

Can CSA Boxes Fight Food Insecurity?

Proposal for Research at Huerta del Valle, Ontario

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CASA (Critical Action and Social Advocacy)

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TABLE OF CONTENTS

Acknowledgements	-	-	-	-	-	-	-	-	-	2
Introduction	-	-	-	-	-	-	-	-	-	3
Literature Review	-	-	-	-	-	-	-	-	-	6
Methods	-	-	-	-	-	-	-	-	-	10
Proposal	-	-	-	-	-	-	-	-	-	13
Conclusions	-	-	-	-	-	-	-	-	-	18
Appendix A	-	-	-	-	-	-	-	-	-	21
Appendix B	-	-	-	-	-	-	-	-	-	23
References	-	-	-	-	-	-	-	-	-	25

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INTRODUCTION

Huerta Del Valle (HDV) is an organization dedicated to creating organic community gardens to support communities of the Inland Empire, a region just east of Los Angeles, CA. It was founded by Maria Alonso when her son's diabetes pushed her to find organic, healthy food and she realized it was extremely inaccessible: it was expensive and far away. Maria wanted to make healthy food easily accessible to families like hers in the Inland Empire, so she proposed the idea of growing her own food. After partnering with Pitzer College students and faculty, she started a garden in an elementary school, and after receiving support from the city of Ontario, Maria and a dedicated team of supporters founded the HDV Ontario site. They began providing plots of land for community members to tend to, and dedicated the other half of the garden to communal space. The communal half of the garden is tended to by volunteers and employees who put together CSA (Community Supported Agriculture) boxes and hold open markets for people to purchase fresh fruits and vegetables. There are currently 7 sites across the Inland Empire: Ontario, Jurupa Valley, Rubidoux, Jensen-Alvarado, Crestmore, San Bernardino, and the Ontario Carbon Farm ("Huerta Del Valle" n.d.)

HDV's mission is to have a community garden in every square mile of the Inland Empire. Through these gardens, HDV can simultaneously foster meaningful engagement and relationships while providing food access, nutrition education, and sustainable production and distribution. HDV envisions a community working actively to build the kind of Inland Empire that they advocate for, and hopes that the garden can be a space for research, learning, growing, and training. They intend to meet these goals by developing community partners, employing

farmers, composting, growing, educating, and providing land for the community (“Huerta Del Valle” n.d.).

At the end of 2019, HDV had 60 families using community plots and 30+ community members at monthly meetings. Jurupa Valley offers 25 plots for the community, and HDV is excited about continuing the establishments of other sites in San Bernardino and Crestmore. HDV hosts a youth program called Abejas to bring children into the HDV community and teach them about healthy, organic food from a young age. Abejas has a plot of land, just like the community members’ plots, where children are taught about soil, compost, and tending to a garden. HDV also offers opportunities for youth to engage by volunteering or interning at the farm (“Huerta Del Valle” n.d.). Further, HDV hosts a New Farmer Training Program (Agricultores del Valle) which teaches long-term skills to farmers in the area, growing the urban agriculture movement and local food access in the Inland Empire. They had 23 farmers in training in 2019 and they hope to continue the expansion of this program. HDV also offers nutrition classes in which participants can learn about harvesting, preparing, and cooking nutritious meals.

HDV is 100% not-for-profit and receives the majority of their funding from grants, but they also rely on donations from individuals and trusts. Initially, they were financially supported by Pitzer College, but as they grew as an organization and received support from the city of Ontario, they began getting their own grants and donations. Currently, HDV’s community partners include the City of Ontario, Pitzer College, Loma Linda University, Cal Poly Pomona, Kaiser Permanente, Scripps College, and many more. One challenge with HDV’s funding is that when the Ontario site originated, it was heavily supported by students and staff at Pitzer College,

and with support came financial backing. Currently, the Jurupa Valley site doesn't have the financial support of a community partner such as a university or organization, and thus is struggling to get off the ground. Additionally, volunteers are imperative in the success of HDV as an organization, because there are limited paid-staff on site.

A team of dedicated leaders make up HDV's paid staff. Maria Alonso is the Executive Director, Founder, and a Board Member of HDV. Her roles include organizing the finances of the organization, doing outreach at the Jurupa Valley site, and organizing community meetings. Arthur Levine is the Projects Manager, and he works on grants and funding, the New Farmer Training Program, and various external projects. HDV also has a CSA market shares coordinator, a nutrition programs coordinator, a youth programs coordinator, garden managers, paid farmers, and many interns from Pitzer College, Scripps College, Cal Poly Pomona, and Loma Linda University. Finally, HDV has many volunteers who come from colleges, schools, and local neighborhoods to support the growth of the community gardens. Most of HDV's behind-the-scenes work is done in the CASA Pitzer building in Ontario, where Maria and Arthur have offices. The rest is done on-site on one of the 7 locations across the Inland Empire.

HDV has an integral role in the Inland Empire because many communities in this area struggle with food insecurity and obesity. Food insecurity in a region is defined by analyzing a variety of factors that make healthy food inaccessible, including distance to grocery stores, cost of food, and the availability of culturally appropriate food options (Hunger, 2018). Urban farms and community gardens such as HDV help alleviate this issue by providing healthy, affordable food in areas where food insecurity is a pertinent issue (Hunger, 2018).

After supporting HDV employees at CSA box pick up sites and during their open markets, we were inspired to investigate the successful CSA box program that HDV has established. CSA boxes are available on a weekly or every-other-week basis, and have mini, regular, and large options. They are available for pick-up at a variety of sites so that location is more accessible, and they include a wide range of organic, in-season fruits and vegetables. After reaching out to Arthur and Maria about the idea of researching the CSA box program, they requested more data on where Ontario residents are purchasing their food, because they noticed that there was no data available on the types of purchases that community members were making. Inspired by this idea, we began to research food insecurity in Ontario and how that affects community members' food purchases.

LITERATURE REVIEW

Food-insecure households are defined as “uncertain of having, or unable to acquire, at some time during the year, enough food to meet the needs of all their members because they had insufficient money or other resources for food (USDA Economic Research, 2019).” In 2018, over 8.7 million U.S. households were considered food insecure (Chaparro et al., 2012). Food insecurity is inextricably linked to overall health issues, including greater risk of depression, obesity, diabetes, and hypertension (Chaparro et al., 2012). Food insecurity is most prevalent in households of color; 20% for Black non-Hispanic households and 16% for Hispanic households (USDA Economic Research, 2018). Although food insecurity reaches across all areas of residence, from metropolitan to rural, the proposed solutions are starkly different for each area.

This is because people in different places have different factors contributing to their food insecurity.

While food insecurity focuses on an individual's lack of access to food, the term "food desert" can mean the literal absence of retail food in a given area. However, in low-income urban areas that are considered "food deserts," the word takes on a more nuanced meaning, having to do more with the nutritional value of the immediately accessible and affordable foods (Beaulac et al. 2009). Detroit is often used as a prime example of an urban area food desert due to the fact that more than half the city lives in a food desert. Many of Detroit's residents depend on "fringe retailers" like bodegas and liquor stores for food. However, these retailers provide high-calorie snacks and sodas that are high in fat and sugar with little nutritional content (Weatherspoon 2012). In urban food deserts, grocery retailers are often much farther away, thus requiring more time and money (Weatherspoon, 2012). However, placing retail grocery stores in the middle of food deserts is not particularly effective. Food desert residents struggle to integrate fresh foods into their diet because they are extremely perishable and require time for preparation (Weatherspoon, 2012). This is often exacerbated by the lack of cooking facilities and safe storage. Moreover, more nuanced approaches must be taken in order to properly integrate fresh fruits and vegetables in areas that have not known it for so long, which is why community urban gardens have become very popular.

One way that communities have worked to fight the issue of food inequity and food insecurity is the creation of urban community gardens (Shisanya and Hendriks 2011). Community gardens can take many forms, but generally intend to provide a region with fresh, healthy, local produce, and most offer the opportunity for community members to have their own

plots for learning about and growing food. They are run by the individuals who work in the garden, and in this way the growers and consumers create community and mutual support through food production. Benefits of community gardens include the learning and teaching of garden skills, increased physical fitness, access to nutritious food, increased self-reliance, more time outdoors, and a space for building community (Shisanya and Hendriks 2011).

Ontario, California (the site where we plan to conduct our research) is part of the Inland Empire, a region located an hour east of Los Angeles that includes San Bernardino and Riverside counties. There is limited academic writing about this region's transitions from Tongva land to Mexican control to the colonial development of the United States. Beginning in the second half of the 1800s, Europeans began to settle in the Inland Empire, building a massive citrus industry (De Lara, 2018). While white people owned and controlled the quickly developing agricultural economy, Mexican and indigenous practices were displaced. A second wave of immigration and a surge in industry growth occurred during World War II, and the narrative of white dominance continued as white people managed the agriculture and steel industries, while Latinx and Asian people primarily made up the workforce. This further ingrained a racialized division of wealth, land, and power in the Inland Empire. Finally, from the 1980s to 2010, the Inland Empire once again saw a massive spike in population growth, this time from primarily Latinx people. Immigrants also added to this massive population shift, making up 22.1% of the population, and primarily coming from Mexico and Latin America (De Lara, 2018).

Most of the academic research done on community gardens in the Inland Empire was done as a senior thesis by a Pomona College student. Using GIS, the student mapped out potential locations for urban gardens by using geographic indicators to find food deserts across

San Bernardino and Riverside counties (McCoy, 2011). However, there is no national or local data regarding how residents of the inland empire spend their food dollars. Food dollars, more specifically, may include the store the food was bought at and what type of food it is (fresh, shelf-stable, organic, nonorganic). This information is imperative in aiding families who are food insecure and have little access to healthy food.

There is limited data available on where people are currently spending their food dollars. In 1996, *Food Review* printed an article on the effect of income and diet on food spending on a global scale (Meade and Rosen, 1996). This article explains that high-income countries spend an average of 16% of their income on food, while middle-income countries spend an average of 35% of their income, and low-income countries spend an average of 55% of their income on food. The study concluded that low-income people are forced to spend most of their money on food in order to survive. As incomes increase, they will buy more and better food. When food needs are satisfied, people will spend their extra income elsewhere (Meade and Rosen, 1996). This may include other crucial living expenses like healthcare and education which are often sacrificed when a family is food insecure. This trend of food insecurity harming other aspects of life is likely to still be present today, and is likely to be applicable to smaller-scale studies like the research that we are proposing in Ontario.

While HDV fights to provide healthy, local, and fresh produce to residents of the area, there is limited research on where and how HDV CSA box users spend their food dollars outside of the produce they receive from their boxes, and how CSA boxes may inform spending. The Inland Empire, while historically a hot spot for agriculture and citrus production, has seen rapid developments of warehouses and factories in the past decade. As a result, necessary

neighborhood developments like grocery stores and parks have been pushed aside to prioritize the growth of warehouses for massive corporations like Amazon (DeLara, 2018). Ontario residents who wish to shop at supermarkets carrying a variety of organic foods, like Whole Foods or Sprouts Market, must travel outside their neighborhoods which is expensive and time-consuming. Further, most families in Ontario cannot afford the prices at stores like these. This combination has caused many families to be food insecure, creating both financial and health challenges (Chaparro, 2012).

METHODS

Although HDV has supported families by giving them access to fresh, healthy, and cheap produce, it is important to investigate how families conduct their food spending outside of HDV. If having a weekly CSA box encourages patterns of frugal and healthier food purchasing, this is important information for HDV to share with potential grants and donors. Additionally, this information may allow HDV to adjust the items they carry, their prices, and CSA box pick-up locations in order to maximize the number of people receiving food from them.

Thus, we propose the questions: where are people in Ontario spending their food dollars? How does this compare to regional and national data? How can HDV adjust their prices, produce selection and locations to maximize the number of people and families receiving healthy, local produce? How can this research support the community garden model and encourage more community members to use CSA boxes?

This proposal for research will focus on the ‘sales’ part of the food system, compiling national data from the US Bureau of Labor and San Bernardino County Indicators report on

grocery store purchases. We will then compare these national and regional averages to HDV's CSA box users. We would like to know how families supplement their CSA boxes, the types of food they buy, and how much they spend. By comparing these findings to national data, we will be able to draw conclusions about the positive or negative impact, financially and health-wise, of having CSA boxes in communities.

We propose that an on-site survey be conducted at the flagship Ontario location during each CSA box pick up date over a two week period that does not take place over a holiday. We will incentivize individuals to participate by entering all participants into a raffle for a month of free CSA boxes.

We will give out a survey that asks participants to record their food spending for a week (Appendix A). Participants will be instructed to fill out the survey after every food related purchase so as to avoid any forgotten purchases. They will be asked to record: Household size and address, When (Date/time of purchase), What (type of food/beverages), Where (store type [retail, bulk, bodega], city/area of purchase), Prices (per item, total).

The simplicity of this survey makes it adaptable as a model for urban community gardens nationally. Not only will this information provide asset-based research of the given community, but it will allow organizations to maximize their impact by identifying the needs of the community and adjusting appropriately. For example "Nopales" or Opuntia Cacti (cactus leaves), are a popular ingredient in Mexican cuisine and beloved by members of the HDV Community. We recorded in our field notes that on open market days, customers arrive early in order to get the first pick of the nopales being sold for the day. Moreover, it is important to note that HDV's choice to grow and sell nopales is a direct response to the culture and cuisine of the

community they are serving. In using this survey, other urban gardens may be able to identify their own unique cultural constituency and grow fruits or vegetables accordingly.

Our proposal emerges from our experience as interns at HDV. Our choice to focus on CSA boxes in particular is intentional; we witnessed many families come to the markets to pick up their own CSA box, raving about the delicious fruits and vegetables alongside an affordable price. By focusing on this successful community oriented program, we hope to employ an asset based approach to our research. This research approach is conceptualized as the Asset-Based Community Development Research model (ABCD) by Tessa Hicks Peterson (Hicks Peterson, 2017).

It is important that we claim our own social positions as a young, cis-gendered, able-bodied, white women. Additionally, we are members of an elite liberal arts institution nearby, and live outside of the city of Ontario. This positionality is different from many of the members of the HDV community. Social position is an essential part of methodology because it filters and frames the way we live our lives and thus, our research question, findings, and interpretations (Walter, 2013). It is also important to consider that we are passionate environmental advocates, and have interests that specifically lie in the value of eating fresh fruits and vegetables. Because we integrate many of HDVs values into our own lives, it is imperative to consider that our own cognitive biases may include confirmation bias. Confirmation bias is the idea that we may stop gathering information because what we already know confirms our views (Wason, 1960). Lastly, we are incentivized to produce this paper for the sake of passing a class, which is external to community needs.

PROPOSAL

We hypothesize that if we compare the weekly per-household spending on fresh produce between CSA box users and non-CSA box users, HDV's CSA box users will spend more money than non-CSA box users. However, we believe that overall weekly spending on food will be lower for CSA box users. This is because most people who are not part of community gardens or similar organizations are not purchasing much fresh produce to cook at home. Instead, vegetables and fruits are purchased frozen, canned, or at restaurants. We predict that CSA box users will continue the pattern of healthy purchases, buying more "food at home" than non-CSA box users. Food at home is a category used in the US Bureau of Labor data, which means food that is cooked in the house, as opposed to eaten out or eaten to-go. Food at home often correlates with healthier purchases, because it means less fast food, less "junk" food like gas station chips and candy, and more home-cooked meals. Additionally, food at home is found to be less expensive and often results in meals lower in calories, sugar, and fat (Arpita, 2017).

We propose a sample size of 20 participants from HDV. After compiling data from our 20 HDV CSA box user survey participants, we expect to have enough comprehensive data to compare to national averages. Our survey (Appendix A) asks 5 very intentional questions with space for specifics: .

- Household size and address is included so that we may calculate cost per person as well as calculate the distance travelled from home to whatever site the food is purchased at.
- What (type of food/beverages) is included to see if families are purchasing more fruits and vegetables to supplement the CSA box, and what type of vegetables they are. This is used to help HDV adjust the produce that they are growing and selling.

- Where (store type [retail, bulk, bodega], city/area of purchase) is included so that we are able to see how far people are travelling.
- Prices (per item, total) are included so that we can see if community members must spend more on fruits and vegetables that aren't from HDV.

Data from the U.S. Bureau of Labor shows us that average spending on fresh vegetables for US households was \$259 in 2017. The average spending on fresh fruits was \$295 per year, for a total of \$554 spent on fresh produce per year. Weekly, this is \$10.65 per household. Of course, this is very general data, because it does not account for household size. The data summary does point out that there is a large range in annual spending--for families earning less than \$15,000 per year, \$317 was spent annually on fresh produce, while families earning more than \$200,000 spent an average of \$1,113 annually (Table 1). Additionally, the same data set indicates that on average, consumers spent \$4,363 on “food at home” items and spent \$3,665 on “food away from home” items annually (Table 2) (Consumer, 2019).

	Fresh produce	Fresh produce income < \$15,000 per year	Fresh produce income > \$200,000 per year
2016-2017 Weekly Averages per Household	\$10.65	\$6.10	\$21.40

Table 1. Comparing weekly average spending on fresh produce across income brackets.

	Food at home	Food away from home
2016-2017 Weekly Averages per Household	\$83.91	\$64.71

Table 2. Comparing food at home and food away from home national averages (Consumer, 2019).

More locally, we can compare HDV’s CSA box user data to regional data from San Bernardino County. San Bernardino county does not give data on produce spending, but they report that residents spend an average of \$92 per week on groceries (food at home). Compared to the national average weekly grocery spending, which is \$131, it is clear that the average San Bernardino County resident is spending less money on groceries than the national average. San Bernardino county has a median income of \$37,392 while the national median income is \$53,443 (Truty, 2018). These observations are mirrored in the USDA’s Food Prices report, which indicates that food spending as a share of income is declining as income is rising (Figure 1) (USDA, 2020).

HDV provides discounted food for low income people and students. Their prices are also exceptionally low for the amount of fresh, organic produce they provide (Table 3). When compiling data from CSA box users, this analysis will include what is paid for in a CSA box, as well as the fresh produce that supplements that CSA box.

Size of CSA Box	Price	Student/Low Income Price
Mini (7-10 items)	\$17	\$10
Standard (12-15 items)	\$27	\$20
Large (15-17 items)	\$32	\$25

Table 3. HDV CSA Box Pricing

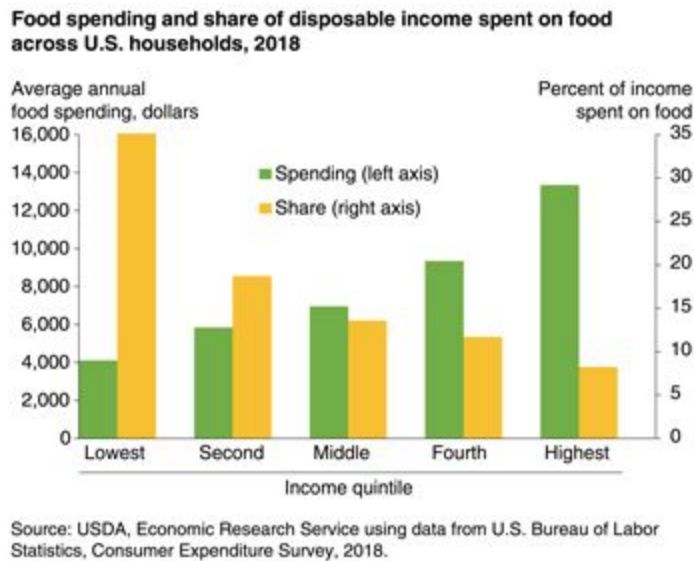


Figure 1. Food spending as a share of income declines as income rises (USDA, 2020).

To obtain a reasonable analysis in which we can compare data from HDV’s CSA box users to national and regional data, we will use three separate two-tailed, two sample hypothesis tests comparing six sets of data. The first t-test will compare data from HDV’s CSA box users to data from the U.S. Bureau of Labor Consumer Expenditures data, analyzing average weekly spending on fresh produce. The second t-test will compare total weekly spending on all food between HDV’s CSA users and the U.S. Bureau of Labor Consumer Expenditures data. The third will compare the average weekly spending on “food at home” between the aforementioned groups. The t-tests will show us if each of these comparisons have significant differences.

For example, if we compare the average weekly household spending on fresh produce from HDV’s CSA users to the US Bureau of Labor’s data on average weekly household spending on fresh produce, we will need to determine if the differences are significant. To do

this, we would compile the data from HDV’s CSA users and average their weekly spendings (all HDV data below is hypothetical, this is only for the purpose of an example) (Table 4).

	Fresh produce only, HDV and outside shopping combined (mean +/- Standard Deviation)
Average weekly spending	\$12.08 +/- 3.85

Table 4. Example, average weekly spending for HDV CSA box users (mean +/- SD, n=20).

This data would then be compared with the US Bureau of Labor’s data on weekly spending on fresh produce in a one sample t-test. A program such as Vassarstats would be used (http://vassarstats.net/t_single.html). To do this, the data from HDV CSA users would be placed into the column labeled “data entry,” and the nation average weekly spending on fresh produce would be entered in the box titled “enter hypothetical population mean.” The program would then generate a p-value, as well as the degrees of freedom (Appendix B). The same pattern would be followed for the two subsequent t-tests.

This investigation is imperative for the growth of HDV as an organization. Local food spending data will allow HDV to adjust the produce they provide. For example, if survey participants indicate that they must go to grocery stores for corn because HDV isn’t providing adequate corn for their families, then HDV can plan to begin planting more corn, or can reach out further to understand the types of corn that are desired. Or, if survey participants are spending significantly more at HDV than they would at local grocery stores, HDV can consider a price adjustment or a discount depending on financial and familial circumstances.

Further, this data can potentially support the community garden model and the success of CSA boxes in areas that struggle with food insecurity. If a positive relationship is found between

the CSA box users and healthier overall purchases, then this data can be used to support the growth of CSA box programs in other communities. Or, if CSA box users are spending less on groceries than non-CSA users in the region, then this data can be used for publicity purposes and encourage more people to sign up for CSA box programs. Finally, this data can be further used for grant writing and funding purposes.

One important drawback to consider about this proposed research is that it relies heavily on participants. Those who choose to participate in the research must answer consistently and honestly. For a community that already struggles to find the time to grocery shop, it is a lot to ask of them to remember to record down what they purchase every time they go to the store. If a participant were to make up their data because they forgot, or didn't feel like it, or just wanted a chance to participate in the raffle, then our data may be skewed. Because we have spent so much time in the HDV community, and interacted with its dedicated and compassionate members we are assuming how they would participate in the research. However, overall, this research is an exciting step forward for HDV and we hope that they are able to utilize it to its greatest extent in the future.

CONCLUSION

Although we only have half of our results for this study, important conclusions can already be drawn from the national data on food spending. An average of \$10.64 per week per household on fresh produce is shockingly low, and will likely be a lower number than what the average CSA box user is spending. This generates important conclusions about the state of health and food spending in the United States. Most Americans are not purchasing many fresh fruits and vegetables despite the irreplaceable nutritional value of fresh produce in our diets. This is

likely supplemented by food away from home purchases and frozen or canned fruits and vegetables. In the case that this proposal does generate data indicating that CSA box users spend more than the average American, it will be imperative to point out the nutritional deficit faced by many Americans, especially in the San Bernardino county region (Truty et al., 2018). Further, if data does indicate that CSA box users are spending less overall on food purchases, this will be imperative to highlight and can be used by HDV to further promote the health and financial benefits of CSA boxes.

As the Inland Empire struggles with food insecurity and obesity, HDV seeks to approach these problems from multiple angles. Their locations make food shopping a 5 minute drive instead of a 35 minute one for many families, and their low prices place fruits and vegetables back on shopping lists without major sacrifice (Hunger, 2018). CSA boxes seek to simplify the shopping experience even more--customers, if they wish, do not have to take the time to select the items they would like to purchase. Rather, they can pick up a prepaid box that is price adjusted to their financial situation. The popularity of CSA boxes has proved them to be a viable alternative to grocery shopping in areas that struggle with food insecurity, yet their quantitative impact is unknown.

One area for future research is the distance that people travel to their grocery stores. Because this survey asks for address and location, future students could analyze how far CSA box users have to travel to grocery stores, how that compares to how far they must travel to HDV to pick up their CSA box, and those distances compare to the San Bernardino County average (2.1 miles) and the average for areas defined as food deserts (3.6 miles) (Truty, 2018). This data

would be important for establishing new HDV garden sites and for assessing food insecurity in the area.

Further, the simplicity of the survey we proposed allows it to be adapted to the needs of similar community gardens on a national level. Another possibility for future work would be the distribution of this survey on a wider scale, not only at HDV's Jurupa Valley and San Bernardino sites but additionally at other organizations with similar missions to HDV. The data collected could be compared against the data that we have already analysed from the US Bureau of Labor. This would be important because it would make a large sample size for the CSA box users half of the data, and wider conclusions could be drawn about community gardens in general.

As HDV continues to support its community with fresh produce and community building, it is important to consider the quantitative impacts of their work. Although HDV's community members are experiencing (and tasting!) the benefits of the garden, quantitative representation allows for further growth of the organization. Additionally, as the community garden model gains popularity, it is important to have standardized methods of quantitative research in place so that HDV's achievements are recognized on a larger scale. HDV's work is a revolutionary solution to the problems faced in the Inland Empire. It is a site for connection, community, restoration, hope, wellness, and shared purpose. We hope that our research is able to contextualize this numerically so that HDV may receive the recognition, funding, and support that it deserves.

APPENDIX A, SURVEY DESIGN

Huerta del Valle CSA Box User Survey, English

First name: _____

Address: _____

Number of people in household: _____

Date: _____

In the tables below, please write the name of the grocery store where you purchased your food, and then list each item you purchase. Please record everything you purchase for one week. Do not include restaurants or to-go food, only things you eat and make at home.

Name and location of store:

Date:

What your purchased	Price

Name and location of store:

Date:

What your purchased	Price

Huerta del Valle Encuesta para Participantes del Programa CSA, Español

Nombre: _____

Dirección: _____

Número de personas en su hogar: _____

Fecha: _____

En las tablas abajas, escriba el nombre de la tienda donde compró los alimentos. Después, enumere cada artículo que compró. Registre todo lo que compró durante una semana. No incluya restaurantes o comida para llevar, solo cosas que se come y se hace en casa.

Nombre y ubicación de tienda:

Fecha:

Lo que compró	Precio

Nombre y ubicación de tienda:

Fecha:

Lo que compró	Precio

APPENDIX B, T-TEST EXAMPLE

Example of a one sample t-test in Vassarstats:

5/6/2020

Single Sample t-Test

Single Sample t-Test

This page will perform a t-test for the significance of the difference between the observed mean of a sample and a hypothetical mean of the population from which the sample is randomly drawn.

Procedure:

- **Entering Data Directly into the Data Entry Field:**
After clicking the cursor into the text area labeled *Data Entry*, enter the values for the sample in sequence, pressing the carriage return key after each entry except the last. (On a Macintosh platform, the carriage return key is labeled 'Return'; on a Windows platform it is labeled 'Enter'.)
- **Importing Data via Copy & Paste:**
Within the spreadsheet application or other source of your data, select and copy the column of data for the sample. Then return to your web browser, click the cursor into the text area for *Data Entry* and perform the 'Paste' operation from the 'Edit' menu.
- **Data Check:**
Make sure that the final entry in the list is **not** followed by a carriage return. (A carriage return after the final entry will be interpreted as an extra data entry whose value is zero. Importing data via the copy and paste procedure will almost always produce an extra carriage return at the end of a column.) After all values for the sample have been entered, click the cursor immediately to the right of the final entry in the list, then press the down-arrow key. If an extra line is present, the cursor will move downward. Extra lines can be removed by pressing the down-arrow key until the cursor no longer moves, and then pressing the 'Backspace' key (on a Mac platform, 'delete') until the cursor stands immediately to the right of the final entry.
- **When all** sample values have been entered, click the button labeled 'Calculate.'

<i>Data Entry</i>
8.7
11.4
6.7
20.5
8.9
3.4
11.0
9.0
8.55
7.9
13.2
15.6
10.5
14
18.2
7.3
11.0
9.3
10.2
9.1

vassarstats.net/t_single.html

1/2

Enter Hypothetical Population Mean	
10.65	
Reset	Calculate

<i>Summary Values</i>		
n	20	
$\sum X$	214.45	
$\sum X^2$	2601.7925	
SS	302.3524	
variance (inferential)	15.9133	
standard deviation (inferential)	3.9891	
standard error	0.892	
sample mean	10.7225	
hypothetical population mean	10.65	
difference	0.0725	
t	0.0813	
df	19	
P	one-tailed	0.468027
	two-tailed	0.936054

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