<td>406%</td>
<td></td>
</tr>
</tbody>
</table>
| Orange vegetables                   | - All orange vegetables such as carrots, pumpkin, winter squash, and sweet potatoes—with or without fat added  
<p>|                                     | - Tomato, tomato sauce, tomato puree, tomato paste, tomato soup, and tomato juice—with or without fat added | Carrots             | lb    | $0.99           | $1.39            | -29%   |                  |
|                                     |                                                                              | Squash              | lb    | $0.99           | $1.29            | -23%   |                  |
| Canned and dry beans, lentils, and peas (legumes) |                                                                                 | Black Beans (canned) | 29oz  | $2.39           | $1.25            | 91%    | With loyalty card ($0.67/15.5oz) |
|                                     |                                                                              | Red Beans (canned)  | 29oz  | $2.39           | $1.25            | 91%    | With loyalty card ($0.67/15.5oz) |
|                                     |                                                                              | Garbanzo (canned)   | 15.5oz| $1.39           | $1.25            | 11%    | With loyalty card ($0.67/15.5oz) |
|                                     |                                                                              | Peas (dry)          | lb    | $1.19           | $0.85            | 40%    |                  |
|                                     |                                                                              | Black (dry)         | lb    | $2.29           | $1.85            | 24%    |                  |
|                                     |                                                                              | Red (dry)           | lb    | $2.29           | $1.33            | 72%    |                  |
| Other vegetables                    | All other vegetables such as green beans, beets, cabbage, cauliflower, corn, eggplant, green peas, iceberg lettuce, bell pepper, snow peas, turnip, and Brussels sprouts—with or without fat added | Beets               | 15 oz | $1.09           | $0.67            | 63%    | Store brand      |
|                                     |                                                                              | Corn                | 15 oz | $1.09           | $0.67            | 63%    | With loyalty card |
|                                     |                                                                              | Peas                | 15 oz | $1.09           | $0.67            | 63%    | With loyalty card |
|                                     |                                                                              | Beets - fresh       | lb    | $1.39           | $1.99            | -30%   |                  |
| Fruits                              |                                                                              | Whole fruits        |       |                 |                  |        |                  |
|                                     | - Oranges, grapefruits, limes, lemons, and tangelos; melons (e.g., watermelon, cantaloupe, and honeydew); berries (e.g., | Navel Oranges       | 3 for | $1.99           | $3.00            | -34%   |                  |
|                                     |                                                                              | Grapefruit          | 2 for | $1.00           | $3.00            | -67%   |                  |</p>
<table>
<thead>
<tr>
<th>Food category</th>
<th>Description</th>
<th>Item</th>
<th>Size</th>
<th>El Mercado Cost</th>
<th>Stop &amp; Shop Cost</th>
<th>% Diff</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>str</td>
<td>strawberries, blueberries, cranberries, raspberries, and blackberries</td>
<td>Red Delicious Apples</td>
<td>lb</td>
<td>$1.39</td>
<td>$1.79</td>
<td>-22%</td>
<td></td>
</tr>
<tr>
<td>fr</td>
<td>- Fruits such as bananas, apples, cherries, peaches, pears, grapes, plums, papayas, and apricots</td>
<td>Cantaloupe</td>
<td>each</td>
<td>$2.49</td>
<td>$3.49</td>
<td>-29%</td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td>Fruit juices</td>
<td>- 100% fruit juices made from citrus fruits, melons, and berries</td>
<td>Apple Juice</td>
<td>gallon</td>
<td>$5.99</td>
<td>$4.29</td>
<td>40%</td>
</tr>
<tr>
<td>100%</td>
<td>- 100% fruit juices made from fruits other than citrus fruits, melons, and berries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>milk</td>
<td>Milk products</td>
<td>Whole milk, yogurt, and cream</td>
<td>Yogurt</td>
<td>6 oz</td>
<td>$0.72</td>
<td>$0.50</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>- All fluid, evaporated, condensed, and dry whole milk; regular yogurt; all fluid creams; cream substitutes; cream cheese; and dips</td>
<td>Danimals</td>
<td>4-oz pack</td>
<td>$3.19</td>
<td>$2.49</td>
<td>28%</td>
<td></td>
</tr>
<tr>
<td>lowfat</td>
<td>Lower fat and skim milk and lowfat yogurt</td>
<td>Fat Free Milk</td>
<td>gallon</td>
<td>$3.99</td>
<td>$3.49</td>
<td>14%</td>
<td>With loyalty card</td>
</tr>
<tr>
<td></td>
<td>- All fluid, evaporated, and dry reduced-fat and skim milks; buttermilk; and lowfat or nonfat yogurts</td>
<td>Borden Singles</td>
<td>16 slices</td>
<td>$2.89</td>
<td>$2.99</td>
<td>-3%</td>
<td>Store brand</td>
</tr>
<tr>
<td></td>
<td>All cheese (including cheese soup and sauce)</td>
<td>Shredded Cheddar</td>
<td>8 oz</td>
<td>$2.99</td>
<td>$2.50</td>
<td>20%</td>
<td>Store brand</td>
</tr>
<tr>
<td>Milk</td>
<td>Milk drinks and milk desserts</td>
<td>Chocolate Milk</td>
<td>1/2 gallon</td>
<td>$4.19</td>
<td>$2.99</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Milk-based drinks (e.g., malted milk, hot chocolate, eggnogs, cocoa, infant formulas, and meal-replacement drinks) with fat equivalent to that of whole milk; dairy desserts (e.g., ice cream, frozen yogurt, ice milk, custard, and puddings) having more than 6% fat by weight</td>
<td>Eggnog</td>
<td>32 oz</td>
<td>$4.69</td>
<td>$2.29</td>
<td>105%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Milk-based drinks made with reduced-fat or skim milk and dairy desserts having 6% or less fat by weight</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat and beans</td>
<td>Beef, pork, veal,</td>
<td>Chop Steak</td>
<td>lb</td>
<td>$4.99</td>
<td>$2.19</td>
<td>128%</td>
<td>With</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Roast</td>
<td>lb</td>
<td>$3.59</td>
<td>$4.99</td>
<td>-28%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pork Chops (w/</td>
<td>lb</td>
<td>$3.99</td>
<td>$2.49</td>
<td>60%</td>
<td>With</td>
</tr>
<tr>
<td>Food category</td>
<td>Description</td>
<td>Item</td>
<td>Size</td>
<td>El Mercado Cost</td>
<td>Stop &amp; Shop Cost</td>
<td>% Diff</td>
<td>S&amp;S Notes</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-----------------------------------</td>
<td>-----------------------------</td>
<td>-------</td>
<td>-----------------</td>
<td>------------------</td>
<td>--------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Lamb, and game</td>
<td>Primal (bone)</td>
<td>Pork Chops (boneless)</td>
<td>lb</td>
<td>$3.29</td>
<td>$4.99</td>
<td>-34%</td>
<td>loyalty card</td>
</tr>
<tr>
<td>Chicken, turkey, and game birds</td>
<td>Whole Chickens</td>
<td></td>
<td>lb</td>
<td>$1.49</td>
<td>$1.29</td>
<td>16%</td>
<td>With loyalty card</td>
</tr>
<tr>
<td>Fish and fish products</td>
<td>Pollack Fillets (frozen)</td>
<td></td>
<td>lb</td>
<td>$3.99</td>
<td>$9.32</td>
<td>-57%</td>
<td>With loyalty card</td>
</tr>
<tr>
<td></td>
<td>Canned Tuna (chunk light in water)</td>
<td></td>
<td>5 oz</td>
<td>$1.29</td>
<td>$1.15</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Canned Salmon</td>
<td></td>
<td>14.75 oz</td>
<td>$3.79</td>
<td>$2.59</td>
<td>46%</td>
<td>With loyalty card</td>
</tr>
<tr>
<td>Bacon, sausages, and luncheon meats (including spreads)</td>
<td>Bacon</td>
<td></td>
<td>lb</td>
<td>$3.99</td>
<td>$3.33</td>
<td>20%</td>
<td>Store brand</td>
</tr>
<tr>
<td>Nuts, nut butters, and seeds</td>
<td>Peanut Butter</td>
<td></td>
<td>18 oz</td>
<td>$3.59</td>
<td>$2.39</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>Eggs and egg mixtures</td>
<td>Eggs (large - white)</td>
<td></td>
<td>1 dozen</td>
<td>$1.89</td>
<td>$2.39</td>
<td>-21%</td>
<td></td>
</tr>
<tr>
<td>Other foods</td>
<td><strong>Table fats, oils, and salad dressings</strong></td>
<td><strong>Butter</strong></td>
<td>lb</td>
<td>$3.69</td>
<td>$3.00</td>
<td>23%</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Gravies, sauces, condiments, and spices</strong></td>
<td><strong>Ortega Salsa</strong></td>
<td>16 oz</td>
<td>$2.89</td>
<td>$2.50</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Coffee and tea</strong></td>
<td><strong>Coffee (Bustelo)</strong></td>
<td>10 oz</td>
<td>$4.39</td>
<td>$3.19</td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Lipton Tea</strong></td>
<td></td>
<td>100 bags</td>
<td>$4.99</td>
<td>$4.19</td>
<td>19%</td>
<td></td>
</tr>
<tr>
<td>Food category</td>
<td>Description</td>
<td>Item</td>
<td>Size</td>
<td>El Mercado Cost</td>
<td>Stop &amp; Shop Cost</td>
<td>% Diff</td>
<td>S&amp;S Notes</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------</td>
<td>------</td>
<td>------</td>
<td>-----------------</td>
<td>------------------</td>
<td>--------</td>
<td>----------</td>
</tr>
<tr>
<td>Soft drinks, sodas, fruit drinks, and ades (including rice beverages)</td>
<td>- Fruit drinks, cola- and pepper-type soft drinks, ginger ale, root beer, fruit punches, ades (e.g., lemonades and limeades), and other sodas containing sugar - Sugar-free or low-sugar drinks such as cola- and pepper-type soft drinks, ginger ale, root beer, fruit-flavored drinks, fruit punches, ades, and other sodas</td>
<td>Hawaiian Punch</td>
<td>gallon</td>
<td>$3.59</td>
<td>$3.49</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coca-Cola (2L)</td>
<td>2L</td>
<td>$1.66</td>
<td>$1.79</td>
<td>-7%</td>
<td></td>
</tr>
<tr>
<td>Sugars, sweets, and candies</td>
<td>All types of sugars, sweeteners, and syrups (e.g., honey, jams, jellies, marmalades, preserves, icings, gelatin desserts, marshmallow, and fudge); all types of candies and chocolates; and chewing gum</td>
<td>Molasses</td>
<td>12oz</td>
<td>$3.09</td>
<td>$3.99</td>
<td>-23%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Syrup</td>
<td>24oz</td>
<td>$2.19</td>
<td>$2.79</td>
<td>-22%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown Sugar</td>
<td>2 lbs</td>
<td>$3.49</td>
<td>$2.29</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sugar</td>
<td>5 lbs</td>
<td>$4.19</td>
<td>$2.99</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Honey</td>
<td>16oz</td>
<td>$3.99</td>
<td>$4.79</td>
<td>-17%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Strawberry Jam</td>
<td>18oz</td>
<td>$2.69</td>
<td>$2.79</td>
<td>-4%</td>
<td></td>
</tr>
<tr>
<td>Soups (ready-to-serve and condensed)</td>
<td></td>
<td>Chunky</td>
<td>18.6oz</td>
<td>$2.99</td>
<td>$2.29</td>
<td>31%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Campbell's</td>
<td>10.75oz</td>
<td>$1.89</td>
<td>$1.79</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Progresso</td>
<td>19oz</td>
<td>$2.89</td>
<td>$1.79</td>
<td>61%</td>
<td></td>
</tr>
<tr>
<td>Frozen or refrigerated entrées (including pizza, fish sticks, and frozen meals)</td>
<td></td>
<td>Fish Sticks</td>
<td>38.4 oz</td>
<td>$7.99</td>
<td>$7.82</td>
<td>2%</td>
<td>$4.99/24.5oz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Banquet Hot Wings</td>
<td>14 oz</td>
<td>$12.19</td>
<td>$8.99</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>$227.41</td>
<td>$198.37</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Average Price Difference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td>Total Price Difference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$29.04</td>
<td></td>
</tr>
</tbody>
</table>