**Project Data Harvest: Decentralized Agriculture for US Food Deserts**

Description: Food Deserts are geographic areas of the US (as defined by Census tracts) where low income, Grocery proximity or transportation access, keep nutritious food out of reach for a significant portion of the population. Small, local farms could enter these food desert markets in order to fill the unmet needs of the US population. Also, Tumi our team member is interested in setting up a protected farm in her backyard located in Saratoga county, NY state. With this background, one of the questions asked was to how a small farm could increase its chances of success if looking to enter the Food Desert market? For this I looked at the data for high demand, profitable produce items (vegetables and fruits) across US and also focused on New York state to see which vegetables and fruits were highest revenue generators.

Following Data Analyses were done using various USDA websites with API keys and csv files:

**Data Analyses from across the US for Vegetables:**

* Url: [www.ers.usda.gov/data-products/vegetables-and-pulses-data/vegetables-and-pulses-yearbook-tables/#Supply%20and%20Utilization:%20Fresh%20Market](http://www.ers.usda.gov/data-products/vegetables-and-pulses-data/vegetables-and-pulses-yearbook-tables/)
* Data obtained from CSV files. Data Cleaning such as - commas need to be removed from the price and quantity columns in the data set; data set for all vegetables and fruits were available in rows and needed to be converted into columns
* Data was used to plot graphs using Pandas and Matplotlib in Jupyter notebook.

Results:

1. Graph: Vegetable Prices for 2017 across US - Data shows that Asparagus is the most expensive vegetable with a price of $ 118/cwt (cwt = 100 lb count) making the top of the chart in terms of price. However, potatoes are the least expensive with a cost of 10.57 $/cwt.
2. Graph: Fresh Vegetable per capita availability 2017 - Results indicate that although Potatoes are cheapest compared to other vegetables, the per capita availability of Potatoes are the highest with 33 lbs. Following potatoes are Onions (22 lb) and Tomatoes (21 lb). The lowest per capita availability was for Spinach(1.67 lb), Asparagus (1.58 lb) and Snap Beans (1.51 lb).
3. Graph: Fresh Vegetable Per Capita Availability Trendline from 1990 – 2017 -The trendline data shows that the highest demand over the years has been potatoes compared to other vegetables. However, in the recent years the per capita availability of Potatoes has dropped by 25%, and the demand for onions and tomatoes are increasing indicating that people are making healthy choices in their diet .
4. Graph: Fresh Vegetable Market Price Trendline from 2000 to 2017 - The comparative trendline data shows that comparatively the cost of tomatoes have been highest over the years with potatoes been the least. Over the decade, the price of tomatoes have not changed considerably.
5. Graph: Fresh Vegetable Revenue Per Capita Trendline from 1990 – 2017 - The Revenue Per Capita trendline data across US shows that the highest revenue generated is from tomatoes compared to other vegetables.

**Comparison of Prices between Conventional and Organic Vegetables and Fruits across US**

* Url: [https://www.marketnews.usda.gov/mnp/fv-report-retail?repType=&run=&portal=fv&locChoose=&commodityClass=&startIndex=201&type=retail&class=ALL&commodity=ALL&region=NORTHEAST+U.S.&organic=ALL&repDate=12%2F29%2F2018&endDate=01%2F04%2F2019&compareLy=No](https://www.marketnews.usda.gov/mnp/fv-report-retail?repType=&run=&portal=fv&locChoose=&commodityClass=&startIndex=201&type=retail&class=ALL&commodity=ALL&region=NORTHEAST+U.S.&organic=ALL&repDate=12/29/2018&endDate=01/04/2019&compareLy=No)
* Data used from Excel files was used to plot graphs using Pandas and Matplotlib

1. Graph: Comparison of Prices between Conventional and Organic for Vegetable across US - The prices for Organically grown vegetables are slightly higher than that of conventionally grown vegetables.
2. Graph: Comparison of Prices between Conventional and Organic for Fruits across US - The prices for Organically grown fruits are slightly higher than that of conventionally grown fruits. The price for strawberries was missing from the data set.

**Data Analyses from within the New York State for Vegetable and Fruits:**

* **Url:** [**https://quickstats.nass.usda.gov/api/api\_GET/?key=3FCBDF3D-4566-36B0-8B88-5260E1ACF994&q=&sector\_desc=CROPS&group\_desc=VEGETABLES&agg\_level\_desc=STATE&state\_ansi=36&year=2017**](https://quickstats.nass.usda.gov/api/api_GET/?key=3FCBDF3D-4566-36B0-8B88-5260E1ACF994&q=&sector_desc=CROPS&group_desc=VEGETABLES&agg_level_desc=STATE&state_ansi=36&year=2017)
* API Key obtained; Data Cleaning was done and graphs were created using Pandas data frame and matplotlib. Data cleaning helped remove some unwanted data columns from the data set obtained from the USDA websites.

1. Graph: Revenue Generated Per Acre for Vegetables in NY State in 2017 - The highest revenue generated per acre for the year 2017 in New York State area among all the vegetables is that from the Onions with $7,249 per acre land.
2. Graph: Revenue Generated Per Acre for Fruits in NY State in 2017 - Strawberries have generated the highest revenue per acre for the year 2017 in New York State area compared to other fruits with $ 8661 per acre.

* Conclusions: Results from data analyses of various data sets for vegetables across US regions show that per capita trendline shows that population is changing to healthy eating habits and consumption of potatoes per capita has gone down by 25% while tomatoes have gone up 25% and leafy vegetables have tripled during the same period. The prices for tomatoes and leafy vegetables have also gone up during the same period.
* Results from data analyses of data sets for vegetables and fruits in the New York state for the year 2017 show that Onions and Strawberries have generated higher revenue ($ per acre). Results indicate that not all vegetables are grown in this area which provides opportunity to grow high demand vegetables like greens and tomatoes in protected farming.
* Overall, the data shows that the prices for Organically grown vegetables and fruits are slightly higher than that of conventionally grown vegetables and fruits. Given that production costs for of organic produce is higher, we don’t know if it is feasible for profitability to the growers.
* This information provides insight to Tumi as to select the type of vegetables and fruits for growing in her prospective protected farm business in the New York area.

**Challenges:**

Data access and lack of availability of desired data sets from the government websites were some of the challenges in this project. USDA websites were shut down resulting in difficulty in obtaining the API key. Due to lack of availability of Organic vs Conventional data regarding the price for vegetable and fruits in NY only the national data has been included.

Data cleaning helped remove some unwanted data columns from the data set obtained from the USDA websites. Data cleaning examples such as: commas need to be removed from the price and quantity columns in the data set; data set for all vegetables and fruits were available in rows and needed to be converted into columns.