

# Incentivizing SNAP Beneficiaries to Purchase Healthier Food:

The Impact of Farm Fresh Rhode Island's Bonus Bucks Program

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## **List of Acronyms**

CSA – Community-supported agriculture

CI – Confidence interval

DUFB – Double Up Food Bucks

DEM – Department of Environmental Management

EBT – Electronic benefit transfer

ERS – Economic Research Service

Farm Fresh RI – Farm Fresh Rhode Island

FINI – Food Insecurity Nutrition Incentive

FNS – Food and Nutrition Service

FY – Fiscal year

HHS – United States Department of Health and Human Services

NIFA – National Institute of Food and Agriculture (NIFA)

RI – Rhode Island

RICFB – Rhode Island Community Food Bank

SNAP – Supplemental Nutrition Assistance Program

SSB – Sugar-sweetened beverage

TFP – Thrifty Food Plan

USDA – United States Department of Agriculture

WIC – Special Supplement Nutrition Program for Women, Infants, and Children

## **Executive Summary**

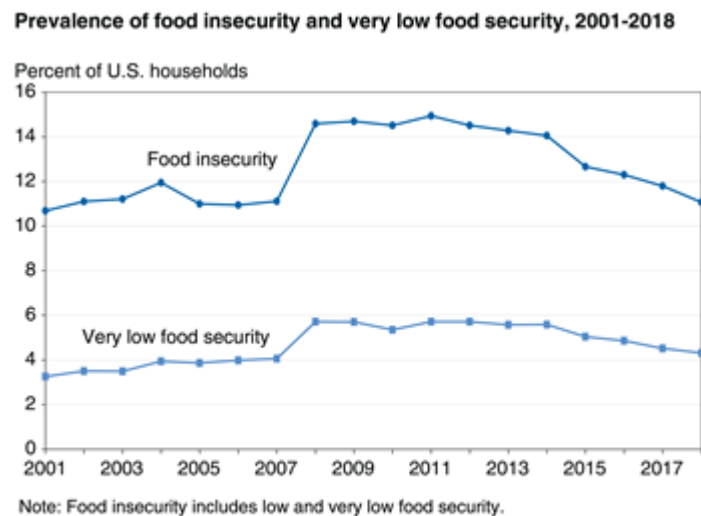
The Supplemental Nutrition Assistance Program (“SNAP,” and formerly “Food Stamps”) is a \$65 billion per year federal entitlement program that alleviates food insecurity by providing supplemental food payments to low-income individuals and families. Recipients’ often use their benefits to buy calorie-dense but non-nutritious food that contributes to obesity, diabetes, and other health problems. Although more nutritious dietary choices could mitigate these issues and save the federal government more than \$63 billion annually in healthcare costs, the government has neither increased funding nor provided meaningful incentives for recipients to buy healthier food.

Private organizations have sought to address this problem. This paper evaluates one such effort – Farm Fresh Rhode Island’s “Bonus Bucks.” The program offers additional funds to SNAP recipients to buy fresh produce at the organization’s farmers markets. Bonus Bucks thus encourages the purchase of healthy food from locally suppliers. An analysis of Bonus Bucks transactions conducted over a four-year period shows that where (i.e., location) – as opposed to how often (i.e., number of days offer) – Bonus Bucks were distributed and the percent of incentive matching had a significant influence on the amount of SNAP benefits used at a given farmers market.

## SNAP's Impact on Food Insecurity and Nutrition

### *The Problem of Food Insecurity*

Food insecurity – the lack of access to enough food to sustain an active and healthy life – affects more than 37 million Americans, including 11 million children (United States Department of Agriculture 2019; Coleman-Jensen et al. 2019).<sup>1</sup> The number of Americans experiencing food insecurity grew from one-in-nine (11%) in 2001 to one-in-seven (14.9%) in 2011 (USDA-ERS 2019). See Figure 1. Although a strong economy helped reduce the percentage to 11.9% in 2018, pandemic-related circumstances could cause the number of food-insecure Americans to soar to 54 million, a 46% increase (Feeding America 2020).<sup>2</sup>



**Figure 1:** Prevalence of food insecurity and very low food security, 2001-2008

**Image Source:** USDA, Economic Research Service using data from Current Population Survey Food Security Supplements U.S. Census Bureau (2019).

<https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=58378>

The prevalence and demonstrated negative health consequences of food insecurity make it one of the most important nutrition-related public health issues in the U.S. (Gundersen et al.

<sup>1</sup> This statistic comes from a study conducted by the Economic Research Service – a primary source of economic research and analysis from the U.S. Department of Agriculture. The same branch found that the prevalence of food insecurity in 2018 declined, for the first time, to the pre-recession (2007) level of 11.1% (Coleman-Jensen et al. 2019). In the 2019 study, though, an exact number of food insecure Americans was not provided.

<sup>2</sup> Shortly before the pandemic began to spread in the U.S., President Trump proposed cutting SNAP by more than \$180 billion – nearly a 30% rollback. The move could have severed benefits for nearly 700,000 low-income adults (Rosenbaum and Neuberger 2020).

2011). Food insecurity, which can be temporary, sustained, or episodic, impacts physical and mental health, sometimes chronically. Regarding physical health, both sustained food shortages and cycles of having enough food followed by insufficient amounts to eat can lead to improper nutrition, accumulation of visceral fat, and weight gain. These factors can, in turn, facilitate the development of chronic diseases, such as diabetes and heart disease (Lee et al. 2012).

Households with high food security – access to nutritious food at all times during the year – have a 37% probability of having a member develop a chronic illness. By comparison, households with low food security – one or more household members skip meals or otherwise eat less at some point during the year because they lack resources – have a 53% probability of having a member develop a chronic illness, a 40% increase in risk (Carlson and Keith-Jennings 2018).

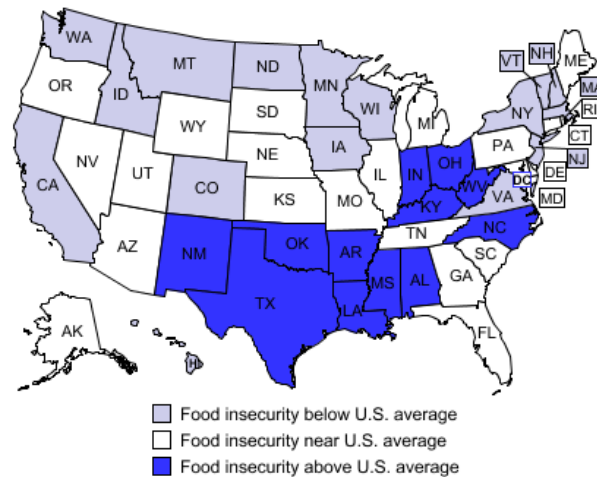
Food insecurity also elevates the risk of developing mental illness, especially when compounded by stressful life events (Martin et al. 2016). Inadequate nutrition is correlated with depression and anxiety (Gundersen 2013). Reducing food insecurity could thus reduce many health problems.

### ***Food Insecurity in Rhode Island***

The extent of food insecurity in Rhode Island is similar to levels nationwide. More than 20% of the state's population lives in communities facing extreme economic hardship, where demand for food assistance is high. In its *2019 Status Report on Hunger in Rhode Island*, the Rhode Island Community Food Bank (RICFB) reported that in 2019, 11% of households (47,000) in Rhode Island were food insecure. This figure is slightly below the 11.7% level nationally. See Image 1: *Prevalence of food security, average 2016-18*. According to the United States Department of Agriculture's (USDA's) Economic Research Service (ERS), the difference between the prevalence of food insecurity in Rhode Island and the national average from 2016 through 2018 was statistically insignificant (USDA-ERS 2019). 4.7% of Rhode Island

households (20,398) faced very low food security (i.e., hunger), compared to 4.8% nationally (RICFB 2020).

**Prevalence of food insecurity, average 2016-18**



**Image 1:** Prevalence of food security, average 2016-18

**Image source:** United States Department of Agriculture, Economic Research Service, using data from the December 2016, 2017, and 2018 Current Population Survey Food Security Supplements (2019).

<https://www.ers.usda.gov/webdocs/charts/80071/map.png?v=34.2>

RICFB stated that 188.3 million meals are needed annually to feed three meals a day to everyone in the state living in households with incomes below the poverty level. Government-sponsored food assistance programs fund 55% of these meals, food banks cover another 10%, and personal income supports 29% – leaving 6% of meals unfunded. See Figure 2. As a result, low income Rhode Island households missed 11.3 million meals in 2019, or more than 30,000 meals a day (RICFB 2020). Thus, while federal and state support bridge the meal gap, many still go hungry.



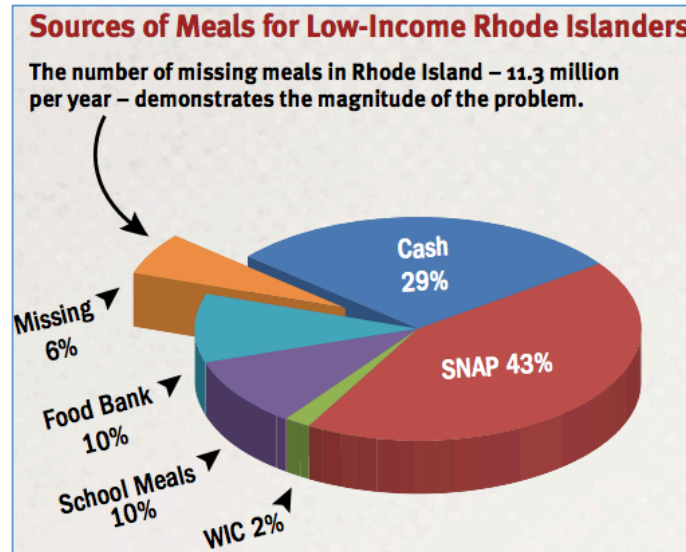


Figure 2: Sources of meals for low-income Rhode Islanders

**Image Source:** Rhode Island Community Food Bank, “2019 Status Report on Hunger in Rhode Island” (2019).  
<https://2cyg1u24pr903unzk92wub21-wpengine.netdna-ssl.com/wp-content/uploads/2019/11/2019-RICFB-StatusReport-Web.pdf>

### ***The Government’s Solution to Food Insecurity: Nutrition Assistance Programs***

The federal government addresses food insecurity primarily through nutrition assistance programs that provide food subsidies. In fiscal year 2018 (FY18), the USDA spent \$96.1 billion on 15 food and nutrition assistance programs. These efforts, which include Child and Adult Care Food Program, National School Lunch Program, and the Special Supplement Nutrition Program for Women, Infants, and Children (WIC), reach 13% of the U.S. population (Morrison 2019). The largest such program is the Supplemental Nutrition Assistance Program (SNAP), formerly known as “Food Stamps.” SNAP accounted for \$65 billion – approximately 68% – of federal nutrition assistance expenditures in FY18. See Image 2. SNAP is thus one of the largest entitlement programs – closely following Social Security, Medicare, Medicaid, and disability insurance.

### USDA expenditures for food assistance, fiscal 1980-2018

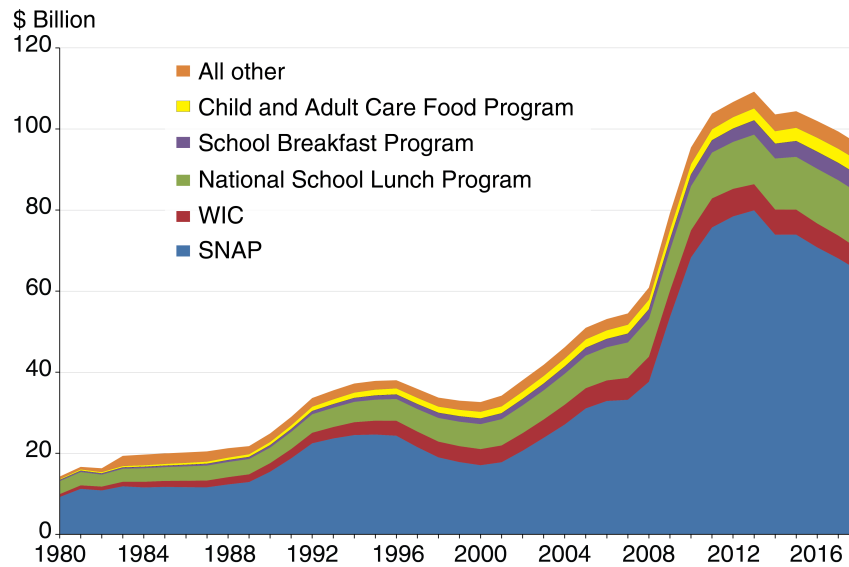


Image 2: USDA expenditures for food assistance, fiscal 1980-2018

**Image Source:** USDA, Economic Research Service using data from USDA, Food and Nutrition Service (2019). [https://www.ers.usda.gov/webdocs/charts/58387/40105\\_food-security\\_fig06.png?v=4156.7](https://www.ers.usda.gov/webdocs/charts/58387/40105_food-security_fig06.png?v=4156.7)

According to the USDA’s website, SNAP provides eligible low-income individuals and families with a monthly supplement to purchase “healthy food and move toward self-sufficiency” (Coleman-Jensen et al. 2019; USDA-FNS 2020). Thus, two important goals of the program are to promote healthy eating and to help beneficiaries become self-reliant for food. Although SNAP has undergone numerous changes since its inception, its basic operational model has remained the same. SNAP provides benefits that recipients can use to buy food in authorized retail food outlets, including virtually all food stores.

The federal government funds all SNAP benefits, while federal and state governments split the administrative costs (Center on Budget and Policy Priorities 2018). Nationally, 92.3% of SNAP spending goes directly to food purchases. Another 7.3% is spent on state administrative costs, including eligibility determinations, employment, training, nutrition education for SNAP

households, and anti-fraud activities. The remaining 0.4% covers federal administrative costs (Center on Budget and Policy Priorities 2018).

Nationally, approximately 40 million Americans, or 12% of the population, received SNAP benefits in 2018 (Coleman-Jensen et al. 2019).<sup>3</sup> In Rhode Island, approximately 158,000 of the state's residents, representing 15% of the state's population, received SNAP benefits in 2018. A third of these beneficiaries were younger than 18-years-old, a figure consistent with the national average of 30% (Rhode Island Department of Human Services 2019; United States Department of Agriculture 2019).<sup>4</sup> Households receiving SNAP benefits get an average of \$223 per month (RICFB 2020).

Rhode Island's SNAP spending is almost identical to the national average. According to 2016 data from the USDA's Food and Nutrition Service (FNS), Rhode Island's total SNAP benefit issuance was \$271,959,596, representing 92.8% of SNAP spending in the state. SNAP administrative costs in Rhode Island during this year were \$20,969,763, equal to 7.2% of total spending.<sup>5</sup> The State of Rhode Island paid 50.08% of this administrative cost, and the federal government paid 49.92%. State agency administrative costs are affected by a number of variables, including participation levels, the number and salary of state staff, inflation, the location of the state agency offices, the type of issuance system, worker training costs, the degree of automation, and the level of fraud control activity (Food and Nutrition Service SNAP Accountability and Administration Division 2017). Due to the high costs associated with SNAP's implementation and management, it is important to efficiently target participants' health if the program's goals are to be achieved.

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<sup>3</sup> The authors of this USDA ERS report do not explain the discrepancy between this number and the 37 million Americans they state are food insecure.

<sup>4</sup> According to RICFB, 148,000 Rhode Islanders were enrolled in SNAP in 2019 (Rhode Island Community Food Bank 2020). Therefore, there might have been a 10,000 SNAP participant decrease between 2018 and 2019.

<sup>5</sup> These calculations do not account for federal administrative costs, specifically for Rhode Island, which were not available.

Studies confirm that SNAP reduces food insecurity, although there is disagreement about the extent of its impact. According to the USDA, six months of SNAP participation correlated with a five to 10 percent decrease in food insecurity, including in households with food insecure children (FNS 2013; Gundersen et al. 2017).<sup>6</sup> Other research found a greater effect. For example, one study found that SNAP reduced food insecurity by as much as a fifth overall and by roughly a third (from 32% to 22%) for children in families that had received SNAP benefits for six months (Mabli et al. 2013). Another study reported that SNAP decreased food insecurity by as much as 30% (Ratcliffe et al. 2011). The program aided the most vulnerable recipients, such as children and those with “very low food security.” Those helped included households in which one or more members skip meals or otherwise eat less at some point during the year because they lack money (Ratcliffe et al. 2011). The variance in findings about SNAP’s impact on food insecurity are attributable to several factors, including the sources of data, methodologies used to analyze the data, and proxies used to measure food insecurity. Despite these differences, there is consensus that SNAP reduces food insecurity.

### ***SNAP and Unhealthy Eating***

SNAP achieves this goal by helping beneficiaries buy more food consistently, but the food purchased is often non-nutritious.<sup>7</sup> A stated aim of SNAP is promoting nutritious eating – the word “nutrition” is in SNAP’s title – but the program may, paradoxically, not encourage healthy diets. Historically, low-income people were usually thinner than wealthier people because they could not obtain as many calories (Bentley et al. 2018). In recent times, however, cheaper prepared and “junk” foods allowed poor people to afford calorie-dense, unhealthy food.

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<sup>6</sup> The percentage of households that were food insecure decreased by 4.6 percentage points in the cross-sectional sample and by 10.6 percentage points in the longitudinal sample, according to the FNS study.

<sup>7</sup> See Figure 1 in Appendix 1 for the factors affecting the process by which households may or may not achieve SNAP program goals.

With limited funds to spend, SNAP beneficiaries often must choose between purchasing healthier but costlier foods, which typically include nutrient-rich, low-energy-dense rich in fruits, vegetables, fish, and nuts, and nutrient-poor, energy-dense but less expensive foods, such as processed foods, meats, and refined grains. SNAP recipients often choose the latter (Hartline-Grafton 2015). This dietary arrangement can lead to the paradoxical outcome of greater food security and obesity. As a result, SNAP beneficiaries frequently suffer from health problems like diabetes and heart disease (Hartline-Grafton 2015). One study found that SNAP participants exhibit the highest risk of all-cause and cardiometabolic mortality, followed by SNAP-eligible nonparticipants and then SNAP-ineligible individuals (Conrad et al. 2017). While SNAP benefits can lift low-income individuals out food insecurity, they do not necessarily solve the negative health effects associated with a small food budget.

Problems encouraging nutritious diets have existed since the first incarnation of SNAP (as Food Stamps) was implemented in 1939. Initially the program intended to encourage domestic consumption of surplus food as a source of unemployment relief during the Great Depression. It was not until 38 years later that this commodity distribution approach shifted. The Food Stamp Act of 1977 ensured that families would receive coupons valued at the cost of a healthy diet, according to USDA standards (Caswell et al. 2013). The first pilot program to study the use of incentives to encourage the purchase of healthy foods with SNAP benefits was established in 2008, authorized by the Food, Conservation, and Energy Act. The USDA's Food and Nutrition Service has continued to evaluate such incentive programs. Efforts to encourage the consumption of more nutritious products (e.g., fresh fruits and vegetables) have had varied effectiveness, despite the health-related dietary benefits of including fresh produce.

While SNAP is generally effective at reducing hunger and food insecurity, SNAP

participants' diet quality is lower than that of both income-eligible nonparticipants and higher income nonparticipants. Many SNAP participants are at the lower end of eligibility compared with income-eligible nonparticipants. As a result, baseline differences in food insecurity among SNAP-eligible lower end participants and upper end nonparticipants are so large that they could mask the beneficial effect of SNAP participation. In other words, SNAP nonparticipants, with a similar level of food insecurity as SNAP participants, might consume a healthier diet (Andreyeva et al. 2015; Taillie et al. 2018; Nord and Golla 2009). The consequence of lower diet quality is that SNAP recipients are likelier to suffer from serious health problems. This information suggests that participation in SNAP correlates with poor eating habits.

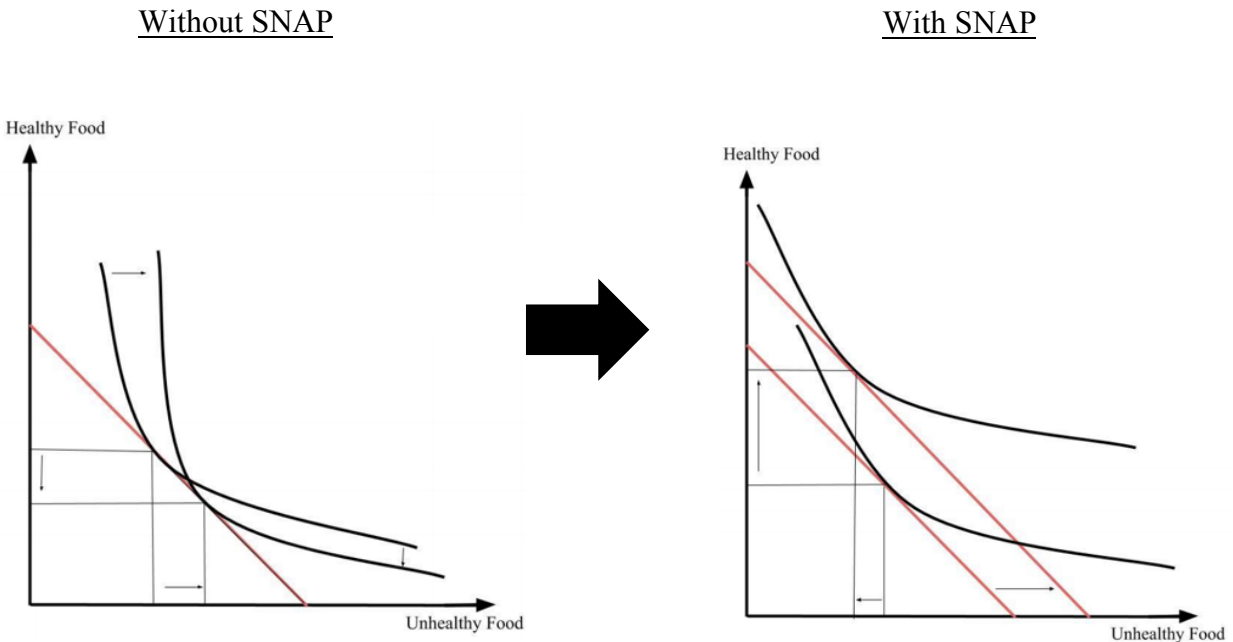
A number of studies have found that getting SNAP's recipients to eat better could substantially improve public health and save tens of billions of dollars spent on healthcare. One research effort used microsimulation modeling, a computer program that mimics the operation of government programs. The project examined policy options that SNAP could leverage to encourage healthy food purchases and discourage unhealthy ones. The study modeled three intervention scenarios among approximately 14.5 million adults receiving SNAP benefits at baseline dietary needs with mean age of 52 years:

1. A 30% subsidy for purchasing fruits and vegetables;
2. An incentive to buy fruits and vegetables with a restriction on the purchase of sugar-sweetened beverages (SSBs); and
3. A broader incentive/disincentive program (SNAP-plus) that combined a 30% financial incentive for purchases of fruits, vegetables, nuts, whole grains, fish, plant-based oils, and a 30% disincentive for purchases of SSBs, junk food, and processed meats.

The research concluded that scenarios 1, 2, and 3 would prevent 11,713, 40,420, and 48,008 cardiovascular deaths, respectively, over the next 20 years. The model also anticipated substantial cost savings from improved beneficiary health. For example, over the lifetimes of current SNAP participants, scenario 3 would prevent nearly 950,000 cardiovascular events and save more than \$63 billion (a figure that accounts for increased SNAP costs) in healthcare and other government costs (Mozaffarian et al. 2018). Unfortunately, America has a distinctive bias in health care toward disease treatment rather than disease prevention. By one calculation, altering this approach – to address causes rather than symptoms – could prevent 70% of the illnesses being treated in the U.S. (Paarlberg et al. 2018). These results provide a compelling social and economic case for encouraging SNAP recipients to consume more fruits and vegetables, even if doing so has additional upfront costs.

### ***The Economics and Psychology of Healthy Eating***

Many factors influence consumer decisions about the food they purchase. Additional SNAP supplements could promote healthier eating but there is no guarantee of this outcome. A simple economic model called the consumer utility maximization curve helps explain how providing additional SNAP benefits can affect beneficiaries' decision to purchase healthy or unhealthy food.



**Image 3:** The impact of SNAP on consumer utility maximization curve

**Images Source:** Spector-Bishop, “Food Deserts or Food Desserts? An Examination of Whether Food Deserts Matter” (2018). [https://digitalcommons.macalester.edu/cgi/viewcontent.cgi?article=1092&context=economics\\_honors\\_projects](https://digitalcommons.macalester.edu/cgi/viewcontent.cgi?article=1092&context=economics_honors_projects)

In this simple economic model, an individual can buy two types of foods – healthy and unhealthy. The red line in the “Without SNAP” figure in Image 3: *The impact of SNAP on consumer utility maximization curve* represents the combinations of these two food types that an individual can afford with their budget. The black, U-shaped indifference curve shows the bundles of healthy and unhealthy food that make the consumer equally happy. This curve represents the individual’s *preference* for healthy versus unhealthy food. The point(s) at which the curve and budget line intersect indicate(s) where the consumer can achieve their preferences and stay within their budget. The “Without SNAP” figure shows that an indifference curve can intersect the budget constraint at different points, depending upon the individual’s preferences for a combination of healthy and unhealthy food. The indifference curve of a person who favors cheaper, more caloric, unhealthy food over costlier healthy food, as low-income individuals



often do (or must), hits the red line farther down. The challenge is moving the curve up the red line.

The “With SNAP” picture shows how additional SNAP benefits can move the indifference curve. A food subsidy allows an individual to purchase more food – the primary goal of SNAP – regardless of their preferences. The “With SNAP” figure shows that SNAP benefits increase the food budget, shifting the budget constraint (red line) to the right. This additional income can yield one of five potential outcomes in the amount of healthy and unhealthy food that the individual purchases:

<b>Impact of Budget Constraint Increase on Food Purchasing</b>					
<i>Food Type Purchased</i>	<i>Potential Outcome</i>				
	Outcome 1	Outcome 2	Outcome 3	Outcome 4	Outcome 5
Healthy	Increase	Increase	Increase	Decrease	No Change
Unhealthy	Increase	Decrease	No Change	Increase	Increase

**Table 1:** Impact of Budget Constraint Increase on Food Purchasing

The “With SNAP” figure displays “Outcome 2” – the most desirable result. Here, the individual uses their increased budget to purchase more healthy food and less unhealthy food. There is some evidence that increasing SNAP benefits could yield Outcome 2 for at least some recipients. Higher incomes are associated with eating more healthy foods, such as fresh fruits and vegetables, and less unhealthy foods, such as added sugars (French et al. 2019). Meanwhile, the amount of healthy foods demanded appears to respond positively to income in econometric analysis (Weatherspoon et al. 2013). Because there is a limit on how much people can eat, as they consume more healthy food, their consumption of unhealthy food should decrease. In this situation, unhealthy food is an inferior good whose demand declines as income rises, while healthy food is a normal good whose demand rise as income increases. Under this scenario, healthy food could also be a luxury good whose demand increases *even more* than if it were a normal good.

Although Outcome 2 is possible and perhaps even likelier in some circumstances than others, it is not a guaranteed result. As Table 1 illustrates, Outcome 2 is one of five possible outcomes, and SNAP does not try to steer beneficiaries towards any particular result. For example, Outcome 1 represents a scenario where a consumer treats both healthy and unhealthy foods as normal goods and therefore increases their consumption of both. Many variables affect the choices consumers make. An important influence is their preferences, which might not change just because SNAP benefits increase.

As a result, other incentives might be needed to change consumer preferences and behavior, pushing up the indifference curve. Ammerman et al. (2017) suggest steps that SNAP could take, besides increasing SNAP benefits, to encourage healthy food consumption. These actions include providing monetary incentives to purchase healthy foods, issuing SNAP benefits twice a month, incentivizing small food retailers to offer more healthy food choices in low-income neighborhoods, and increasing the number of grocery stores and supermarkets offering healthy food in poor neighborhoods. The authors also recommend strengthening the SNAP-Ed program, an education initiative that teaches SNAP-eligible individuals about good nutrition and effectively using benefits. In addition, behavioral economics suggests methods to nudge consumers towards healthier food consumption. A number of these options will be considered later.

### ***Conclusion***

Food insecurity is a widespread and growing problem in America. The government addresses this issue mainly by providing food subsidies through nutrition assistance programs. The largest such program, SNAP, has been shown to reduce hunger and food insecurity. However, it does not specifically promote healthy diets and could even encourage unhealthy

eating. Changing SNAP to promote healthier food selection could produce enormous social and health benefits and cost savings. The next several chapters consider how SNAP could encourage healthier eating.

## SNAP's Limit on Supplemental Benefits

### *The Intentional SNAP Funding Gap*

Even with food subsidies, many SNAP participants struggle to afford nutritious food. By design, SNAP benefits do not fully fund all of a recipients' meals. As the program's title indicates, SNAP provides a food purchase *supplement*. The program uses a formula to calculate benefit amounts that assumes families spend 30% of their net income on food. SNAP is supposed to finance the remaining amount of food needed to achieve a nutritious diet that this 30% does not cover. To calculate the price of a meal, the USDA considers the cost of a diet plan that it determined was nutritionally adequate using a low cost estimate (Yaktine and Caswell 2014).<sup>8</sup> While SNAP benefits are higher for those in greater need, they do not account for the area of residency, which can significantly affect food prices ("Supplemental Nutrition Assistance Program (SNAP) Fiscal Year (FY) 2020" 2019).<sup>9</sup> Thus, the formula yields only a rough estimate of the cost of a person's meal.

In fact, SNAP pays considerably less than the amount of the cost of a nutritious meal. In FY17 and FY18, the average SNAP participant received approximately \$126 a month (about \$4.20 a day, or \$1.40 per meal). In Rhode Island, the average SNAP participant received \$140 a month (about \$4.67 a day, or \$1.56 per meal) (Coleman-Jensen et al. 2019; Center on Budget and Policy Priorities 2018).<sup>10,11</sup> In 2018, an average meal for a Rhode Island recipient that satisfied the USDA's nutritional standards cost approximately \$3.46 (Rhode Island Community

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<sup>8</sup> According to the Urban Institute, the SNAP benefit does not cover the cost of a low-income meal in 99% of U.S. continental counties and the District of Columbia. The average cost of a low-income meal in 2018 was \$2.46. This is 27% higher than the SNAP maximum benefit per meal of \$1.86, which takes into account the maximum benefit available to households of varying sizes (Waxman et al. 2018).

<sup>9</sup> This excludes Hawaii and Alaska.

<sup>10</sup> In 2020, the maximum allotment of SNAP benefits a household of 1 and 4 in United States (except Hawaii and Alaska) can receive is \$194 and \$646, respectively (Food and Nutrition Service 2019).

<sup>11</sup> See Figure 2 in the Appendix 1 for a table on SNAP maximum monthly allotments by household size.

Food Bank “Food Cost Study” 2018).<sup>12</sup> Thus, SNAP only funded approximately 45% of the average nutritious meal’s cost. For many beneficiaries, depending on their location and income, this might not be enough to reach the USDA’s nutritional standards.

Other studies corroborated this finding. A 2017 study by North Carolina State University (NCSU) and the Union of Concerned Scientists found that SNAP covers only 43% to 60% of the cost of a healthy diet, as defined by federal dietary guidelines. The cost to individuals of following these guidelines varies significantly with the type and location of food purchases (Mulik and Haynes-Maslow 2017). For example, fresh produce is typically more expensive if bought at farmers markets and boutique stores than at large supermarkets.

For a SNAP recipient seeking meals more nutritious than the minimal federal baseline, the funding gap is even bigger. A four-person SNAP household (two adults and two children) needs to spend \$627 per month *in addition to their SNAP benefits* to eat only fresh produce or an additional \$487 for a vegetarian diet (Mulik and Haynes-Maslow 2017). These figures represent 28% to 36% of the average monthly income of a SNAP recipient. These studies make clear that, even with SNAP benefits, many low-income households cannot afford to consistently follow a diet that meets federal dietary guidelines. The non-profit Food Research and Action Center said that “the greatest shortcoming of SNAP is that benefits for most households are not enough to get through the entire month without hunger or being forced to sacrifice nutrition quality” (Food Research and Action Center 2019).

The funding gap reflects the fact that healthy diets are generally more expensive than unhealthy ones (Darmon and Drewnowski 2015; Andrieu et al. 2006). According to research from Harvard School of Public Health, a healthier overall diet for a person costs about \$1.50

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<sup>12</sup> Menus were created for 21 meals (breakfast, lunch and dinner) to feed a family of four for one week. In 2018, the total cost of these meals was \$290.69 (i.e., \$3.46 per person per meal).

more per day than a much less healthy overall diet. Over the course of a year, this equates to almost \$550 per person, an unaffordable amount for some families (Rao et al. 2013). This price difference can force SNAP recipients to adopt lower quality diets (Drewnowski 2010). If SNAP benefits for all recipients increased by \$1.50 per day, the additional SNAP expense would be approximately \$22 billion annually.

The SNAP funding gap for healthy diets is expanding because SNAP benefits have not kept pace with increases in real food costs. Between 2016 and 2018, food costs in Rhode Island rose 15%, according to a study of local supermarket prices, while the average SNAP benefits per person decreased by approximately 0.6% (McDermott 2018). Income for poor families is also lagging. For example, food inflation in Rhode Island is outpacing wage growth. From 2016 to 2018, workers' wages increased just five percent, one-third the rate of food inflation. The growing gap between food prices and beneficiaries' income and benefits make it harder for low-income families to afford nutritious food. SNAP recipients who exhaust their benefits must find alternate assistance, such as food pantries, or forego meals or other necessities (RICFB 2018). Thus, in the current environment, the ability of SNAP recipients to maintain a healthy diet is diminishing.

### ***Calculating SNAP Benefits using the TFP Model***

SNAP uses that relies on the Thrifty Food Plan (TFP) to calculate monthly allotments. The TFP is the lowest-cost plan that the USDA can design using the types and quantities of foods – and the attendant costs – that people can purchase and consume at home for a nutritious diet. SNAP benefits are calculated by subtracting 30% of the household's net income from the value of the TFP. The TFP accounts for household size and composition (Tiehen et al. 2017). Established in 1975, the TFP is not routinely increased for food inflation. It was last adjusted in

2006, meaning that SNAP benefits have eroded 30% in value (U.S. Bureau of Labor Statistics 2020).<sup>13</sup>

There are several problems with using the TFP to determine benefits. First, the formula to calculate benefits considers only the cost of food purchases. It assumes that households have unlimited time to prepare food at home. If the cost of time is ignored, then many families, as many as 38%, do not have enough money to reach TFP goals. If the formula accounted for the time costs required to meet the TFP are incorporated, then families would be much more constrained (Ziliak 2016). Second, the TFP improperly assumes that food costs are the same across the country, which they are not. Interstate grocery costs can fluctuate from approximately 11 percentage points below the national baseline to 65 percentage points above it. Michigan has the cheapest groceries per household – 11.3% below the national average. Hawaii and Alaska have the most expensive groceries per household – 64.6% and 34.0%, respectively, above the national average. Rhode Island’s groceries are 6.4% higher than the national average (Missouri Economic Research and Information Center 2019).

Third, the TFP fails to account for necessary dietary variation. The survey used to construct the TFP samples from a highly disadvantaged population and misses important segments of the SNAP population, including people with special dietary needs and elderly or disabled people who might not be able to purchase and prepare foods themselves. The plan also does not account for the special needs of pregnant women, adolescents, or persons engaged in heavy manual labor (Natale and Super 1991). By not accounting for variations in people and their diets, the TFP does not provide sufficient allowances. The TFP formula also assumes that SNAP recipients can eat a monotonous diet. In seeking to minimize food costs and meet basic

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<sup>13</sup> \$1.00 in February of 2006 has the same buying power as \$1.30 in February 2020.

nutritional needs, the benefits calculation contemplates diets with little variety, an approach that deviates substantially from social norms. Aligning diets with mainstream consumption patterns would increase costs. Food plans designed for low-income individuals and families would need to be adjusted further to be affordable and nutritious *as well as* socially acceptable (Maillot et al. 2010). The TFP model also lacks the variety called for by the USDA's Dietary Guidelines for Americans (Food Research & Action Center 2019).

Other researchers have also criticized the TFP model. The Committee on the Examination of the Adequacy of Food Resources and SNAP Allotments – composed of economics, health, nutrition, and policy experts – recommended that, in defining SNAP allotment adequacy – the program's success in reaching goals of food security and access to a healthy diet – the FNS should consider the influence of specific individual, household, and environmental factors on SNAP participants' purchasing power. These include time as well as geographic price variation and access to food outlets (Caswell and Yaktine 2013).

In response to the shortcomings, reforms to the TFP have been proposed. One proposal calls for an immediate 20% adjustment in the value of preparation time (Gundersen and Ziliak 2018). Ignoring the cost of time artificially reduces the price of the TFP. As a result, TFP-calculated amounts are insufficient for the purchase and preparation of a market basket for all but a small fraction of recipients.<sup>14</sup> For a four-person household in FY16, the maximum monthly benefit would increase from \$649 to \$779. Notably, this still places it 10% lower than the next highest plan that the USDA offers. Other proposals include relaxing the constant-cost requirement across plan updates, introducing geographic cost-of-living adjustments, and

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<sup>14</sup> The case study section addresses nutrition education, which teaches participants how to incorporate fresh ingredients into their diets.



researching new data sources like the USDA's Food Acquisition and Purchase Survey dataset to revise the TFP (Ziliak 2016). Thus far, little progress has been made on these proposals.

### ***Conclusion***

One way to promote healthier eating among SNAP recipients is to increase their benefits so they can afford a more nutritious diet. The benefit amounts SNAP recipients receive are considerably lower than needed for the cost of a meal, and the shortfall is growing. Updating and revising the TFP model that is used to calculate benefits could produce allotments that allow beneficiaries to adopt healthier diets. These changes would require a bigger budget, which appears politically unlikely now. Thus, other options for improving nutrition should be explored.

## **Requiring Healthy Food Purchases with SNAP Benefits**

### ***SNAP's Lack of Nutritional Requirements for Food Purchases***

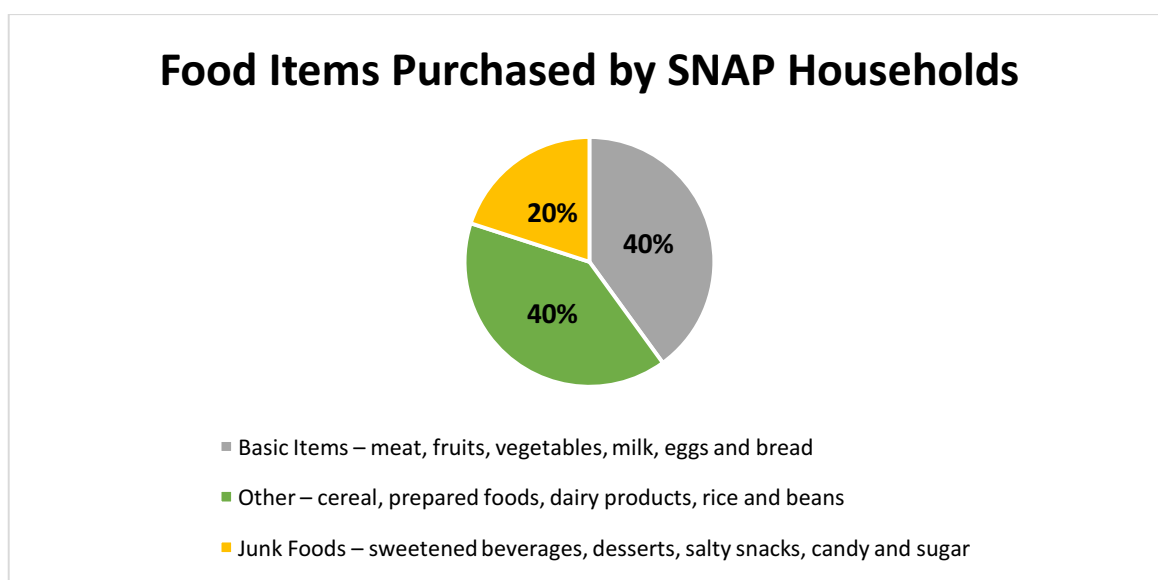
One obvious way to make SNAP recipients purchase healthy food is to require that they use their benefits for that purpose. SNAP is the only federal nutrition assistance program that does not require that foods purchased satisfy the U.S. Department of Health and Human Services' (HHS') Dietary Guidelines for Americans. Other programs restrict the foods that participants can purchase with their subsidies. For example, WIC – the Special Supplemental Nutrition Program for Women, Infants, and Children – designates for purchase specific types of foods, chosen through a rigorous scientific process, that tend to be lacking in the diets of low-income women. These foods include whole-grain bread, baby food, infant formula, and milk (Food and Nutrition Service 2013). WIC participants are also given “cash value vouchers” to buy fruits and vegetables (Center on Budget and Policy Priorities 2017). By contrast, SNAP allows purchases of a wide variety of grocery items, such as bread, cereal, fruits, vegetables, meat, and dairy. Recipients can, however, use their benefits to purchase sugar-sweetened beverages (SSBs), cookies, salty-snacks, and candy.

### ***Purchasing Junk Food with SNAP Benefits***

SNAP benefits can be used to purchase nutrient-deficient foods and beverages, which are major contributors to obesity. A 2016 report by the USDA – the organization that oversees SNAP – revealed that SSBs are the item that SNAP households most commonly purchased. SSBs, which includes soft drinks, fruit juices, energy drinks, and sweetened teas, accounted for more than 9% of the dollars they spent on food. Soft drinks alone accounted for more than 5% of dollars spent. The report also compared SNAP and non-SNAP households. While those who used the benefits program bought slightly more junk food and fewer vegetables than non-beneficiaries, both SNAP and non-SNAP households bought ample amounts of sweetened

drinks, candy, ice cream, and potato chips. Among non-SNAP households, for example, soft drinks ranked second on the list of food purchases, behind milk. As a share of total solid fats and added sugars expenditures, sweetened beverage expenditures were 10 percentage points higher in SNAP households than non-SNAP households (Garasky et al. 2016). Thus, unhealthy food choices are not limited to SNAP recipients.

The report used data from an unnamed national grocery chain. The chain provided the USDA with monthly records of food items bought in 2011 by more than 26 million households, about three million of which were SNAP recipients. Overall, the report found, SNAP households spent about 40 cents of every dollar at the grocery store on “basic items” like meat, fruits, vegetables, milk, eggs and bread. Another 40 cents of every dollar was spent on “cereal, prepared foods, dairy products, rice and beans.” The last 20 cents were spent on a broad category of junk foods that included “sweetened beverages, desserts, salty snacks, candy and sugar” (Garasky et al. 2016). See Figure 1.



**Figure 3:** Food items purchased by SNAP households

In this junk food category, SNAP households spent 9.3% of their grocery budgets on SSBs. That was slightly higher than the 7.1% figure for households that did not receive SNAP

benefits. SNAP households spent 7.2% of their grocery budgets on vegetables. That was slightly lower than the 9.1% figure for households that did not receive SNAP benefits. SNAP households also spent 4.7% of their grocery budgets on fruits, well below the 7.2% that non-SNAP households spent (Garasky et al. 2016). Thus, SNAP households purchased more junk food and less healthy food than non-SNAP households.

### ***The Case for Nutritional Restrictions on SNAP Purchases***

Given SNAP's widespread involvement with food purchases by low-income Americans, the program has been criticized for failing to mandate that recipients use benefits to buy healthy foods. Several states, including New York and Maine, requested waivers from USDA policy to exclude energy-dense foods from the list of SNAP-eligible foods. These exclusions arguably correct two types of market failures. First, they reduce public health costs directly and indirectly associated with obesity, unfitness for certain jobs, and susceptibility to other health afflictions. The USDA treats these costs, which are handled largely by other departments like the HHS, as externalities, even though the public absorbs the cost. Second, a restriction promotes rational behavior by guiding consumers towards healthier choices (Negowetti 2018). Thus, it would seem that argument for requiring healthy food purchases is strong.

The case for excluding SSBs is especially compelling. In contrast to foods like chips and candy, which some argue contain a modicum of nutritional value, the evidence of SSB's damage to public health is considerable and less controversial (Negowetti 2018). Sweetened beverages are devoid of nutritional value and do not alleviate hunger because they do not satiate (Negowetti 2018). Compelling evidence links SSBs to obesity, diabetes, and other chronic diseases for which low-income Americans are particularly at risk (Blondin 2014). The Center for Disease Control has stated frequently that drinking SSBs is associated with weight gain, obesity, type 2

diabetes, heart disease, kidney diseases, non-alcoholic liver disease, tooth decay and cavities, and gout (Center for Disease Control 2018). Even the dietary guidelines of the USDA – SNAP’s governing organization – state that these beverages are the major source of added sugars in typical U.S. diets. SSBs contribute almost half of added sugars that the U.S. population consumes (Dietary Guidelines Advisory Committee 2016).

Perhaps surprisingly, several studies have found that SNAP recipients support requirements to purchase healthy food with their allotments. Leung et al. (2016) used Amazon Mechanical Turk, a crowdsourcing marketplace, to survey 387 individuals, 118 of whom were SNAP recipients. The survey found that SNAP recipients favored increasing the benefit allowance, funding of nutrition education programs, and imposing use restrictions that encouraged healthy food purchases and discouraged unhealthy purchases. In addition, most SNAP participants (68%) supported removing SSBs from eligible purchases if paired with incentives for healthy foods. Thus, SNAP recipients appear willing to accept modifications to the program to encourage better nutrition. The authors acknowledged shortcomings in the study. For example, survey respondents averaged 36.9 years old, while the mean age of SNAP recipients is 52. Survey respondents were disproportionately female and white and might have been more technologically savvy than the general SNAP population. These factors might have distorted the embrace of SNAP recipients of the proposed policy change (Leung et al. 2016).

In another study, more than three-fourths of respondents – consisting of SNAP and non-SNAP recipients – supported restrictions on the use of SNAP benefits in certain contexts. 82% of respondents supported providing additional benefits to SNAP participants that could be used to buy only healthy foods. Of the SNAP participant respondents, the majority supported barring the use of SNAP benefits to purchase sugary drinks. Overall, the majority of respondents supported

restrictions unhealthy food purchases and incentives to buy healthy foods with SNAP benefits (Long et al. 2014).

That SNAP recipients support restrictions on what they buy may seem counter-intuitive. Presumably, SNAP beneficiaries would want the freedom to purchase any products they desire. However, this result can be explained by meta-preferences, which are our preferences about our preferences. For example, smokers might wish they did not smoke and thus support anti-smoking regulations. Likewise, a lazy person might buy a gym membership because they would like to be in shape. In this case, SNAP recipients might want to eat healthier but lack the knowledge, resources, or willpower to do so on their own. Regulations would help set them on the right path.

### ***Lobbyists Against SNAP Nutritional Reforms***

Although denying junk food and SSBs purchases with SNAP allotments is a relatively low cost change with high potential returns and the support of some SNAP recipients, the USDA has refused to ban purchases of energy-dense foods. A primary obstacle to making these changes is lobbying by the food and beverage industry. With billions of dollars in government funds at stake, special interests have frequently rallied against nutritional reforms to SNAP. In 2013, the American Beverage Association, together with individual beverage companies, spent \$16.2 million on SNAP-related lobbying (Paarlberg et al. 2018). According to the Center for Responsive Politics, a nonprofit that tracks money in politics, PepsiCo lobbied the federal government to prevent restrictions on SNAP purchases in 2011, 2012, and 2013 (Center for Responsive Politics 2011). In 2012, the sugar industry, Coca Cola, and Kraft Foods lobbied against a Florida bill that would have banned the use of SNAP benefits to purchase soda and junk food (Simon 2012). The Snack Food Association in 2011 tag-teamed with beverage industry lobbyists and the National Confectioners Association, which represents candy

companies, to take down New York City's proposed ban on SNAP benefits to buy SSBs (Pear 2011). Using the information that SNAP households spend about 20 cents of every dollar (i.e., 20% of their food budget) on junk foods and that SNAP has \$65 billion in funding, 92.3% of which goes directly to households to purchase food, as much as \$12 billion federal dollars go toward junk food. This purse has been too attractive for the food and beverage industry to forego.

### ***Other Arguments For and Against Nutritional Restrictions***

Beyond the political barriers, implementing a requirement that SNAP benefits be used for nutritional purchases raise logistical and philosophical issues. Schwartz (2017) summarized the major issues as follows:

1. Feasibility: is restricting SNAP purchases too difficult?
2. Justification: is restricting SNAP purchases fair and justifiable because SNAP participants might be at higher risk of poor diet than the general population?
3. Effectiveness: will restricting SNAP purchases yield positive impact?
4. Slippery slope: will restricting some SNAP purchases lead the USDA to ban many or all "unhealthy foods?"
5. Consistency: can the government verify that everyone who receives benefits uses them wisely?
6. Dignity: will restricting SNAP purchases stigmatize participants and discourage participation?
7. Distrust: are certain advocates (e.g., public health and anti-hunger or SSB lobby and legislator) misguiding the opposition?

The key arguments of advocates and opponents of nutritional food regulations typically fall into one of these categories. For example, proponents argue that taxpayer dollars should not

subsidize the purchase of food and drinks with little nutritional value (justification). They also note that newer technology, especially phone apps, can help recipients determine which foods can be purchased (feasibility). These apps can provide updated SNAP-eligible food list notify SNAP recipients whether a product is eligible, and use sales tax systems to identify ineligible foods (Schwartz 2016).

Those against such restrictions say that developing and enforcing standards for allowable foods is difficult (feasibility). The vast size and diversity of the food and beverage markets makes it hard to craft comprehensive regulations (Blondin 2014). They also argue that restrictions are paternalistic and potentially counter-productive (dignity). If SNAP participants are denied foods they like to consume, especially those purchased at the checkout counter in front of others, they may feel stigmatized or deprived, and become likelier to drop out of the program.

Opponents also note that attempts to reform SNAP to encourage healthy eating often fail (effectiveness). For example, the 2014 Farm Bill aimed to increase nutritious food consumption by requiring SNAP-authorized retailers to offer more healthy food options. On its face, the law made sense. With a dearth of local grocery stores in low-income neighborhoods, residents often purchased food from convenience stores and gas stations that typically lacked healthy food choices. The bill provided \$100 million in mandatory funding for the Food Insecurity Nutrition Incentive (FINI) grant program. This program supported efforts to provide financial incentives to SNAP participants to purchase fruits and vegetables.

The law did not have the desired impact. It increased the availability of healthy foods to beneficiaries, but they were not inclined to purchase it. Many incentive efforts were either not evaluated or had low incentive uptake (i.e., were not taken advantage of) (Moran et al. 2019).



Moreover, the law imposed an economic burden on retailers by requiring them to carry perishable goods that their customers often did not buy. This burden included not only the expense of the items themselves but also the time required to secure the items and the durable equipment/refrigeration needed to store perishable goods (Gostin and Wiley 2018). Thus, well-intentioned but untested reforms can go awry.

### ***Conclusion***

Preventing SNAP beneficiaries from using their allotments to purchase unhealthy food, especially SSBs, seems like a reasonable, low-cost step for discouraging poor eating habits. Yet the change has not happened. There is strong political opposition, as junk food is profitable for retailers and manufacturers. Efforts in cities like Chicago and New York to limit the sales of large sodas prompted a public outcry and were scrapped. In June 2013, during an early Farm Bill debate, 18 mayors including from New York, Chicago, and Los Angeles, sent a letter to congressional leaders asking for a chance to “test and evaluate choices” for limiting SSBs, but to no avail (Paarlberg et al. 2018). Congress has remained unmoved by such recommendations.

## **Using Behavior Modification to Encourage Healthy Purchases**

### ***Encouraging Healthy Diets with Choice Architecture***

There are ways to discourage bad food choices besides banning them. Many factors influence consumers when they are buying food. One study found that almost two-thirds of consumer decisions are impulsive and made while shopping (Iyer et al. 2019). SNAP could apply lessons from behavioral economics to nudge SNAP recipients toward healthier food choices. Behavioral economics is an emerging branch of economic research that studies the effect of psychological factors on the decision-making of consumers and other individuals. In its jargon, a “nudge” is an attempt to influence consumer behavior by presenting choices in a certain way without forbidding any choices or significantly changing incentives.

One behavioral tool to nudge consumers, “choice architecture” can stimulate psychological responses that include healthier eating. Choice architecture influences consumer decision-making by altering the design of environments where choices are made. The new arrangements can make healthy choices more obvious and easier to make, requiring less consumer self-control or willpower (Ammerman et al. 2017).

An example of such choice architecture is product placement. Making displays of healthy foods more prominent and accessible can promote their selection and consumption. For example, placing healthier foods at eye level near aisle end caps or near checkout aisles encourages their purchase. A 24-month choice architecture intervention in a large hospital cafeteria found that the proportion of healthy food sales increased from 41% to 46% when items were rearranged to make healthy food more accessible (Thorndike et al. 2014). Policy changes that encourage retailers to enhance healthy food access could increase their purchase by SNAP participants.

In addition to making healthy food more accessible, SNAP-authorized retailers can make unhealthy food less tempting. In a recent commentary, Thorndike and Sunstein introduced the idea of a SNAP choice architecture policy that would prohibit SNAP-authorized retailers from placing nutritionally-poor items, like SSBs, in highly visible locations, like end-of-aisle, free-standing, and checkout counter displays. This policy would allow stores to continue to sell SSBs but would reduce the likelihood of impulse purchases by reducing exposure to SSBs in the store (Thorndike and Sunstein 2017). This policy of discouraging bad food choices complements one of promoting healthy selections.

Cues, which are another component of choice architecture, can also trigger impulse buys by providing positive or negative feedback. These environmental alerts remind consumers to seek healthy selections or decrease temptations to make bad decisions. Potential cues for SNAP participants include increased lighting of displays of healthier options and visually appealing displays in grocery retail outlets. A SNAP choice architecture policy that uses cues can balance the major health risks of consuming SSBs and other unhealthy foods with freedom of choice by making unhealthy food less convenient and less visible at the point of purchase is desirable (Thorndike and Sunstein 2017). These changes can be achieved in controlled environments, like grocery stores, but are less pertinent with other SNAP purchasing venues, such as farmers markets.

### ***Obstacles to Mandating Choice Architecture***

Requiring retailers to implement choice architecture that promotes healthy food purchases faces several obstacles. One issue is that manufacturers and retailers might reject them. SSBs and other unhealthy food are profitable to producers and sellers. The products generate income not only through direct sales but also as loss leaders that attract customers. In

addition, distributors often set-up product displays, so removing them would require additional labor from the retailer. Thus, manufacturers and retailers may resist taking steps that could reduce sales of these products, just as they lobbied against bans on unhealthy product purchases.

Another issue is paternalism. Applying behavioral economics methods is manipulative. It presumes that individuals either do not know which choice advances their interest or lack the capacity to make the proper choice. In the former case, the subject of a paternalistic act might acknowledge that the promoted good is valued but not view it as the *highest* good. They might agree health is important, but less so than individual choice. In the latter case, the subject might agree that health is the highest good but lack the agency to make changes individually and therefore support behavioral inventions. For example, someone who eats unhealthy food might want to eat healthy food but have insufficient drive to do so individually (Furth-Matzkin and Sunstein 2017; Rostbøll 2005). The question is whether the government should dictate what choices consumers should make to protect them from their own ignorance or inability.

A third issues with implementing choice architecture is enforceability. Designing standards for merchandizing food can be difficult. For example, must a Bodega with limited space avoid putting snacks neither the register? Will someone check how bright the lights in a supermarket are near the potato chips or the broccoli? These requirements may be hard to draft and to enforce.

### ***Conclusion***

Behavior modification provides a method less heavy-handed way than a ban to improve healthy eating among SNAP recipients. Evidence suggests that changing food merchandising can encourage consumers to buy healthier food. As with restrictions on SNAP food purchases, producers and retailers might balk at regulations that would decrease their income or increase

their costs. In fact, they may be even likelier to condemn choice architecture rules than regulation. The former would merchandising changes that could reduce sales from *all* consumers, not just SNAP beneficiaries.

## **Private Programs to Promote Healthy Eating by SNAP Beneficiaries**

### ***Private SNAP Incentive Programs***

With SNAP benefits failing to keep up with inflation and the federal government's unwillingness to demand healthy food purchases, it is becoming harder for SNAP beneficiaries to adopt a healthy diet. As a result, private organizations are stepping in with programs designed to improve nutrition. A number of these programs provide incentives to SNAP consumers to buy healthy food. These efforts typically offer a dollar-for-dollar match (or, in some cases, a discount) for each SNAP dollar spent on targeted foods (usually fruits and vegetables) at farmers markets or grocery stores. These subsidies essentially extend the value of SNAP benefits.

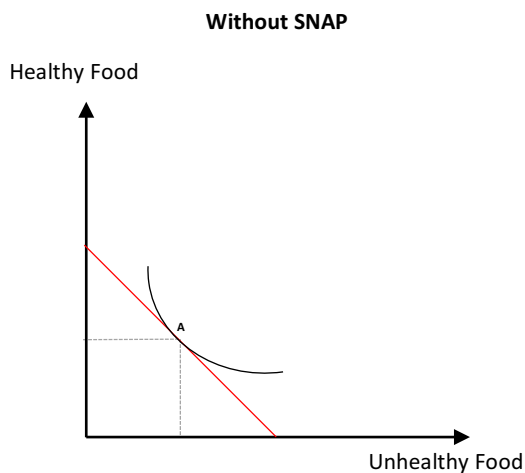
There is evidence that these programs work. Studies have shown that use of federal nutrition assistance dollars increased after incentive dollars were introduced into the local food system (Freedman et al. 2014; Baronberg et al. 2013). A small experiment tested a "double-dollar" fruit and vegetable incentive distributed to both SNAP-eligible and non-SNAP-eligible participants in a grocery retail setting in rural Maine. These groups were given coupons to redeem for fruits and vegetables, and the groups' respective total redemptions were analyzed. The program increased weekly spending on fruits and vegetables among households participating in SNAP by 45% compared with only 11% among participants not enrolled in SNAP (Polacsek et al. 2018). In this study, SNAP recipients took advantage of the incentive to buy fresh produce. The effectiveness of similar programs will be discussed in greater detail later.

### ***How Dollar Matching Programs Work: The Consumer Utility Maximization Model***

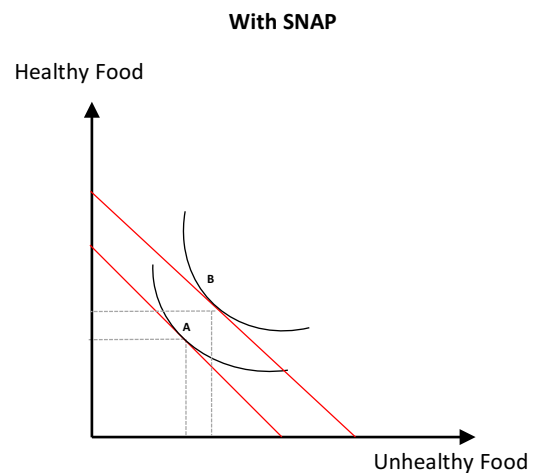
The consumer utility maximization economic model that was used to explain why SNAP benefits work also illuminates the theory behind dollar-matching incentive programs. As a refresh, in this simplified model, an individual can buy healthy and unhealthy food. The red line

represents the individual's budget constraint (i.e., the food combinations the individual can buy with their budget), and the black U-shaped curve show the individual's preferences for healthy versus unhealthy food (i.e., the bundles of consumption that make the consumer equally happy). Point "A" in Figure 2A indicates the initial bundle of healthy and unhealthy food the individual chooses to buy based upon their preferences before SNAP or any other incentive program is implemented. Figure 2B illustrates the impact of SNAP benefits on the individual's budget constraint. Point "B" shows the new bundle of healthy and unhealthy food the individual chooses based upon their preferences.

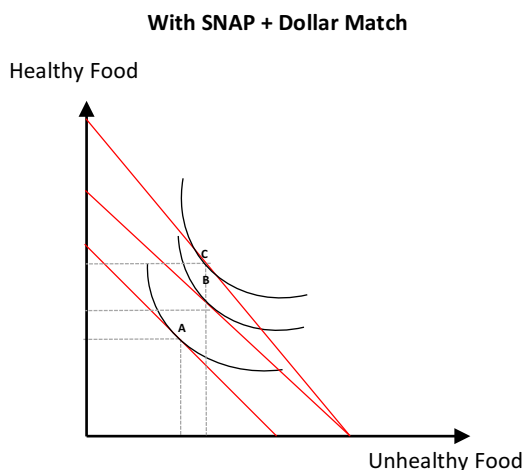
Rather than shifting the budget constraint outward, an incentive program like dollar-matching alters its slope. This is because SNAP benefits increase the overall budget constraint of individuals, while healthy food incentives effectively lower the price of healthy food and increase the individual's purchasing of that good. Figure 2C shows the impact of adding a healthy food incentive to SNAP. Point "C" indicates the new bundle of healthy and unhealthy food the individual chooses to buy based on their preferences. This movement from point "A" to "B" to "C" illustrates how the bundle of food purchased changes as the budget constraint shifts. Incentive programs thus make healthy food more affordable.



**Figure 4A:** Consumer utility maximization curve without SNAP benefits



**Figure 2B:** Consumer utility maximization curve with SNAP benefits



**Figure 2C:** Consumer utility maximization curve with SNAP benefits and dollar-for-dollar matching

### *The Role of Farmers Markets*

Farmers markets often play an important role in SNAP incentive programs. Recognizing the paradox that it is often cheaper to buy fruits and vegetables grown thousands of miles away by a multinational corporation than from a local farmer a few miles away, some activists and policymakers have begun focusing on making local food cheaper by using incentive dollars to promote farmers markets. These efforts are succeeding. Many farmers markets now accept SNAP benefits. In 2020, farmers markets in nearly 30 states will have implemented dollar-matching and bonus monetary incentive programs for SNAP recipients (Fair Food Network 2020).<sup>15</sup> Because farmers markets need little infrastructure (often nothing more than a parking lot), they can be set-up quickly in needy areas, including food deserts.

The expansion of two-for-one SNAP benefit program offerings at farmers markets correlates with the rise of SNAP benefit redemptions at those locations. Between 2013 and 2019,

<sup>15</sup> See Figure 3 in the Appendix 1 for a map of states offering Double Up food programs.



the percentage of SNAP dollars spent at farmers markets rose by approximately 47%, from \$95,522 to \$140,196. Rhode Island exceeded the national average with an increase of approximately 70%. During the same period, the number of farmers markets accepting SNAP benefits increased by approximately 124% nationally and approximately 157% in Rhode Island (United States Department of Agriculture 2020). It is not clear from existing data whether SNAP users who already shopped at farmers markets simply started using their benefits (or redeeming more benefits) or whether private programs attracted new attendees.

Technology also helped make SNAP programs more successful at farmers markets. Electronic benefit transfer (EBT) cards are an alternative method for issuing and redeeming benefits, in the continuing effort to fight fraud, waste and abuse. The EBT card replaces traditional SNAP (or food stamp) coupons with a plastic magnetic striped card (like a bank debit/credit card). SNAP recipients use the card at authorized retailers to access their benefits accounts at a central computer. Coupled with the expanded acceptance of EBT cards at markets, incentive programs in cities such as New York, Philadelphia, and San Diego have proven effective at increasing the amount of food assistance dollars spent at farmers markets, as well as advancing participants' self-reported fresh fruit and vegetable consumption (Baronberg et al. 2013; Young et al. 2011).

Beyond improving participants' health, offering SNAP incentives at farmers markets can be an economic stimulus. Channeling incentives through farmers markets links consumers to local producers and distributors. This connection strengthens the local food supply and enhances community food sovereignty – the right of people to choose the food they consume, as well as where and how it is produced (Holt-Giménez 2010; Autio et al. 2013).<sup>16</sup> Shopping at these

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<sup>16</sup> While SNAP addresses mainly short-term hunger issues of consumer demand, building a sustainable, long-term supply of fresh food requires a local food system. Local food systems are collaborative networks that integrate

markets benefits both the farmers and consumers directly. When farmers sell their produce wholesale, they exclude ‘middleman’ costs associated with grading produce, packing, shipping, handling, brokering, wholesaling, distributing, and retailing, which can consume as much as 70 cents of every dollar spent on fruits and vegetables. Farmers can thus earn a greater share of the retail price, typically 40 to 80 percent more, while realizing their income immediately rather than waiting for payment from brokers (Andreatta & Wickliffe 2002). Farmers can also offer a greater array of products, such as more heirloom varieties, while building relationships consumers (Farmers Market Coalition 2020).

Money spent at farmers markets can benefit the local economy by circulating more times in the local area before leaving. Studies have shown that for every dollar spent at a large food chain, about 15 cents stays in the area. By contrast, locally-owned enterprises like farms can trap 30 to 45 cents (Mitchell 2016). This local assistance can be especially beneficial in economically-depressed communities, which are typically net exporters of financial capital (Bullock 2000). Keeping money within an area is an important aspect of regeneration, and supporting local food initiatives is a good way to do that.

Generating demand for regionally-supplied food boosts employment in the local food chain. In fact, local food systems generate jobs at a higher rate than conventional agriculture. A report from the USDA’s ERS found that fruit and vegetable farms selling into local and regional markets employ 13 full-time workers per \$1 million in revenue earned, for a total of 61,000 jobs in 2008. By comparison, fruit and vegetable farms not engaged in local food sales employed 3

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sustainable food production, processing, distribution, consumption, and waste management to enhance the environmental, economic, and social health of a particular area (Longo 33). Building resilient local food systems is important to having a steady supply of fresh healthy food. Climate change is making the need for local food systems increasingly urgent because they lower carbon footprints and offer more reliable food supplies as the world’s breadbaskets shift.

full-time workers per \$1 million in revenue (Merrigan 2017). Eating more locally-supplied food can have the macroeconomic benefit of strengthening the economy.

Food systems that rely on local, rather than conventional, agriculture can also have a positive environmental impact. According to Pirog et al. (2001) and Saunders and Hayes (2007), food is traveling further from farmers to consumers as the food system increasingly relies on long-distance transport and global distribution networks. Advocates of localization of the food system argue that reducing transport distances for food, or food miles, can reduce fossil fuel energy use, pollution, and GHG emissions (Thompson (Jr.) et al. 2008; Low 2015).

Recognizing the value of private dollar-matching programs at farmers markets, the federal government has begun to fund them. Created in the 2014 Farm Bill and expanded in the 2018 Farm Bill, the Gus Schumacher Food Insecurity Nutrition Incentive Program (GusNIP), formerly the Food Insecurity Nutrition Incentives (FINI) program, supports private incentive programs. This USDA program provides grants to projects that help SNAP recipients access and purchase fresh produce through “cash” incentives that increase their purchasing power at the point of purchase, including farmers markets. Between 2015 and 2018, the USDA awarded \$85.6 million under FINI to more than 100 nonprofit organizations and public agencies around the country supporting produce purchasing incentives for SNAP beneficiaries (Fair Food Network 2019). The 2018 Farm Bill more than doubled funding for these SNAP incentive programs, a success for both SNAP consumers and farmers markets (McMinimy 2019). The government’s increased funding reflects the success of the FINI program and highlight the need for continued innovations in helping SNAP participants purchase fruits and vegetables (Parks et al. 2019).

### ***Michigan’s Double Up Food Bucks***

Michigan's Double Up Food Bucks (DUFB) program illustrates how incentive programs work. In 2009, the Michigan nonprofit Fair Food Network created DUFB. It sought to increase healthy food consumption while boosting purchases from local farmers. DUFB matched SNAP dollars spent on fresh produce up to \$20 at farmers markets. Starting at five farmers markets, the program expanded to more than 250 farmers markets and grocery stores across Michigan.

Cohen et al. (2018) studied the impact of the DUFB program, including the factors that influenced program use and retention among eligible low-income individuals. DUFB consumers at farmers markets were demographically similar to the overall Detroit SNAP-enrolled population but poorer and disproportionately female. The proximity of DUFB shoppers to farmers markets significantly affected their likelihood of returning to it, a finding that reinforces the importance of accessibility. Although only five percent of Detroit SNAP-enrolled households used DUFB during the study period, Cohen et al. stress that this figure is substantially higher than the 1.4% of SNAP enrollees who shopped at farmers markets nationally. Lack of awareness that such a program exists and understanding the mechanics of how it works also limits the use of DUFB.

The authors examined 21,541 confirmed SNAP and DUFB transactions from June through November 2012 and July through October 2013. These transactions totaled \$410,400 in redeemed SNAP benefits and \$318,222 in Double Up Food Bucks. 11,983 unique individuals used DUFB during the study period. Program participants were predominantly female (72%), African-American (74%), and from households below the federal poverty line (87%). While nearly 12,000 SNAP enrollees redeemed incentives during the two-year period, only about one-third had repeat transactions during this time.

The DUFB program had a positive, though limited and short-term, impact on participants' healthy food purchases. Ratigan et al. (2017) found that fruit and vegetable intake and perceived dietary quality increased by 2% and 10%, respectively, per month of participation in DUFB. The long-term impact of DUFB programming on the target population required that participants were able (and wanted) to access and use such programming reliably over time. According to Steele-Adjognon and Weatherspoon (2017), the DUFB program increased SNAP customers' monthly expenditure on fruits and vegetables by \$0.40 per month. Withdrawing the financial incentives reduced healthy food purchases. The impact of DUFB is modest compared to that of other financial incentive programs in supermarkets, such as the Healthy Incentives Pilot program. This subsidy intervention gave SNAP customers 30% off targeted fruit and vegetable purchases, increasing fruit and vegetable expenditures by 20%. This increase exceeded the 5.8% fruit and vegetable expenditure increase for DUFB. One explanation for DUFB's more limited impact is a \$10 fruit and vegetable minimum purchase requirement to activate the incentive. This threshold may have discouraged participation rather than encouraged spending more. In contrast, the Healthy Incentives Pilot program lacked this purchase hurdle.

The DUFB program positively affected fresh produce purchases among SNAP participants who shopped in Michigan supermarkets, especially when shoppers earned DUFB points with purchases of all fresh produce. Rummo et al. (2019) explored pricing incentives DUFB in grocery stores. Using data on millions of transactions from 32 grocery stores, they found that SNAP participants' spending on fresh produce was significantly higher at stores that implemented the subsidy than at control stores during a two-year intervention period – 7.4% in 2015 and 9.6% in 2016. In these cases, dollar-matching programs were effective and technically and operationally feasible.

### ***Other Obstacles to Encouraging Produce Purchases***

Even with financial incentives, obstacles remain for encouraging the purchase of fresh fruits and vegetables. Recent studies of farmers market use by SNAP recipients showed that many lack exposure to fruits and vegetables, including the availability in the home, cooking, serving, and tasting of fruits and vegetables. This unfamiliarity may be as significant an impediment to fruit and vegetable consumption as limited access (Racine 2010; Haynes-Maslow et al. 2013). Nutrition education is thus essential for any nutrition assistance program to boost purchases of fruits and vegetables, and it must target the issues that prevent users from buying produce. The curriculum should include why unhealthy, calorically-dense food should be avoided, how to buy healthy food, and how to prepare fruits and vegetables (Wyker et al. 2012). Nutrition programs often do not directly address issues of unfamiliarity with and acceptance of the benefits of eating fruits and vegetables (An 2013). Any education should also aim convince participants to buy fresh fruits and vegetables despite their relatively high costs and shorter shelf lives instead of canned and processed foods. Consumers might also be uncertain that investing time and money in shopping and cooking will improve their health or worry that spending money on unfamiliar foods served to their family will go to waste (Ammerman et al. 2016; An 2013).

Other approaches also familiarize consumers with fresh produce. One program increased fruit and vegetable consumption by 0.48 cups among racially and ethnically diverse low-income children aged 3 to 13 years by selling produce at a discount through a public-private partnership. This alliance between a local food distributor and community organizations serving low-income families in Rhode Island facilitated an increase in fruit and vegetable consumption (Gorham 2015). Thus, a variety of models can help spur healthy eating.

In addition, relatively few SNAP beneficiaries patronize farmers markets due to a lack of familiarity and proximity and to higher prices (Cotter et al. 2017). The typical farmers market shopper is a middle-aged, white females who live in proximity to the market (Byker et al. 2012; Freedman et al. 2016). Different strategies can be adopted to more directly target low-income, racially-diverse communities. Some incentive programs improve the access of target populations to fresh produce by locating farmers markets in their communities. By addressing barriers to shopping at farmers market, such as making it known that SNAP recipients can redeem or even double their benefits and placing markets in proximity to beneficiaries, greater fruit and vegetable purchasing and nutrition can be reached by an already disadvantaged group.

### ***Conclusion***

Private SNAP incentive programs encourage the purchase of healthier foods. The consumer utility maximization economic model explains that these programs work by making produce cheaper. Farmers markets have become an important distribution channel for these incentive programs. They can provide quick access to fresh produce in targeted communities. In addition, purchases made in farmers markets strengthen local food systems. Education is important component of any program to stimulate produce consumption, as many consumers are unfamiliar with the benefits and preparation of fruits and vegetables.

## **Farm Fresh Rhode Island's Bonus Bucks Program**

### ***Organizational Background***

Farm Fresh Rhode Island (Farm Fresh RI) is a not-for-profit food hub based in Providence. The USDA defines a “food hub” as “a centrally located facility with a business management structure facilitating the aggregation, storage, processing, distribution and/or marketing of locally/regionally produced food products” (Barham 2010). Farm Fresh RI provides short-term and long-term solutions to food insecurity by increasing access to, and the supply of, locally-sourced produce to low-income individuals.

Inspired by a Brown University student project, Farm Fresh RI was founded in 2004. The organization employs more than 45 full-time and part-time employees and has a budget of \$2.3 million, 60% of which it earns from services it provides (Farm Fresh 2019). Farm Fresh RI's mission is to increase community access to local food sources and strengthen the local food system, thereby promoting food justice (Farm Fresh 2019).<sup>17</sup> Geographer Rasheed Hislop described “food justice” as “the struggle against racism, exploitation, and oppression taking place within the food system that addresses inequality's root causes both within and beyond the food chain” (Hislop 2015; Alkon 2014). Promoting food justice includes expanding access to fresh produce for low-income populations.

To achieve its mission, Farm Fresh RI offers two types of programs. Its Community Access programs increase the availability and affordability of locally-sourced foods for Rhode Islanders and other New Englanders. These projects include organizing farmers markets that make healthy food more accessible to local residents while allowing New England farmers,

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<sup>17</sup> New York City-based Just Food, an organization that promotes greater access to healthy, locally-grown food, describes food justice as “communities exercising their right to grow, sell, and eat [food that is] fresh, nutritious, affordable, culturally appropriate, and grown locally with care for the well-being of the land, workers and animals” (Alonso-Fradejas 2015).



fishers, and small food businesses to reach customers directly. The organization also provides culinary job training as well as nutrition education that teaches participants how to incorporate fresh ingredients into their diets. In addition to Community Access programs, Farm Fresh RI's Food System Enterprise services offer production, distribution, and marketing services to small farms in the state. These services help producers sell directly to consumers, removing intermediaries and increasing sellers' profitability.

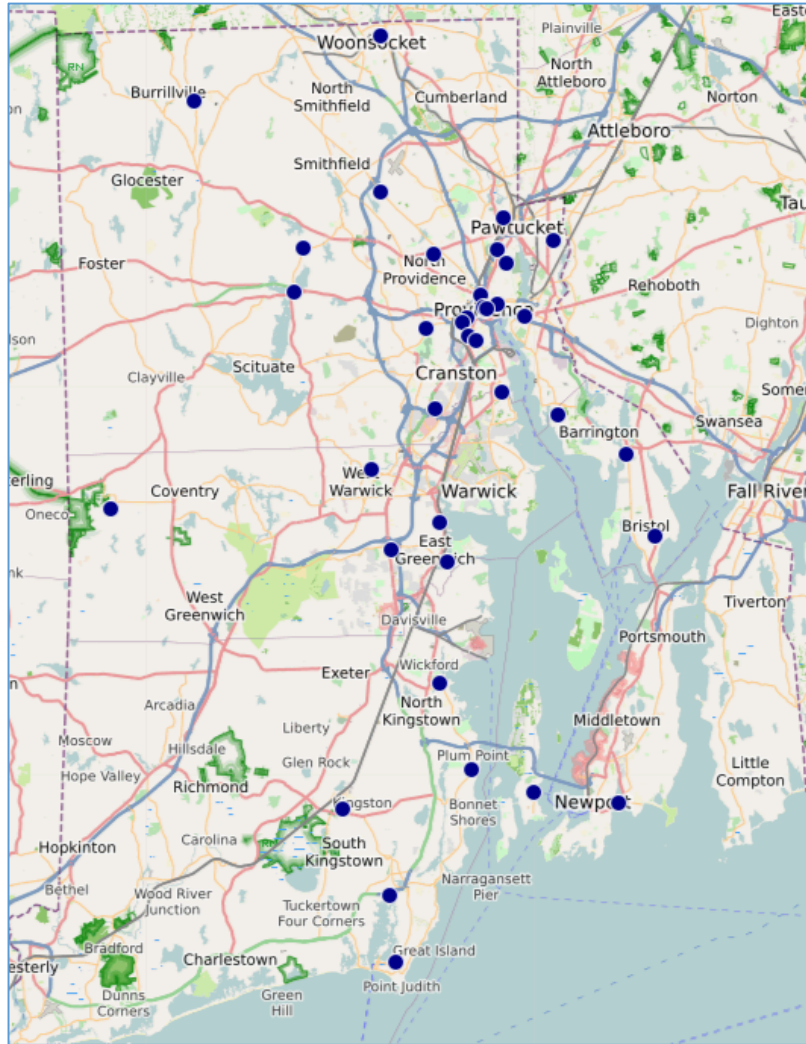
### ***Bonus Bucks***

Farm Fresh RI's "Bonus Bucks" nutrition incentives program subsidizes SNAP recipients' purchases at local farmers markets and other venues. The original version of the Bonus Bucks program provided 40% matching for these purchases. For every \$5 that a SNAP beneficiary spent at certain farmers markets, the organization provided an extra \$2 in "Bonus Bucks" for fresh fruit and vegetable purchases. Initially incentives were distributed as wooden tokens called "Fresh Bucks." Incentives were provided in whole dollar amounts. For example, if someone spent \$24 in SNAP benefits, instead of receiving \$9.60 in incentives (a 40% match), they typically received \$10.

To qualify for the incentive, a customer had to spend at least a dollar in SNAP benefits. This minimum purchase is lower than the Michigan DUFEB's \$10 threshold, which some authors hypothesized discouraged participation (Steele-Adjognon and Weatherspoon 2017). Over the past four years, the average Bonus Bucks transaction, both before and after the NIFA grant, averaged \$23. From 2015 through 2018, 19% of the transactions were for less than \$10 – meaning almost one in five Bonus Bucks transactions would not have qualified for incentives under the Michigan DUFEB threshold.

In 2018, Bonus Bucks incentives became much more generous. That year, USDA's National Institute of Food and Agriculture (NIFA) provided Farm Fresh RI with a \$4.6 million grant to enhance the Bonus Bucks program (Farm Fresh 2019). The organization increased the match to 100% of the amount of SNAP benefits used to buy fresh produce through Farm Fresh RI's farmers markets, community-supported agriculture systems (CSAs), farm stands, and produce subscription boxes. These venues are functionally similar except CSAs, farm stands, and produce subscription boxes tend to be delivered to SNAP beneficiaries and therefore eliminate the accessibility barrier. (CSAs allow consumers to subscribe to the harvest of a certain farm or group of farms. Consumers can purchase boxes of fruits and vegetables at a CSA's farm stands, which do not have retail presence.) Qualifying for the incentive matching program is the same among these venues.

The map below shows where Farm Fresh RI's markets are located. Many markets are in low-income areas that lack full-scale grocery stores nearby. During the summer of 2018, Farm Fresh RI opened six farmers markets in northern Rhode Island neighborhoods that experienced food scarcity and whose residents suffered disproportionately from diet-related health problems (Farm Fresh 2019). More than 100 local farmers and producers sell goods at Farm Fresh RI's farmers markets. Producers require Farm Fresh RI's approval to participate in its farmers markets.



**Image 4:** Rhode Island Farmers Markets offered by Farm Fresh RI

**Image Source:** Farm Fresh Rhode Island (2020).

<https://guide.farmfreshri.org/food/farmersmarkets.php?zip=02909>, [http://umap.openstreetmap.fr/en/map/farm-fresh-rhode-island-farmers-markets\\_436527](http://umap.openstreetmap.fr/en/map/farm-fresh-rhode-island-farmers-markets_436527)

### ***Bonus Bucks – Data***

The Bonus Bucks program presents a good case study for a nutrition incentive program. Farm Fresh RI has a substantial database of its Bonus Bucks transactions. (The NIFA grant requires the organization to maintain this data.) In addition, the size and scope of the Bonus Bucks program and its farmers markets allow the analysis to focus on Rhode Island. If the program had been smaller, there may have been insufficient data to conduct statistical analysis. By contrast, if the program were broader geographically, either in having multi-state markets or

by attracting many consumers and suppliers from other states, it might have been difficult to isolate the impact on state residents and suppliers. As many Farm Fresh RI farmers markets in the state are located more than 20 minutes from neighboring states, analyzing these markets is likely to limit the number of non-Rhode Island SNAP visitors. Numerous studies have confirmed that longer distances to markets are barriers for low-income populations to purchase fresh fruits and vegetables (Haynes-Maslow et al. 2013; University of Washington Center for Public Health Nutrition 2014). In non-rural areas, when purchasing food, people in low-income neighborhoods typically choose between smaller but closer local stores (which are often less healthy and more expensive) and spending an average of 20 minutes to reach the nearest large retailer (Ploeg et al. 2019). Thus, the database can help focus on the impact in Rhode Island.

Farm Fresh RI controls the markets where most Bonus Bucks are distributed, easing the tracking of consumer spending. In fact, according to an inventory that Rhode Island's Department of Environmental Management (DEM) took in 2020, Farm Fresh RI operates 20% of the state's farmers markets, more than any other organization. Inconsistencies between the number of farmers markets that the DEM identified and the number that Farm Fresh RI reports mean the organization's market share could be even greater, perhaps as high as 48%.<sup>18,19</sup> As the state's largest operator of farmers markets, Farm Fresh RI tracks a higher volume of people and purchases, permitting a more robust analysis.

Fresh Farms RI's database was the primary data source for this analysis. The database contains transactions made at the organization's farmers markets by SNAP beneficiaries using

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<sup>18</sup> The number of farmers markets recorded by Rhode Island Department of Environmental Management (DEM) does not match the number reported by Farm Fresh RI (despite the one-year difference). In FY18, Farm Fresh RI reported having 33 farmers markets. In 2020, the DEM reported 45 farmers markets, of which only 9 operated by Farm Fresh RI.

<sup>19</sup> The 48% accounts for the additional 24 farmers market Farm Fresh RI reports to operate.

Bonus Bucks. The database includes the following information (plus a few additional fields) for each transaction:

- the date of the transaction (*Date*)
- the market where the transaction occurred (*Market*)
- the customer's status (e.g., new, returning, or anonymous) (*NewCust*)
- the total amount spent (*TotalD~t*)
- the total amount of SNAP benefits spent (*SNAP*)
- the total amount of incentives distributed (i.e., Bonus Bucks dispensed) (*Incent~I*).

The database does not include the purchaser's identity for each transaction. This makes it impossible to link multiple transactions to one consumer and determine their individual buying patterns.

For this analysis, transactions are grouped by the year that correlates with Farm Fresh RI's fiscal year, which starts July 1. There are several reasons for this approach. First the database covers four full fiscal years. If calendar years were used, there would have been three full years and two half-years. Second, Farm Fresh RI provided a separate database of market days for each farmers market by fiscal year. It would have been impossible to match this information with the transaction database without using fiscal years. Finally, the increased Bonus Bucks incentive program coincided almost perfectly with FY18. Since this paper examines the impact of the bigger incentive, the use of fiscal years was appropriate. The organization labels fiscal years by the earlier included calendar year. Thus, "FY15" refers to the fiscal year spanning 2015 and 2016.

The database contains 28,668 Bonus Bucks transactions conducted during fiscal years 2015 through 2018. This analysis used 20,385 of these transactions. The others were pruned for several reasons. Transactions where purchasers did not use SNAP benefits (which could be supplemented by a personal credit/debit card) were excluded. At these markets, SNAP recipients

can swipe their EBT cards at a centralized booth or cashier stand, helping to distribute and track incentives. The analysis also omitted transactions conducted at farmers markets located out of Rhode Island, to focus on state residents. Transactions with irregular or missing data were also removed.

## ***Data Analysis***

### *Sales Activity Overall*

This section examines Bonus Bucks activity during the four-year period that the data covers, from July 1, 2015 through June 30, 2019.

<b>Fiscal Year</b>	<b>Farmers Markets</b>	<b>Market Days (ofmark~s)</b>	<b>SNAP Transactions (snaptr~s)</b>	<b>New SNAP Customers (newsna~s)</b>	<b>SNAP Sales (snapsa~s)</b>	<b>SNAP Incentives Distributed (Bonus Bucks) (snapin~d)</b>
FY15	29	583	4,290	1,866	\$103,555.00	\$44,063.00
FY16	30	639	5,101	2,061	\$116,344.30	\$58,383.00
FY17	34	648	5,135	1,815	\$109,258.60	\$56,788.92
FY18	33	574	5,859	1,925	\$140,715.50	\$140,433.90
<b>Total</b>		<b>2,444</b>	<b>20,385</b>	<b>7,667</b>	<b>\$469,873</b>	<b>\$299,669</b>
<b>Average</b>	<b>32</b>	<b>611</b>	<b>5,096</b>	<b>1,917</b>	<b>\$117,468</b>	<b>\$74,917</b>

**Table 2:** Sales activity for Bonus Bucks participants

Table 2 provides some general information about sales at Farm Fresh RI's farmers markets during this period. These markets were open for a total of 2,444 days. The 20,385 Bonus Bucks transactions conducted during this time represent approximately \$470,000 in out-of-pocket SNAP sales and \$300,000 in Bonus Bucks incentives. Of these incentives, \$146,000 were from the 40% matching program, and \$154,000 (almost all of it in FY18) were from the 100% match.

Fiscal Year	Farmers Markets	Market Days (ofmark~s)	SNAP Transactions (snaptr~s)	New SNAP Customers (newsna~s)	SNAP Sales (snapsa~s)	SNAP Incentives Distributed (Bonus Bucks) (snapin~d)
FY16	3%	10%	19%	10%	12%	32%
FY17	13%	1%	1%	-12%	-6%	-3%
FY18	-3%	-11%	14%	6%	29%	147%
<b>4-Year</b>	<b>14%</b>	<b>-2%</b>	<b>37%</b>	<b>3%</b>	<b>36%</b>	<b>219%</b>

**Table 3:** Changes from the prior year in SNAP sales and Bonus Bucks distributions

Year-to-year changes in sales activity are displayed in Table 3. Sales activity grew 36% during the four-period, and the number of SNAP transactions increased 37%. Annual sales values fluctuated significantly, however. SNAP sales jumped 12% in FY16, dropped 6% in FY17, then surged by 29% in FY18. This chapter examines what caused the changes in sales levels.

Fiscal Year	SNAP Transactions /Day	New SNAP Customers /Day	SNAP Sales /Day	SNAP Incentives Distributed /Day	SNAP Sales/ Transaction	SNAP Incentives Distributed/ Transaction
FY15	7.36	3.20	\$177.62	\$75.58	\$24.14	\$10.27
FY16	7.98	3.23	\$182.07	\$91.37	\$22.81	\$11.45
FY17	7.92	2.80	\$168.61	\$87.64	\$21.28	\$11.06
FY18	10.21	3.35	\$245.15	\$244.66	\$24.02	\$23.97
<b>Total</b>	<b>8.34</b>	<b>3.14</b>	<b>\$192.26</b>	<b>\$122.61</b>	<b>\$23.05</b>	<b>\$14.70</b>

**Table 4:** Per day and per transaction sales analysis

Notably, the average amount spent per transaction – \$23 during the four year period – did not vary much during any of the four years. See Table 4. Thus, the opportunity to get additional Bonus Bucks did not encourage SNAP recipients to spend much more money per transaction. Consumers spent the same amount but walked away with more produce for the same outlay. The corresponding observation is that consumers did not use Bonus Bucks as a chance to lessen their expenditures on produce. In other words, consumers remained fixed on the amount they paid rather than on the amount of produce the purchased. In addition, the introduction of 100%

matching for Bonus Bucks just before FY18 raised SNAP benefits per transaction to FY15-levels after they fell during the intervening years.

The average SNAP consumer spends a significant portion of their monthly benefits on a single transaction at a Farm Fresh RI farmers market. The average Rhode Island SNAP household receives \$223 per month, and the average participant receives \$140 a month (Coleman-Jensen et al. 2019; Center on Budget and Policy Priorities 2018). In FY18, the \$24 that Rhode Islanders spent on the average transaction, equates to 17% of monthly individual SNAP benefits, or 11% of household SNAP benefits. As mentioned earlier, SNAP households spend 11.9% of their budget on fruits and vegetables, so it is likely that consumers are buying most or all of their produce at Farm Fresh RI's farmers markets (Garasky et al. 2016).<sup>20</sup>

#### *Sales by Farmers Market*

During the four-year period, Farm Fresh RI operated 35 unique farmers markets. The number varied each year, from a low of 29 in FY15 to 33 in FY18.<sup>21</sup> 27 of these markets were open during all four years. The organization ran as many 34 farmers markets in 26 unique ZIP Codes during any individual year. See Table 2. Markets were open approximately 600 total days per year.<sup>22</sup> Because multiple markets are open on the same day, the number of annual operating days exceeded 365.

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<sup>20</sup> They spend 7.2% of their grocery budgets on vegetables and 4.7% on fruits.

<sup>21</sup> For a comprehensive list of the markets, their ZIP codes, and their years of operation, see Figure 1 in Appendix 2.

<sup>22</sup> See Figure 2 in Appendix 2 to see the number of days of operation for each market.



Market	ZIP Code	Market Days (ofmark~s)	SNAP Transactions (snaptr~s)	New SNAP Customers (newsna~s)	SNAP Sales (snapsa~s)	SNAP Incentives Distributed (Bonus Bucks) (snapin~d)
<b>Aquidneck Growers Summer - Newport</b>	02840	94	461	152	\$9,064.00	\$5,807.00
<b>Aquidneck Growers Year Round - Middletown</b>	02840	163	385	100	\$7,946.00	\$5,145.20
<b>Armory Park</b>	02909	94	2689	1117	\$60,339.00	\$38,740.00
<b>Big Train Farm CSA</b>	02909	64	109	7	\$3,082.52	\$2,356.15
<b>Broad St.</b>	02907	83	2002	656	\$49,553.50	\$32,353.50
<b>Brown University</b>	02912	18	19	9	\$475.00	\$340.00
<b>Burrillville Farmers Market - Stillwater</b>	02830	15	27	7	\$404.00	\$404.00
<b>Central Falls</b>	02863	53	235	131	\$2,535.00	\$1,752.20
<b>Charlestown Farmers Market</b>	02813	21	26	11	\$330.00	\$288.00
<b>Coastal Growers Indoor</b>	02852	75	165	25	\$2,715.00	\$1,244.00
<b>Coastal Growers Outdoor</b>	02874	100	419	84	\$11,368.00	\$8,041.00
<b>Downtown Providence</b>	02907	63	908	496	\$9,252.00	\$5,129.00
<b>Goddard Park Farmers Market</b>	02818	97	495	254	\$11,021.00	\$7,659.20
<b>Haines Park Farmers Market</b>	02806	92	140	62	\$2,266.00	\$1,432.00
<b>Hope Street</b>	02906	105	3204	982	\$94,844.00	\$61,486.80
<b>Miantonomi Farmers Market</b>	02840	18	74	45	\$739.00	\$560.00
<b>Mount Hope Farm Year Round Market</b>	02809	165	476	112	\$11,686.00	\$6,804.80
<b>Neutaconkanut Park</b>	02909	61	379	195	\$4,964.00	\$3,213.00
<b>Pawtucket Slater Park</b>	02860	64	459	274	\$7,190.00	\$4,800.00
<b>Pawtucket Wintertime</b>	02860	107	3127	764	\$103,854.00	\$64,738.00
<b>Pawtuxet Village Outdoor Market</b>	02905	96	344	110	\$8,199.00	\$5,395.00
<b>Sankofa Sowing Place Market</b>	02907	4	7	2	\$185.00	\$130.00

Market	ZIP Code	Market Days (ofmark~s)	SNAP Transactions (snaptr~s)	New SNAP Customers (newsna~s)	SNAP Sales (snapsa~s)	SNAP Incentives Distributed (Bonus Bucks) (snapin~d)
Sankofa World Market	02907	69	557	284	\$10,340.00	\$7,452.80
Schoolyard Market 2019	02885	54	98	19	\$2,155.00	\$1,169.00
Scratch Farm CSA	02921	16	16	4	\$1,565.00	\$950.00
South County Summer - Saturday (East Farm)	02883	76	305	96	\$7,591.00	\$4,459.40
South County Summer - Tuesday (Marina Park)	06604	66	166	57	\$2,159.00	\$901.00
South Kingstown Summer Market (East Farm)	02879	4	34	10	\$1,711.00	\$1,711.00
South Kingstown Winter Market	02892	79	329	87	\$8,160.00	\$4,534.20
Veggie Box	02860	56	61	7	\$3,712.74	\$2,633.42
Weaver Library Farmers Market	02914	34	257	138	\$3,696.00	\$2,688.00
West Warwick	02893	75	488	325	\$5,734.00	\$3,488.00
Westbay Farm	02886	23	54	27	\$465.63	\$426.20
Westerly Pawcatuck Farmers Market	02886	63	159	55	\$1,937.00	\$1,075.00
Woonsocket Year-Round	02895	177	1711	963	\$18,635.00	\$10,362.00
<b>TOTAL</b>		<b>2444</b>	<b>20385</b>	<b>7667</b>	<b>\$469,873</b>	<b>\$299,669</b>

Table 4: Sales activity by Bonus Bucks participants at each Farm Fresh RI farmers market during the period FY15-FY18

Table 4: *Sales activity by Bonus Bucks participants at each Farm Fresh RI farmers market during the period FY15-FY18* describes sales activity by Bonus Bucks participants at each farmers market that Farm Fresh RI operated at any time during FY15-FY18. Sales activity is concentrated in four of the markets – Amory Park, Broad Street, Pawtucket Wintertime, and Hope Street. These locations represent 11% of the markets listed but two-thirds of the SNAP

sales – 65% and 64% in FY17 and FY18, respectively.<sup>23</sup> The average annual sales at a market were \$3,213 in FY17 and \$4,264 in FY18. Pawtucket Wintertime generated the highest annual SNAP sales of any market from FY15-FY17, peaking at \$26,728 in FY16. In FY18, Hope Street surpassed the Pawtucket Wintertime with SNAP sales of \$27,866.

Annual sales performance at each market is inconsistent. Only four of the 35 markets had SNAP sales increases each year. They were Aquidneck Growers Year Round – Middletown, Big Train Farm CSA, Central Falls, Haines Park Farmers Market, and Sankofa World Market.<sup>24</sup> Brown University market's experience illustrates the sales volatility. That market suffered one of the biggest annual sales decreases (excluding closed markets), falling 89% between FY15 and FY16, but it also experienced the largest percentage annual sales increase of any market (880% between FY17 and FY18). One potential explanation for this volatility is that it moved locations on the University's campus. Sankofa Sowing Place market had the next highest increase at 725%.<sup>25</sup> The variability in sales performance at most markets suggests that using them as a vehicle to ramp up local food consumption on a large scale might be difficult without significant improvements to stabilize sales.

Along the same lines, of the 27 markets that operated all four years, only two – Sankofa World Market and Veggie Box – saw growth in SNAP benefits spent per transaction every year. The success of these two markets is attributable, at least in part, to their accessibility to customers, which they accomplished in different ways. The Sankofa World Market is accessible because of its location. Unlike some Farm Fresh RI markets that operate in higher-income neighborhoods, Sankofa is located in a low-income section of Providence's West End, where

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<sup>23</sup> Figure 3 in Appendix 2 contains additional detail.

<sup>24</sup> See Figure 4 in Appendix 2 for greater detail.

<sup>25</sup> See Figure 4 in Appendix 2 for greater detail.

many SNAP beneficiaries reside. Median 2016 household income for this neighborhood was \$39,718 (United States Census Bureau 2020). This figure is 34% lower than the median household income statewide and 25% lower than median household income in the same ZIP Code. West End has relatively high unemployment and is more racially diverse than Rhode Island overall (Housing Works RI 2018). As Cohen et al. (2018) found with the DUFEB program, proximity is an important factor for attracting SNAP recipients to farmers markets. Locating market in the same community as its target SNAP recipients appears to have helped the Sankofa World Market achieve year-over-year growth in SNAP benefits spent per transaction.

Veggie Box's approach to being accessibility differs from Sankofa's. Veggie Box is a subscription to a box of hand-selected fresh produce and value-added products from a variety of local farms and food producers. Each Veggie Box contains 6-10 items and weighs about 10 pounds. Like farm-based CSAs, Farm Fresh RI selects the contents of the box, which vary by season, and pre-pack it for the consumer. While the market is functionally the same as others, by providing fresh fruit and vegetable incentives, Veggie Box delivers produce directly to workplaces, community centers, schools, and daycares around Rhode Island. Its ZIP Code and the income of the surrounding area become less pertinent because the boxes are distributed across the state. The year-over-year uptick in its SNAP sales could be explained by its state-wide distribution and convenience.

### SNAP Benefits Spent Per Fiscal Year (FY15-FY18) By Market



Figure 5: SNAP benefits spent per fiscal year by market

### SNAP Benefits Spent Per Transaction Per Fiscal Year (FY15-FY18) By Market

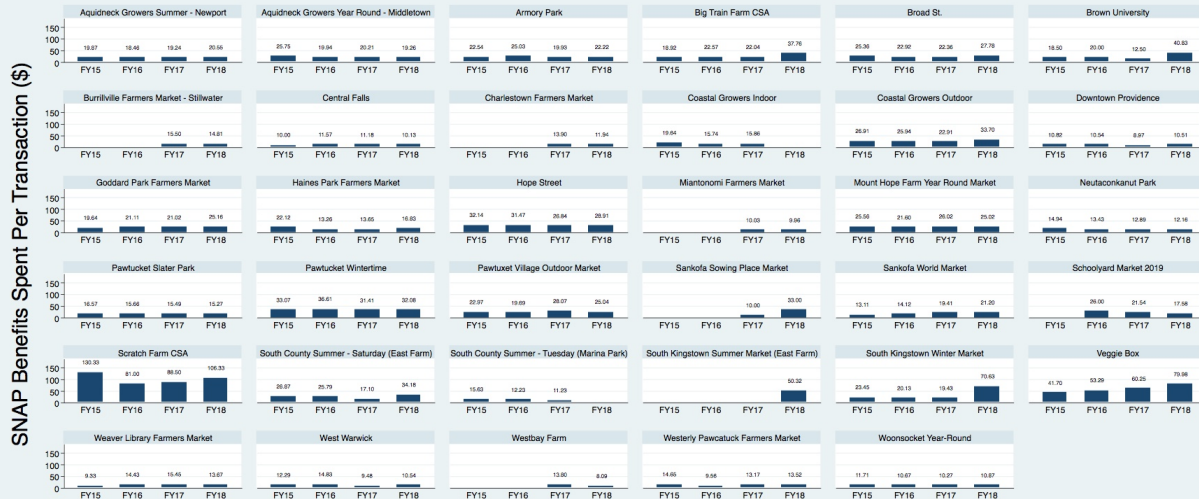


Figure 6: SNAP benefits spent per transaction per fiscal year by market

In FY17 and FY18, two farmers markets had much higher per transaction sales than the others. In FY17, Scratch Farm CSA had SNAP sales per transaction of \$88.50, while Veggie Box's figure was \$60.25. In FY18, these figures grew significantly, to \$106.33 and \$79.98, respectively. By comparison, the average SNAP sales per transaction across all markets for the four-year period was \$23.05. Additionally, these markets had among the fewest transactions per

day or new customers per day. This is because Scratch Farm CSA and Veggie Box are subscription services with delivery. Repeat buying and purchases in bigger volumes are likelier for several reasons. Participants must pay upfront for the service, can easily renew their subscription, and do not have to travel to pick up the produce. Offering more services like these, especially when pandemics restrict travel, could increase SNAP sales.

### ***Examining the Impact of Market Days and Bonus Bucks on SNAP Sales***

#### *Hypotheses About What Drives SNAP Sales*

One presumed goal of the higher SNAP bonus program is increased sales to SNAP recipients at Farm Fresh RI's farmers markets. The question is how to achieve that goal. This section examines two possible drivers of SNAP sales activity. One hypothesis is that the number of market days drives SNAP sales growth. That is, the more days that farmers markets are open, the higher sales should be. An initial review of the data does not support this theory, however. Four-year sales growth of 36% occurred despite a 2% decline in the number of total market days. In FY17, market days increased by 1%, but SNAP sales fell 6% and new SNAP customers decreased by 12%. The discrepancy between sales and market days is most striking in FY18. That year, SNAP sales and SNAP transactions shot up 29% and 14%, respectively, while market days declined by 11%. These fluctuations suggest that market days is not the main driver of SNAP transactions and SNAP sales.

An alternative hypothesis is that the level of Bonus Bucks incentive is a key driver of sales activity. Bonus Bucks distributed in FY18 jumped 147% over the prior year, coinciding with a 29% increase in sales that same year. This increased distribution of Bonus Bucks is presumably linked, at least in part, to increased Bonus Bucks dollar-match from 40% to 100%.

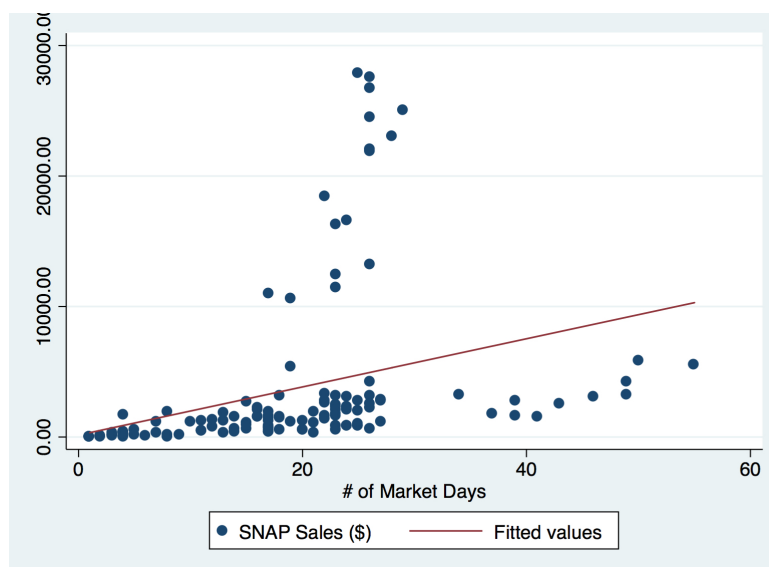
The increase occurred May 31, 2018, a month before FY18 began. The correlation of a bigger incentive with increased SNAP sales increase supports the argument that incentive size matters.

This section will test both hypotheses statistically to see if either has merit. With sufficient time, similar analyses could be performed on other variables to determine their impact.

### *The Impact of Market Days*

Increasing the number of market days should generate more sales and, therefore, more local produce consumption. Table 3 showed, however, that sales grew between FY15 and FY18 despite a 2% decrease in market days. Moreover, raising the number of market days also increases operational costs, such as space rental and labor. Additional days also drain resources of farmers, who must devote staff to supply and attend the markets. Thus, decisions about when markets should be open must be made judiciously.

This analysis examines the effect of market days on three types of sales indicators: sales volume (in dollars); quantity of sales transactions; and number of new customers. Figure 7 and Figure 8 explore the impact of the number of annual market days on the volume of SNAP sales. In the scatterplot, each data point represents a market during one fiscal year. There are three groups of dots. Most data points fall below the red regression line. A second group of dots, open between 17 and 28 days during the year, rise above the line. This group substantially outperformed the others. A third cluster of data points was open more than 30 days and underperformed the regression line.



**Figure 7:** Correlation between SNAP sales and market days<sup>26</sup>

The cluster of dots overperforming the best fit line in Figure 7 with 17 to 28 market days are associated with the same four markets identified in Table 4 for concentrated sales activity – Amory Park, Broad Street, Pawtucket Wintertime, and Hope Street. These markets had average annual SNAP sales of \$15,084, \$12,388, \$25,964, and \$23,711 respectively over the four-year period. In terms of average SNAP sales per market day offered, Pawtucket Wintertime was the best performing market in FY15 through FY17 with \$864, \$1,028, and \$941 respectively. In FY18, Hope Street took this spot with \$1,115 in average SNAP sales per market day offered.

The 11 dots in the bottom right corner of Figure 7 are from three farmers markets: the Aquidneck Growers Year Round – Middletown, Mount Hope Farm Year Round Market, and Woonsocket Year Round. These year-round farmers markets offer more annual market days than most of other markets. However, as Figure 7 shows, more days does not correlate with increased SNAP sales. In fact, markets open more than 25 days per year consistently underperform the trend line. Farm Fresh RI might consider whether to divert resources from these markets to

<sup>26</sup> See Figure 2 in Appendix 2 for a table of the values represented in graph.



markets that overperform the best fit line. On the other hand, there might be reasons to keep these markets open (e.g., lower operating costs, reaching certain populations).

. reg snapsales ofmarketdays, level(95) robust						
Linear regression			Number of obs	=	126	
			F(1, 124)	=	19.61	
			Prob > F	=	0.0000	
			R-squared	=	0.0959	
			Root MSE	=	6155	
snapsales	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
ofmarketdays	184.5316	41.67581	4.43	0.000	102.0435	267.0197
_cons	149.8272	512.5017	0.29	0.771	-864.5573	1164.212

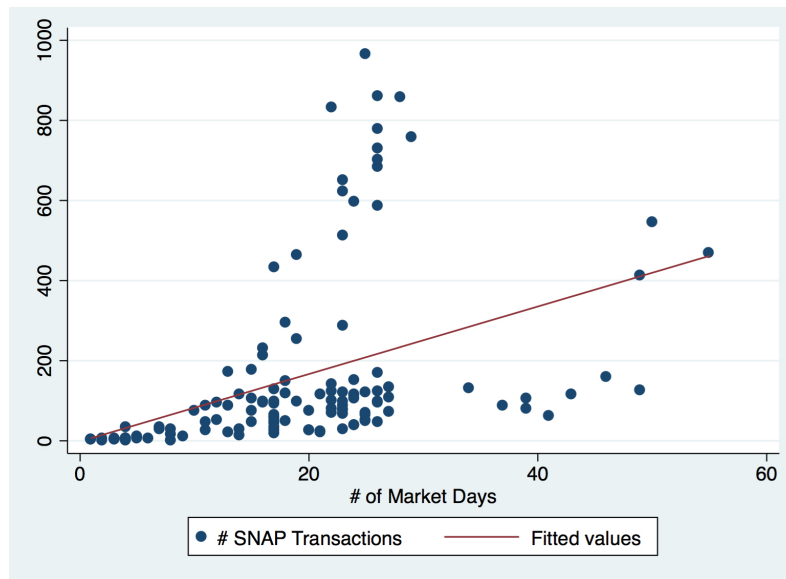
**Figure 8:** Regression of SNAP sales on market days<sup>27</sup>

This analysis in Figure 8 helps explain the patterns in the scatterplot. The coefficient of market days offered is approximately 184.53. This means every additional market day is expected to produce another \$185 of SNAP benefit sales. Assuming that Bonus Bucks are properly distributed (i.e., each dollar of SNAP spending receiving a matching incentive dollar), \$185 in Bonus Bucks would be issued on each additional market day. Using Rao et al.'s finding that the healthiest diets cost about \$1.50 more per day per person than the least healthy diets, \$185 equates to 123 days' worth of incentives to transform the least healthy diets into the healthiest diets.

The analysis confirms the hypothesis that market days are not a strong driver of sales. The 95% confidence interval for the number of market days offered is 102.04 to 267.02. This means that there is a 95% likelihood that the impact of an additional market day on SNAP benefit sales is between approximately 102 and 267 – a wide gap. The  $R^2$  value of 0.0959 means that the regression model for market days offered and SNAP sales accounts for only 9.6% of

<sup>27</sup> See Figure 6 in Appendix 2 for a table of the values represented in this graph.

variance. The less variance for which the regression model accounts, the farther the data points fall from the fitted regression line.



**Figure 9:** Correlation between SNAP transactions and market days<sup>28</sup>

Figure 9 and Figure 10 perform similar analyses to those in Figure 7 and Figure 8 except that they examine the effect of market days on the number of SNAP transactions rather than SNAP sales. The pattern of dots in the scatterplot is similar to that in Figure 7, but less concentrated. The majority of dots is still clustered below the regression line on the left third of the chart. There are about 50% more dots floating above the regression line in Figure 9 than Figure 7. Of the group of dots to the right, three are on or above the regression line.

The cluster of dots overperforming the best fit line with 17 to 28 market days in Figure 9 consist of the same markets as Figure 7. These four markets not only had the greatest SNAP sales but also received the most SNAP transactions. Amory Park, Broad Street, Pawtucket Wintertime, and Hope Street had an average of 672, 501, 782, and 801 annual SNAP transactions respectively between FY15 and FY18. Over the four years, Hope Street had the

<sup>28</sup> See Figure 6 in Appendix for a table of the values represented in this graph.

greatest number of SNAP transactions per market day with 39 in FY18. The second most SNAP transactions per market day occurred at Amory Park during the same year with 38.

Figure 9 displays the same of 11 dots on the right side of the chart as Figure 7, but three intersect or rise above the trend line. The three data points are from the Woonsocket Year-Round market. The two dots that intersect the trendline from FY15, with 55 market days and 469 SNAP transactions, and from FY17, with 49 market days and 411 transactions. The dot overperforming the trendline from FY16, with 50 market days and 545 SNAP transactions. The Woonsocket Year-Round farmers market offered more market days than any market, 55 and 50, respectively, during FY15 and FY16. The higher number of market days yielded more SNAP transactions.

```
. reg snaptransactions ofmarketdays, level(95) robust
```

Linear regression

Number of obs	=	126
F(1, 124)	=	34.87
Prob > F	=	0.0000
R-squared	=	0.1643
Root MSE	=	206.34

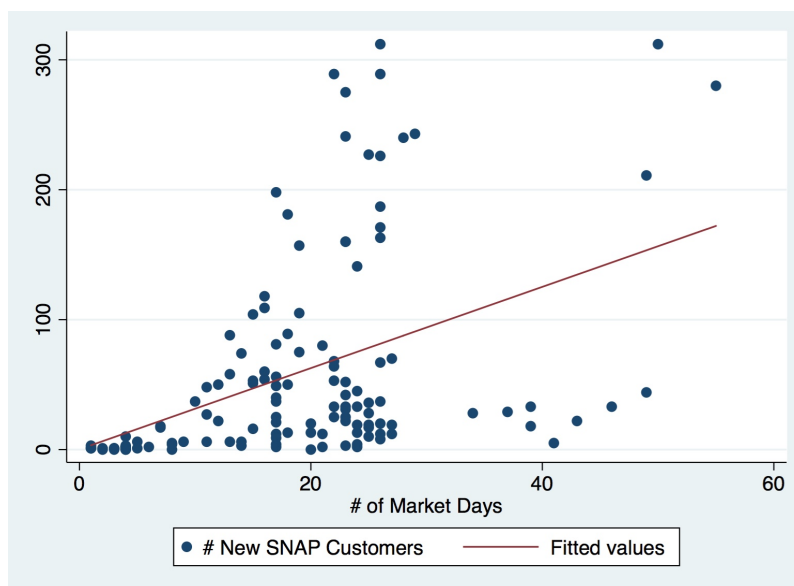
  

snaptransa~s	Robust		t	P> t	[95% Conf. Interval]	
	Coef.	Std. Err.				
ofmarketdays	8.422398	1.426236	5.91	0.000	5.599478	11.24532
_cons	-1.582076	18.80123	-0.08	0.933	-38.79497	35.63082

**Figure 10:** Regression of SNAP transaction on market days

The analysis shows that market days are slightly more correlated with SNAP transactions than they are with sales activity. The 95% confidence interval for the number of market days offered is 5.60 to 11.25. This means that there is a 95% likelihood that the impact of an additional market day on SNAP transactions is between approximately 6 and 11. With an  $R^2$  value of 0.1643, the regression model accounts for only 16.4% of variance. This number is low and indicates that market days is not a strong predictor of sales transactions.

The regression analysis shows that the coefficient of market days offered is approximately 8.42. See Figure 10. This means that every additional market day that Farm Fresh RI hosts a farmers market is predicted to yield another 8.42 SNAP transactions.



**Figure 11:** Correlation between new SNAP customers and market days<sup>29</sup>

Figure 11 and Figure 12 consider sales in another way. They examine whether adding market days is likely to attract more new customers. While the same clusters exist in Figure 11 as in Figure 7 and Figure 9, here they are even more diffuse, especially the cluster in the lower left-hand corner.

Amory Park, Broad Street, Pawtucket Wintertime, and Hope Street once again overperform the line of best fit – here, for the number of new SNAP customers. An average of 279, 164, 246, 191 new SNAP customers per year visited the Amory Park, Broad Street, Hope Street, and Pawtucket Wintertime market respectively.

<sup>29</sup> See Figure 7 in Appendix for a table of the values represented in this graph.

The Woonsocket Year-Round market accounts for the three data points at the upper right of the chart. As with sales transactions, because Woonsocket is open more days than other farmers markets in Farm Fresh RI's network, allowing it to attract more new SNAP customers. In fact, it matched Amory Park for attracting the great number of new customers of any single market during the four-year period with 312 new visitors in FY16. (The same as Amory Park in FY15.)

```
. reg newsnapcustomer ofmarketdays, level(95) robust
```

Linear regression		Number of obs	=	126
		F(1, 124)	=	20.45
		Prob > F	=	0.0000
		R-squared	=	0.1788
		Root MSE	=	72.781

newsnapcus~s	Robust		t	P> t	[95% Conf. Interval]	
	Coef.	Std. Err.				
ofmarketdays	3.126148	.6912481	4.52	0.000	1.757974	4.494321
_cons	.2118679	10.44227	0.02	0.984	-20.45631	20.88004

Figure 12: Regression of new SNAP customers on market days

Figure 12 shows that for every additional market day, 3.1 new SNAP customers are predicted.

The number of annual market days do affect the number of new SNAP customers, but again to a limited degree. The 95% confidence interval for the number of market days offered is 1.76 to 4.49. This means that there is a 95% likelihood that the impact of an additional market day on new SNAP customers is between approximately 2 and 4. The  $R^2$  value of 0.1788 is almost the same as the previous analysis. This means that the regression model accounts for only 16.4% of variance, demonstrating a weak connection between market days offered and new SNAP customers.

In summary, these statistical analyses confirm that market days are not a strong predictor of sales. We will look at another potential driver of sales activity: Bonus Bucks incentives.

### *The Impact of the Bonus Bucks Incentive Level*

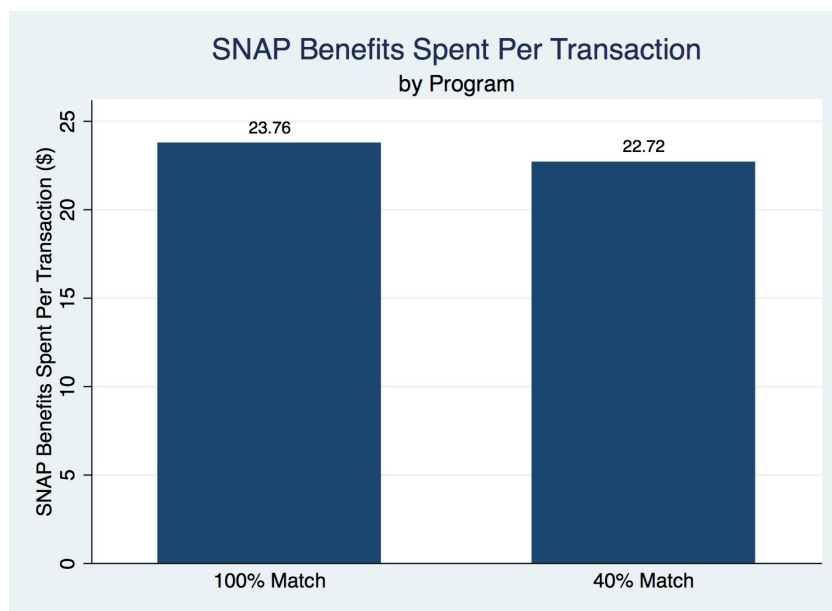
A second hypothesis is that the total amount of the Bonus Bucks distributed drives sales activity. It stands to reason that increasing the incentive match by two-and-a-half times should attract more customers and induce customers to spend more. This analysis investigates whether these assertions are true.

The Fresh Farms RI database lends itself to an evaluation of the impact of the incentive level. The dataset includes information from approximately three years of 40% matching and one year of 100% matching. For better comparison of the two incentive levels, some analyses performed in this section will consider the annual averages for the three years of 40% matching.

<b>Program</b>	<b>SNAP Transactions</b>	<b>SNAP Sales</b>	<b>SNAP Incentives Distributed (Bonus Bucks)</b>	<b>Incentives Distributed-to-Sales Ratio</b>
<b>100% Match</b>	6,499	\$154,411.50	\$154,091.95	99.79%
<b>40% Match</b>	13,886	\$315,461.89	\$145,576.92	46.15%
<b>Total</b>	<b>20,385</b>	<b>\$469,873</b>	<b>\$299,669</b>	<b>63.78%</b>

**Table 5:** Bonus Bucks match comparison

Of the 20,385 SNAP transactions, 13,886 (68%) occurred during the 40% matching program. See Table 5. The remaining 6,499 (32%) transactions occurred during the 100% matching program, which was fully implemented on May 31, 2018. In dollar terms, of the \$469,873 of SNAP benefits distributed over the four-year period, two-thirds (\$315,462) were dispensed as a 40% match, while the remaining third (\$154,411) was given out at the 100% level.



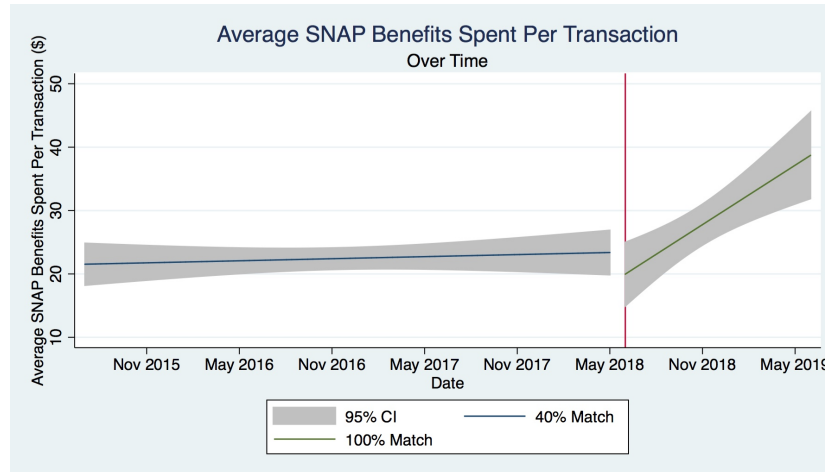
**Figure 13:** SNAP benefits spent per transaction under Bonus Bucks during 100% matching, 40% matching

The amount of SNAP benefits spent per transaction is more for the 100% matching Bonus Bucks program than the prior 40% matching. Before 100% matching, SNAP participants spent an average of \$22.72 per transaction. With 100% matching, they spent \$23.76. This 4.58% increase is noteworthy because the increase in out-of-pocket SNAP spending correlates with the incentive level rise.

The Bonus Bucks incentive increase can make a substantial difference in enabling consumers to eat better. For the average transaction, Bonus Bucks gave SNAP beneficiaries \$23.76 in additional produce under the 100% match program compared to \$9.09 under the 40% match program. Using Rao et al.'s finding that the healthiest diets cost about \$1.50 more per day per person than the least healthy diets, this \$14.67 difference equates to an additional 9.8 days' (a week and a half) worth of the healthiest diet, as opposed to the least healthy, for every transaction.

Since the amount of Bonus Bucks distributed is dependent on SNAP benefits spent, a parallel graph to Figure 7 would show nothing useful. Instead, SNAP benefits spent per

transaction over time can help explain the impact of different levels of Bonus Bucks matching. Figure 13 was created based on the average amount of SNAP benefits spent per transaction at a given market during a given month.



**Figure 14:** Average SNAP benefits spent per transaction over time

Over time, the average amount of SNAP benefits spent per transaction at a given market during a given month increased slightly during the 40% match program, as shown by the blue line in Figure 13. When the 100% match program was introduced (where the vertical line appears), the average amount of SNAP benefits spent per transaction began to increase at a faster rate. One potential explanation for this occurrence is that the introduction of the 100% match attracted many new SNAP customers who were willing to spend more per transaction.

**40% Match**

outcome	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
newdate	.0542852	.088428	0.61	0.540	-.1194742	.2280446
_cons	-14.62471	60.34389	-0.24	0.809	-133.1993	103.9499

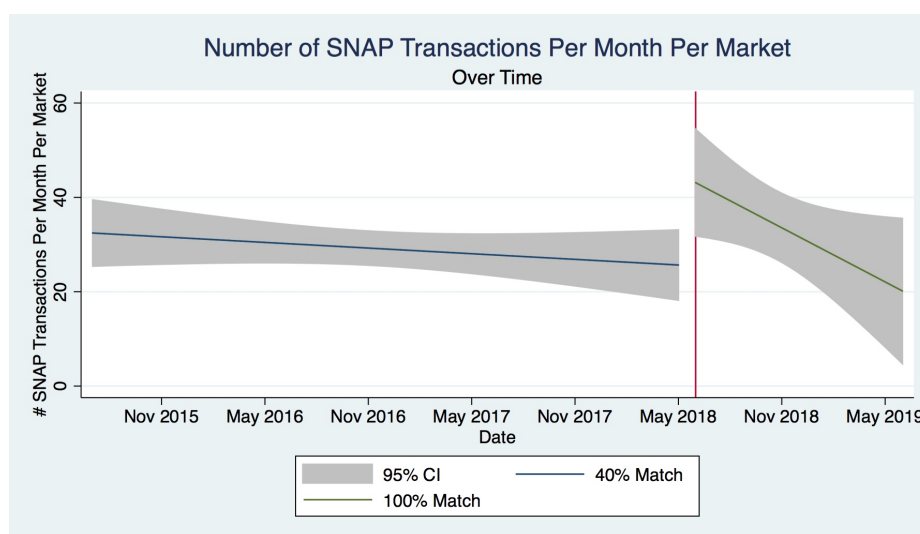


### 100% Match

outcome	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
newdate	<b>1.562014</b>	<b>.4169637</b>	<b>3.75</b>	<b>0.000</b>	<b>.7394853</b>	<b>2.384543</b>
_cons	<b>-1075.006</b>	<b>294.2471</b>	<b>-3.65</b>	<b>0.000</b>	<b>-1655.456</b>	<b>-494.5555</b>

**Figure 15:** Regression of SNAP sales on time by Bonus Bucks matching level

Figure 15 shows the difference between the slopes of these two lines. The “40% Match” line has a slope of 0.05, and the “100% Match” line has a slope of 1.56. This means that for every additional month that passed under the Bonus Bucks program, the average number of SNAP benefits spent per transaction at a given market increased by \$0.05 under the 40% match program and by \$1.56 under the 100% match program. The healthiest diets cost about \$1.50 more per day per person than the least healthy diets (Rao et al. 2013). Therefore, as time passes under the 100% matching program, the average number of healthy meals provided per transaction by the Bonus Bucks program (i.e., non-out-of-pocket SNAP benefits) increases by about one.



**Figure 16:** Correlation between SNAP transactions per month per market and time

Figure 16 and Figure 17 perform an analysis to examine the effect of different Bonus Bucks matching levels on the number of SNAP transactions per month per market.

<b>40% Match</b>						
ofTrx	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
newdate	<b>-.1995024</b>	<b>.1873892</b>	<b>-1.06</b>	<b>0.288</b>	<b>-.5677187</b>	<b>.1687139</b>
_cons	<b>165.3147</b>	<b>127.8757</b>	<b>1.29</b>	<b>0.197</b>	<b>-85.95875</b>	<b>416.5881</b>

<b>100% Match</b>						
ofTrx	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
newdate	<b>-1.913167</b>	<b>.9380176</b>	<b>-2.04</b>	<b>0.043</b>	<b>-3.76356</b>	<b>-.0627752</b>
_cons	<b>1384.25</b>	<b>661.9496</b>	<b>2.09</b>	<b>0.038</b>	<b>78.4472</b>	<b>2690.054</b>

**Figure 17:** Regression of SNAP transactions on Bonus Bucks matching level

Figure 17 shows the difference between the slopes of the “40% Match” and “100% Match” Bonus Bucks lines. The “40% Match” has a slope of -0.20, and the “100% Match” has a slope of -1.91. This means that for every additional month that passed under the Bonus Bucks program, the average number of SNAP transactions at a given market decreased by 0.20 under the 40% match program and by 1.91 under the 100% match program. The faster rate of decrease under 100% matching, compared to 40% matching, could be associated with participants making fewer trips and getting more food per visit or a low return rate among those who test the program.

### ***Conclusion***

Farm Fresh RI is a food hub and the largest operator of farmers markets in Rhode Island. A refined dataset of the organization’s Bonus Bucks transactions for FY15-FY18 showed that organization operated approximately 32 farmers markets annually and generated approximately

\$117,000 in annual SNAP sales in association with its Bonus Bucks program. An analysis of the data reveals several features about the Bonus Bucks program.

1. Sales are highly concentrated. Four farmers markets account for two-thirds of out-of-pocket SNAP sales involving Bonus Bucks. This observation raises a question about whether Farm Fresh RI should focus its efforts on larger markets and shed smaller ones. Part of this answer depends upon the resources Farm Fresh RI must devote to running markets. (Cost figures were unavailable for this analysis.) While the organization should be prudent in its choices, it is not a for-profit entity. In fact, it gives away money rather than seeking it. As a not-for-profit, it has goals besides maximizing sales, such as reaching low-income populations and promoting food justice. Achieving these goals may require that it provide smaller scale venues in some cases.
2. Market accessibility is important. The ability of SNAP recipients to reach a farmer's market is a key determinant of whether they attend and return to these markets. The two markets that grew every year during the four-year period achieved accessibility in different ways. One market was located in a community with many SNAP beneficiaries nearby. Other factors may have influenced its success, but proximity was likely an important factor. Fortunately, farmers markets can be low-overhead events that require mainly a park or parking lot for set-up. This characteristic permits quick formation and easy targeting of low-income communities.

The other venue that had year-over-year sales growth was Veggie Box, a produce delivery service. Farm Fresh RI staff select produce and deliver it to subscribers. As the need for and appeal of grocery delivery has surged during the pandemic, Farm Fresh RI

should consider expanding this program, especially if persistent lockdowns prevent the operations of its farmers markets.

3. Statistical analysis showed that the number of farmers markets and market days do not determine sales. Sales often increased when market days decreased and vice-versa. This insight might help Farm Fresh RI conserve its resources, encouraging it to be strategic about which locations and days open will help it best achieve its mission.
4. Increasing the Bonus Bucks dollar match from 40% to 100% had several positive effects. It encouraged consumers to spend more of money per transaction. After consecutive years of declining transaction size, the average transaction increased 13% in FY18 with the introduction of the bigger incentive. Thus, people were buying more produce, and they were getting it as a big discount with the Bonus Bucks incentive. Thus, consumers walked away with much more produce per transaction. The incremental amount of produce that consumers obtained due to the higher bonus equated to almost 10 days of healthier meals, a substantial improvement for an individual. The increased incentive also was correlated with a 29% jump in total sales for the year, an indication that consumers were taking advantage of the Bonus Bucks program.
5. The data has some limitations. About 20% of the transactions had to be discarded due to flawed, incomplete, missing, or unmatchable data. While there were still more than 20,000 transactions to analyze, the additional data might have been helpful. The data did not have some fields that would have helped the analysis, such as consistent purchaser ID, payment method, and items purchased. Also, there was only one year of data for the 100% match. Another year would have been helpful to see, for example, whether news

of the higher incentive attracted new consumers and increase transaction sizes, or whether sales fluctuated, as they did from year to year in the data set.

Beyond data limitations, it would have useful to have more time to analyze the effect of other variables and to discuss the findings with the organization.

## Next Steps

Food insecurity and improper nutrition are pervasive and growing public health problems in the U.S. These issues afflicting marginalized communities disproportionately are tied to food justice. Incentive programs like Farm Fresh RI's Bonus Bucks plan are important supplements to SNAP to incentivize healthier eating. The analysis in this paper showed that the bigger incentive enabled people to purchase much more produce per transaction. Farmers confer multiple benefits, such as strengthening the local food economy and lowering the carbon footprint of food delivery. Bonus Bucks also exemplifies a good public/private partnership by using private and public funds to improve a public program.

One question is whether the Bonus Bucks program could serve as a model for a national rollout. The answer is almost certainly yes. Michigan's DUFEB program has already expanded, indicating that the opportunity exists to broaden the dollar-matching program at farmers markets. Similarly, Farm Fresh RI has already expanded outside of Rhode Island. However, one program core component – the farmers market – could be hard to scale up significantly. Farmers markets are typically smaller, less formal affairs that require limited infrastructure. To expand dramatically would require more infrastructure and participation, raising the costs of operating farmers markets and diminishing their flexibility. At a large scale, a farmers market might start to resemble a supermarket.

In addition to expanding the use of Bonus Bucks, other changes should be made to help those needing food. For example, the SNAP benefit allotment formula should be updated to accommodate important cost factors (e.g., location) and to reflect current food costs for a reasonably healthy meal. Even if these changes increased SNAP outlay costs, the figures would be offset at least somewhat by reduced healthcare costs. In addition, the U.S. should subsidize

healthy produce like broccoli instead of corn to make nutritious food more affordable. Banning the purchase of SSBs and other junk food using SNAP allotments should curtail unhealthy eating. Finally, educating consumers who are unfamiliar with nutrition and fresh produce could make them much more willing to purchase fruits and vegetables. The problem of unhealthy eating is complex, so a multiple-pronged solution is needed.

The pandemic era has ushered in a new set of rules that could significantly affect Farm Fresh RI. The surge in unemployment is driving up the number of people needing food assistance. In addition, the outbreak has curtailed or closed traditional sources of food assistance, such as pantries and school lunch programs. For farmers, the disease may have closed their restaurant customers. Farm Fresh RI might consider expanding its Veggie Box service, which delivers produce to subscribers. This approach could leverage technology (including online payment) and could have considerable appeal at a time when demand for grocery delivery is skyrocketing.

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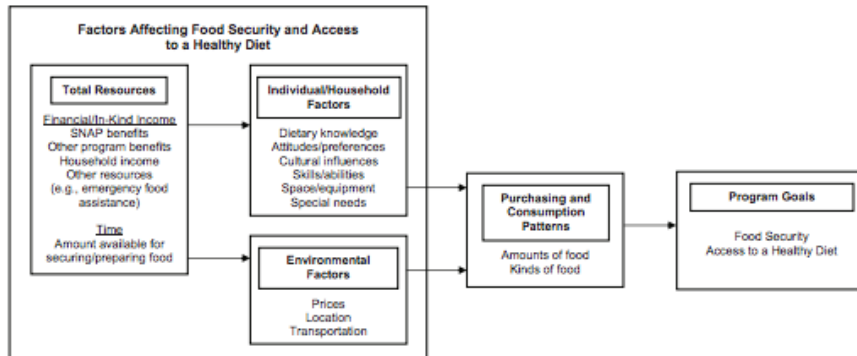
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# Appendix 1

## Factors Affecting the Process by Which Households May or May Not Achieve SNAP Program Goals



**Figure 1:** Factors affecting the process by which households may or may not achieve SNAP goals

**Image Source:** Caswell and Yaktine, “Supplemental Nutrition Assistance Program: Examining the Evidence to Define Benefit Adequacy” (2013).

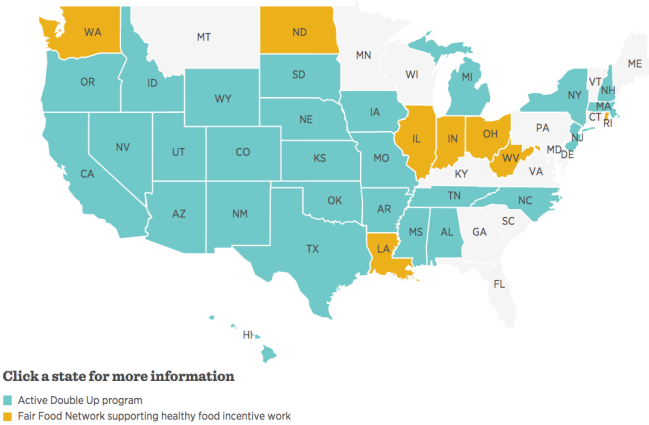
SUPPLEMENTAL NUTRITION ASSISTANCE PROGRAM  
MAXIMUM MONTHLY ALLOTMENTS  
OCTOBER 1, 2019 TO SEPTEMBER 30, 2020

Maximum SNAP Allotments for 48 States and D.C.

Household Size	48 States and DC
1	\$194
2	\$355
3	\$509
4	\$646
5	\$768
6	\$921
7	\$1,018
8	\$1,164
Each additional person	\$146

**Figure 2:** Supplemental Nutrition Assistance Program maximum monthly allotments October 1, 2019 to September 30, 2020

**Image Source:** Food and Nutrition Service, “SNAP - Fiscal Year 2020 Cost-of-Living Adjustments” (2019).  
<https://fns-prod.azureedge.net/sites/default/files/media/file/COLA%20Memo%20FY%202020.pdf>



**Figure 3:** Active Double Up Food Bucks programs nationally

**Image Source:** Fair Food Network, “Across the Nation” (2020).  
<https://fairfoodnetwork.org/projects/double-up-food-bucks/#>

## Appendix 2 – Farm Fresh RI Farmers Market Data

Market Name	ZIP Code	FY15	FY16	FY17	FY18	Offered All Four Years?
<b>Aquidneck Growers Summer - Newport</b>	02840	Y	Y	Y	Y	Y
<b>Aquidneck Growers Year Round - Middletown</b>	02840	Y	Y	Y	Y	Y
<b>Armory Park</b>	02909	Y	Y	Y	Y	Y
<b>Big Train Farm CSA</b>	02909	Y	Y	Y	Y	Y
<b>Broad St.</b>	02907	Y	Y	Y	Y	Y
<b>Brown University</b>	02912	Y	Y	Y	Y	Y
<b>Burrillville Farmers Market - Stillwater</b>	02830			Y	Y	N, 2/4
<b>Central Falls</b>	02863	Y	Y	Y	Y	Y
<b>Charlestown Farmers Market</b>	02813		Y	Y	Y	N, 3/4
<b>Coastal Growers Indoor</b>	02852	Y	Y	Y		N, 3/4
<b>Coastal Growers Outdoor</b>	02874	Y	Y	Y	Y	Y
<b>Downtown Providence</b>	02907	Y	Y	Y	Y	Y
<b>Goddard Park Farmers Market</b>	02818	Y	Y	Y	Y	Y
<b>Haines Park Farmers Market</b>	02806	Y	Y	Y	Y	Y
<b>Hope Street</b>	02906	Y	Y	Y	Y	Y
<b>Miantonomi Farmers Market</b>	02840			Y	Y	N, 2/4
<b>Mount Hope Farm Year Round Market</b>	02809	Y	Y	Y	Y	Y
<b>Neutaconkanut Park</b>	02909	Y	Y	Y	Y	Y
<b>Pawtucket Slater Park</b>	02860	Y	Y	Y	Y	Y
<b>Pawtucket Wintertime</b>	02860	Y	Y	Y	Y	Y
<b>Pawtuxet Village Outdoor Market</b>	02905	Y	Y	Y	Y	Y
<b>Sankofa Sowing Place Market</b>	02907			Y	Y	N, 2/4
<b>Sankofa World Market</b>	02907	Y	Y	Y	Y	Y
<b>Schoolyard Market 2019</b>	02885	Y	Y	Y	Y	Y
<b>Scratch Farm CSA</b>	02921	Y	Y	Y	Y	Y
<b>South County Summer - Saturday (East Farm)</b>	02883	Y	Y	Y	Y	Y
<b>South County Summer - Tuesday (Marina Park)</b>	06604	Y	Y	Y		N, 3/4

Market Name	ZIP Code	FY15	FY16	FY17	FY18	Offered All Four Years?
South Kingstown Summer Market (East Farm)	02879				Y	N, 1/4
South Kingstown Winter Market	02892	Y	Y	Y	Y	Y
Veggie Box	02860	Y	Y	Y	Y	Y
Weaver Library Farmers Market	02914	Y	Y	Y	Y	Y
West Warwick	02893	Y	Y	Y	Y	Y
Westbay Farm	02886			Y	Y	N, 2/4
Westerly Pawcatuck Farmers Market	02886	Y	Y	Y	Y	Y
Woonsocket Year-Round	02895	Y	Y	Y	Y	Y
<b>Grand Total</b>		<b>29</b>	<b>30</b>	<b>34</b>	<b>33</b>	<b>126</b>

Figure 1: Operating years by farmers market and ZIP Code

Market Days Operational					
Market Name	FY15	FY16	FY17	FY18	Grand Total
Aquidneck Growers Summer – Newport	24	23	23	24	94
Aquidneck Growers Year Round – Middletown	41	39	37	46	163
Armory Park	26	23	23	22	94
Big Train Farm CSA	3	20	24	17	64
Broad St.	17	19	23	24	83
Brown University	5	8	1	4	18
Burrillville Farmers Market – Stillwater			2	13	15
Central Falls	4	17	17	15	53
Charlestown Farmers Market		4	9	8	21
Coastal Growers Indoor	23	25	27		75
Coastal Growers Outdoor	26	27	25	22	100
Downtown Providence	13	18	16	16	63
Goddard Park Farmers Market	22	27	22	26	97
Haines Park Farmers Market	20	26	21	25	92
Hope Street	26	26	28	25	105
Miantonomi Farmers Market			7	11	18
Mount Hope Farm Year Round Market	49	43	39	34	165
Neutaconkanut Park	12	14	17	18	61
Pawtucket Slater Park	16	16	17	15	64
Pawtucket Wintertime	29	26	26	26	107
Pawtuxet Village Outdoor Market	26	22	25	23	96

<b>Sankofa Sowing Place Market</b>			1	3	4
<b>Sankofa World Market</b>	15	13	22	19	69
<b>Schoolyard Market 2019</b>	2	17	24	11	54
<b>Scratch Farm CSA</b>	4	4	5	3	16
<b>South County Summer – Saturday (East Farm)</b>	23	26	20	7	76
<b>South County Summer – Tuesday (Marina Park)</b>	25	23	18		66
<b>South Kingstown Summer Market (East Farm)</b>				4	4
<b>South Kingstown Winter Market</b>	23	24	24	8	79
<b>Veggie Box</b>	17	14	4	21	56
<b>Weaver Library Farmers Market</b>	1	11	10	12	34
<b>West Warwick</b>	19	17	21	18	75
<b>Westbay Farm</b>			6	17	23
<b>Westerly Pawcatuck Farmers Market</b>	17	17	15	14	63
<b>Woonsocket Year-Round</b>	55	50	49	23	177
<b>Grand Total</b>	<b>583</b>	<b>639</b>	<b>648</b>	<b>574</b>	<b>2444</b>

Figure 2: Market days operational by farmers market

<b>SNAP Sales (\$)</b>					
<b>Market Name</b>	<b>FY15</b>	<b>FY16</b>	<b>FY17</b>	<b>FY18</b>	<b>Grand Total</b>
<b>Aquidneck Growers Summer - Newport</b>	2086.00	1606.00	2290.00	3082.00	9064.00
<b>Aquidneck Growers Year Round - Middletown</b>	1571.00	1575.00	1738.00	3062.00	7946.00
<b>Armory Park</b>	13211.00	16267.50	12399.50	18461.00	60339.00
<b>Big Train Farm CSA</b>	56.76	564.26	837.61	1623.89	3082.52
<b>Broad St.</b>	10954.00	10591.00	11425.00	16583.50	49553.50
<b>Brown University</b>	185.00	20.00	25.00	245.00	475.00
<b>Burrillville Farmers Market - Stillwater</b>			93.00	311.00	404.00
<b>Central Falls</b>	60.00	694.00	727.00	1054.00	2535.00
<b>Charlestown Farmers Market</b>		0.00	139.00	191.00	330.00
<b>Coastal Growers Indoor</b>	550.00	1023.00	1142.00		2715.00
<b>Coastal Growers Outdoor</b>	2530.00	2776.00	2726.00	3336.00	11368.00
<b>Downtown Providence</b>	1851.00	3110.00	2063.00	2228.00	9252.00
<b>Goddard Park Farmers Market</b>	1355.00	2807.00	2607.00	4252.00	11021.00
<b>Haines Park Farmers Market</b>	575.00	610.00	273.00	808.00	2266.00

<b>Hope Street</b>	21917.0 0	22060.0 0	23001.0 0	27866.0 0	94844.00
<b>Miantonomi Farmers Market</b>			291.00	448.00	739.00
<b>Mount Hope Farm Year Round Market</b>	3195.00	2506.00	2732.00	3253.00	11686.00
<b>Neutaconkanut Park</b>	747.00	1531.00	1263.00	1423.00	4964.00
<b>Pawtucket Slater Park</b>	1558.00	1503.00	1441.00	2688.00	7190.00
<b>Pawtucket Wintertime</b>	25065.0 0	26728.0 0	24472.0 0	27589.0 0	103854.0 0
<b>Pawtucket Village Outdoor Market</b>	2205.00	1575.00	1965.00	2454.00	8199.00
<b>Sankofa Sowing Place Market</b>			20.00	165.00	185.00
<b>Sankofa World Market</b>	957.00	1243.00	2756.00	5384.00	10340.00
<b>Schoolyard Market 2019</b>	0.00	858.00	840.00	457.00	2155.00
<b>Scratch Farm CSA</b>	391.00	324.00	531.00	319.00	1565.00
<b>South County Summer - Saturday (East Farm)</b>	2069.00	3146.00	1248.00	1128.00	7591.00
<b>South County Summer - Tuesday (Marina Park)</b>	813.00	807.00	539.00		2159.00
<b>South Kingstown Summer Market (East Farm)</b>				1711.00	1711.00
<b>South Kingstown Winter Market</b>	1782.00	2295.00	2176.00	1907.00	8160.00
<b>Veggie Box</b>	792.27	639.50	361.50	1919.47	3712.74
<b>Weaver Library Farmers Market</b>	28.00	1241.00	1128.00	1299.00	3696.00
<b>West Warwick</b>	1180.00	1884.00	1100.00	1570.00	5734.00
<b>Westbay Farm</b>			69.00	396.63	465.63
<b>Westerly Pawcatuck Farmers Market</b>	381.00	545.00	619.00	392.00	1937.00
<b>Woonsocket Year-Round</b>	5490.00	5815.00	4221.00	3109.00	18635.00
<b>Grand Total</b>	<b>103555.03</b>	<b>116344.26</b>	<b>109258.61</b>	<b>140715.49</b>	<b>469873.39</b>

Figure 3: SNAP sales by farmer market, fiscal year

<b>Cumulative SNAP Benefits Spent Year-Over-Year Change</b>			
<b>Market Name</b>	<b>FY15- FY16</b>	<b>FY16- FY17</b>	<b>FY17- FY18</b>
<b>Aquidneck Growers Summer - Newport</b>	-23.01%	42.59%	34.59%
<b>Aquidneck Growers Year Round - Middletown</b>	0.25%	10.35%	76.18%
<b>Armory Park</b>	23.14%	-23.78%	48.89%
<b>Big Train Farm CSA</b>	894.12%	48.44%	93.87%
<b>Broad St.</b>	-3.31%	7.87%	45.15%
<b>Brown University</b>	-89.19%	25.00%	880.00%

<b>Burrillville Farmers Market - Stillwater</b>	N/A	N/A	234.41%
<b>Central Falls</b>	1056.67%	4.76%	44.98%
<b>Charlestown Farmers Market</b>	N/A	N/A	37.41%
<b>Coastal Growers Indoor</b>	86.00%	11.63%	-100.00%
<b>Coastal Growers Outdoor</b>	9.72%	-1.80%	22.38%
<b>Downtown Providence</b>	68.02%	-33.67%	8.00%
<b>Goddard Park Farmers Market</b>	107.16%	-7.13%	63.10%
<b>Haines Park Farmers Market</b>	6.09%	-55.25%	195.97%
<b>Hope Street</b>	0.65%	4.27%	21.15%
<b>Miantonomi Farmers Market</b>	N/A	N/A	53.95%
<b>Mount Hope Farm Year Round Market</b>	-21.56%	9.02%	19.07%
<b>Neutaconkanut Park</b>	104.95%	-17.50%	12.67%
<b>Pawtucket Slater Park</b>	-3.53%	-4.13%	86.54%
<b>Pawtucket Wintertime</b>	6.63%	-8.44%	12.74%
<b>Pawtucket Village Outdoor Market</b>	-28.57%	24.76%	24.89%
<b>Sankofa Sowing Place Market</b>	N/A	N/A	725.00%
<b>Sankofa World Market</b>	29.89%	121.72%	95.36%
<b>Schoolyard Market 2019</b>	N/A	-2.10%	-45.60%
<b>Scratch Farm CSA</b>	-17.14%	63.89%	-39.92%
<b>South County Summer – Saturday (East Farm)</b>	52.05%	-60.33%	-9.62%
<b>South County Summer – Tuesday (Marina Park)</b>	-0.74%	-33.21%	-100.00%
<b>South Kingstown Summer Market (East Farm)</b>	N/A	N/A	N/A
<b>South Kingstown Winter Market</b>	28.79%	-5.19%	-12.36%
<b>Veggie Box</b>	-19.28%	-43.47%	430.97%
<b>Weaver Library Farmers Market</b>	4332.14%	-9.11%	15.16%
<b>West Warwick</b>	59.66%	-41.61%	42.73%
<b>Westbay Farm</b>	N/A	N/A	474.83%
<b>Westerly Pawcatuck Farmers Market</b>	43.04%	13.58%	-36.67%
<b>Woonsocket Year-Round</b>	5.92%	-27.41%	-26.34%
<b>Grand Total</b>	<b>12.35%</b>	<b>-6.09%</b>	<b>28.79%</b>

Figure 4: Cumulative SNAP benefits spent year-over-year change by farmers market

<b>SNAP Benefits Spent Per Transaction Year-Over-Year Change</b>			
<b>Market Name</b>	<b>FY15- FY16</b>	<b>FY16- FY17</b>	<b>FY17- FY18</b>
<b>Aquidneck Growers Summer - Newport</b>	-7.08%	4.25%	6.77%
<b>Aquidneck Growers Year Round - Middletown</b>	-22.59%	1.37%	-4.71%
<b>Armory Park</b>	11.01%	-20.35%	11.44%
<b>Big Train Farm CSA</b>	19.29%	-2.34%	71.33%



<b>Broad St.</b>	-9.59%	-2.47%	24.24%
<b>Brown University</b>	8.11%	-37.50%	226.67%
<b>Burrillville Farmers Market - Stillwater</b>			-4.45%
<b>Central Falls</b>	15.67%	-3.30%	-9.39%
<b>Charlestown Farmers Market</b>			-14.12%
<b>Coastal Growers Indoor</b>	-19.88%	0.78%	-100.00%
<b>Coastal Growers Outdoor</b>	-3.61%	-11.70%	47.10%
<b>Downtown Providence</b>	-2.61%	-14.92%	17.17%
<b>Goddard Park Farmers Market</b>	7.47%	-0.38%	19.67%
<b>Haines Park Farmers Market</b>	-40.04%	2.93%	23.32%
<b>Hope Street</b>	-2.08%	-14.71%	7.70%
<b>Miantonomi Farmers Market</b>			-0.79%
<b>Mount Hope Farm Year Round Market</b>	-15.48%	20.44%	-3.83%
<b>Neutaconkanut Park</b>	-10.11%	-4.04%	-5.63%
<b>Pawtucket Slater Park</b>	-5.54%	-1.03%	-1.43%
<b>Pawtucket Wintertime</b>	10.72%	-14.20%	2.12%
<b>Pawtucket Village Outdoor Market</b>	-14.29%	42.59%	-10.80%
<b>Sankofa Sowing Place Market</b>			230.00%
<b>Sankofa World Market</b>	7.75%	37.40%	9.21%
<b>Schoolyard Market 2019</b>		-17.16%	-18.39%
<b>Scratch Farm CSA</b>	-37.85%	9.26%	20.15%
<b>South County Summer - Saturday (East Farm)</b>	-4.03%	-33.70%	99.94%
<b>South County Summer - Tuesday (Marina Park)</b>	-21.79%	-8.16%	-100.00%
<b>South Kingstown Summer Market (East Farm)</b>			
<b>South Kingstown Winter Market</b>	-14.14%	-3.49%	263.53%
<b>Veggie Box</b>	27.80%	13.06%	32.74%
<b>Weaver Library Farmers Market</b>	54.61%	7.08%	-11.51%
<b>West Warwick</b>	20.69%	-36.08%	11.12%
<b>Westbay Farm</b>			-41.34%
<b>Westerly Pawcatuck Farmers Market</b>	-34.75%	37.74%	2.63%
<b>Woonsocket Year-Round</b>	-8.85%	-3.75%	5.85%
<b>Grand Total</b>	-5.51%	-6.71%	12.88%

Figure 5: SNAP benefits spent per transaction year-over-year change by farmers market

<b>Number of Transactions</b>					
<b>Market Name</b>	<b>FY15</b>	<b>FY16</b>	<b>FY17</b>	<b>FY18</b>	<b>Grand Total</b>
<b>Aquidneck Growers Summer - Newport</b>	105	87	119	150	461

<b>Aquidneck Growers Year Round - Middletown</b>	61	79	86	159	385
<b>Armory Park</b>	588	650	622	831	2691
<b>Big Train Farm CSA</b>	3	25	38	43	109
<b>Broad St.</b>	432	462	511	597	2002
<b>Brown University</b>	10	1	2	6	19
<b>Burrillville Farmers Market - Stillwater</b>			6	21	27
<b>Central Falls</b>	6	60	65	104	235
<b>Charlestown Farmers Market</b>		3	17	18	38
<b>Coastal Growers Indoor</b>	216	458	304		978
<b>Coastal Growers Outdoor</b>	736	717	448	99	2000
<b>Downtown Providence</b>	172	295	230	212	909
<b>Goddard Park Farmers Market</b>	69	136	124	169	498
<b>Haines Park Farmers Market</b>	26	46	20	49	141
<b>Hope Street</b>	683	701	857	964	3205
<b>Miantonomi Farmers Market</b>			29	45	74
<b>Mount Hope Farm Year Round Market</b>	125	117	157	130	529
<b>Neutaconkanut Park</b>	50	114	98	117	379
<b>Pawtucket Slater Park</b>	94	96	93	176	459
<b>Pawtucket Wintertime</b>	761	730	779	860	3130
<b>Pawtucket Village Outdoor Market</b>	96	80	70	168	414
<b>Sankofa Sowing Place Market</b>			2	5	7
<b>Sankofa World Market</b>	78	94	199	294	665
<b>Schoolyard Market 2019</b>	2	49	77	26	154
<b>Scratch Farm CSA</b>	3	4	6	3	16
<b>South County Summer - Saturday (East Farm)</b>	492	508	329	33	1362
<b>South County Summer - Tuesday (Marina Park)</b>	187	178	111		476
<b>South Kingstown Summer Market (East Farm)</b>				34	34
<b>South Kingstown Winter Market</b>	532	565	507	27	1631
<b>Veggie Box</b>	17	12	6	24	59
<b>Weaver Library Farmers Market</b>	3	86	73	95	257
<b>West Warwick</b>	104	384	131	149	768
<b>Westbay Farm</b>			5	49	54
<b>Westerly Pawcatuck Farmers Market</b>	108	149	97	37	391
<b>Woonsocket Year-Round</b>	470	547	411	286	1714
<b>Grand Total</b>	<b>6229</b>	<b>7433</b>	<b>6629</b>	<b>5980</b>	<b>26271</b>

**Figure 6:** Number of transactions by farmers market, fiscal year

<b>Number of New SNAP Customers</b>					
<b>Market Name</b>	<b>FY15</b>	<b>FY16</b>	<b>FY17</b>	<b>FY18</b>	<b>Grand Total</b>
<b>Aquidneck Growers Summer - Newport</b>	13	42	52	45	152
<b>Aquidneck Growers Year Round - Middletown</b>	5	33	29	33	100
<b>Armory Park</b>	314	275	241	289	1119
<b>Big Train Farm CSA</b>	1	0	2	4	7
<b>Broad St.</b>	198	157	160	141	656
<b>Brown University</b>	6	0	1	2	9
<b>Burrillville Farmers Market - Stillwater</b>			1	6	7
<b>Central Falls</b>	3	40	37	51	131
<b>Charlestown Farmers Market</b>		0	6	5	11
<b>Coastal Growers Indoor</b>	3	10	12		25
<b>Coastal Growers Outdoor</b>	12	19	28	25	84
<b>Downtown Providence</b>	89	181	118	109	497
<b>Goddard Park Farmers Market</b>	53	70	64	67	254
<b>Haines Park Farmers Market</b>	13	20	12	17	62
<b>Hope Street</b>	290	226	240	227	983
<b>Miantonomi Farmers Market</b>			18	27	45
<b>Mount Hope Farm Year Round Market</b>	44	22	28	28	122
<b>Neutaconkanut Park</b>	22	74	49	50	195
<b>Pawtucket Slater Park</b>	54	60	56	104	274
<b>Pawtucket Wintertime</b>	245	171	163	187	766
<b>Pawtuxet Village Outdoor Market</b>	8	33	36	33	110
<b>Sankofa Sowing Place Market</b>			1	1	2
<b>Sankofa World Market</b>	54	58	69	123	304
<b>Schoolyard Market 2019</b>	0	9	4	6	19
<b>Scratch Farm CSA</b>	2	1	1	0	4
<b>South County Summer - Saturday (East Farm)</b>	22	38	20	17	97
<b>South County Summer - Tuesday (Marina Park)</b>	19	25	14		58
<b>South Kingstown Summer Market (East Farm)</b>				10	10
<b>South Kingstown Winter Market</b>	31	35	19	4	89
<b>Veggie Box</b>	2	3	0	2	7
<b>Weaver Library Farmers Market</b>	3	48	37	50	138
<b>West Warwick</b>	75	81	80	89	325

<b>Westbay Farm</b>			2	25	27
<b>Westerly Pawcatuck Farmers Market</b>	12	22	17	6	57
<b>Woonsocket Year-Round</b>	281	312	211	160	964
<b>Grand Total</b>	<b>1874</b>	<b>2065</b>	<b>1828</b>	<b>1943</b>	<b>7710</b>

**Figure 7:** Number of new SNAP customers by farmers market, fiscal year

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