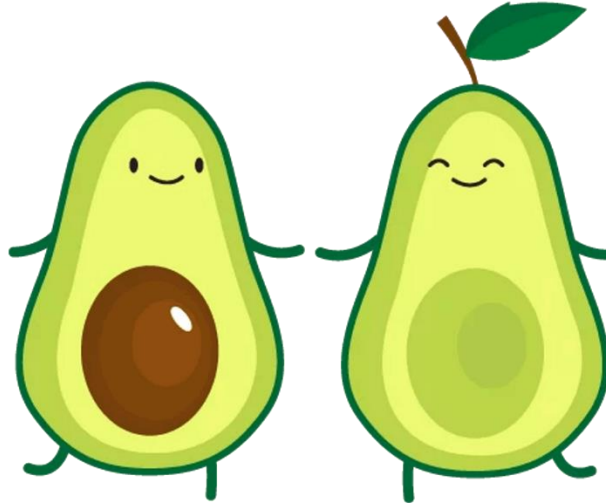


Exploratory data analysis of Avocado Sales in the USA



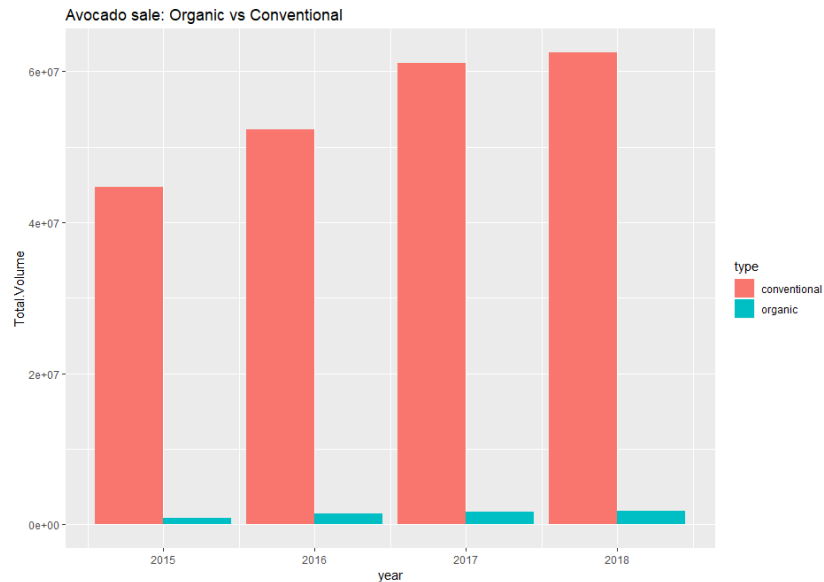
Some Wonderful Facts:

- 🥑 Did you know that the birth of Hass Avocado was essentially a stroke of luck? Rudolf Hass, a California mailman, and amateur horticulturist purchased and planted three avocado seedlings in 1926. One grew into a tree whose fruit had never been seen. The skin of this new avocado was dimpled and thicker than most. The color changed from green to purplish-black as it ripened.
- 🥑 California is the largest producer of avocados grown in the U.S. There are more than 3,000 avocado growers in California. A single Avocado tree can produce on average about 200 to 500 avocados per year.
- 🥑 One-third of a medium avocado (50 g) has 80 calories and contributes nearly 20 vitamins and minerals, making it a nutrient-rich choice.

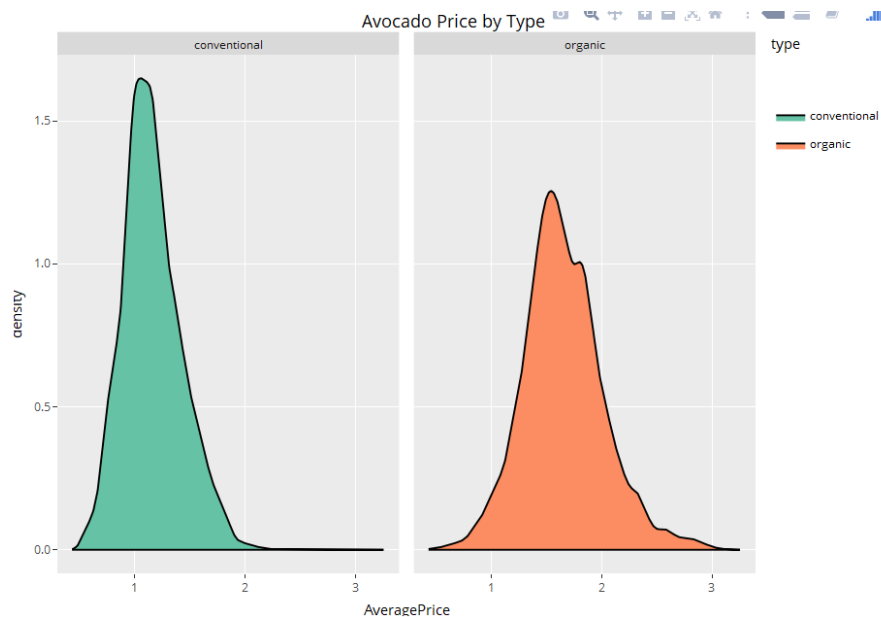
In this analysis we are going to explore the data of Hass avocado prices in the USA. Let us first look at the attributes of this data.

- 🥑 Data – The date of observation
- 🥑 Average Price – Average price of single Avocado
- 🥑 Type- type of Avocado (Organic / Conventional)
- 🥑 Year – the year of sale
- 🥑 Region – the city or region of observation
- 🥑 4046 – Total number of avocados with PLU 4046 sold
- 🥑 4225 - Total number of avocados with PLU 4225 sold
- 🥑 4770 - Total number of avocados with PLU 4770 sold
- 🥑 Total Volume - Total number of avocados sold

Which type of Avocado do you eat? Organic or the conventional type? Let us see the distribution of the sales of these Avocados.



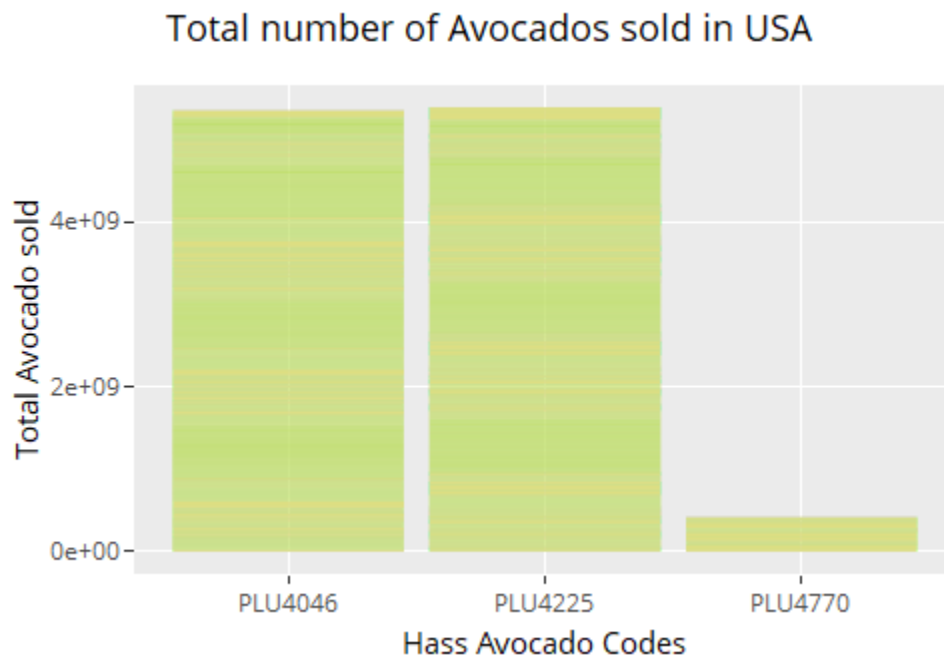
It is evident from the bar plot above that sale of conventional avocados are much higher than the organic avocados. Why is that? We all know that organic products are expensive than the conventional ones. Let us look at the distribution of average piece of the both types of Avocados.



Type	Average Price in dollars
Organic	1.5233
Conventional	1.0393

We might want to look at which PLU-type are sold more.

In the plot below we can see that the small and medium sized avocados are sold more than the large sized avocados.



The table below shows the average sale of number of avocados from the year 2015 to 2018. We can see that the sale of conventional PLU4046 and PLU4225 are very close.

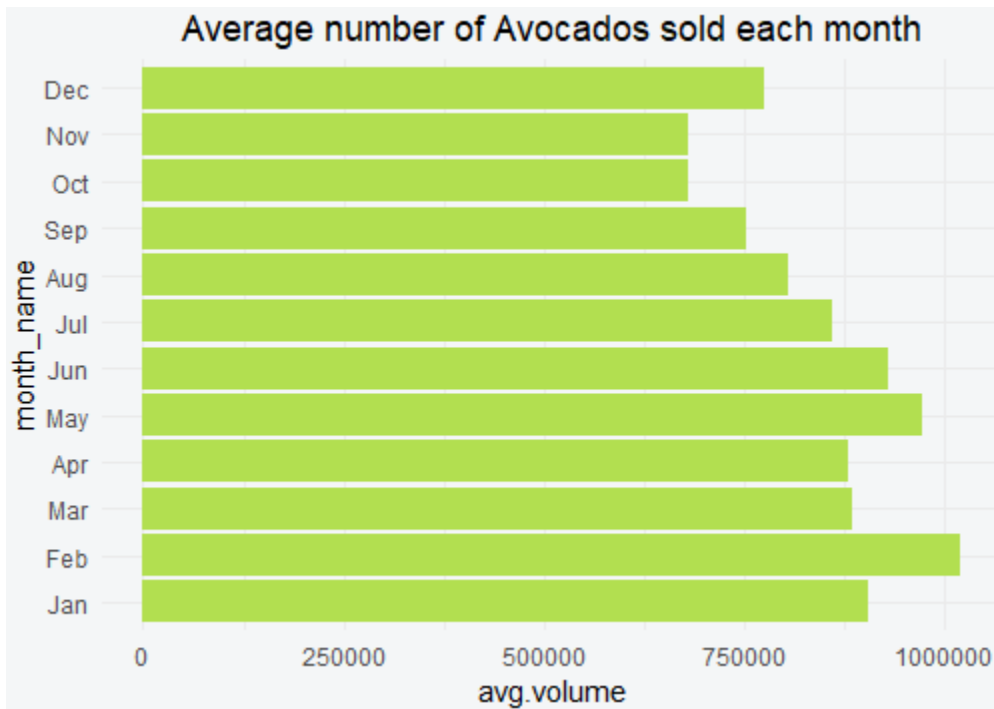
Type	Conventional	Organic
PLU4046	578611.650	7311.282
PLU4225	574805.32	15411.86
PLU4770	45405.7968	266.2546

Have you ever wondered why Avocados always seem to be in season?

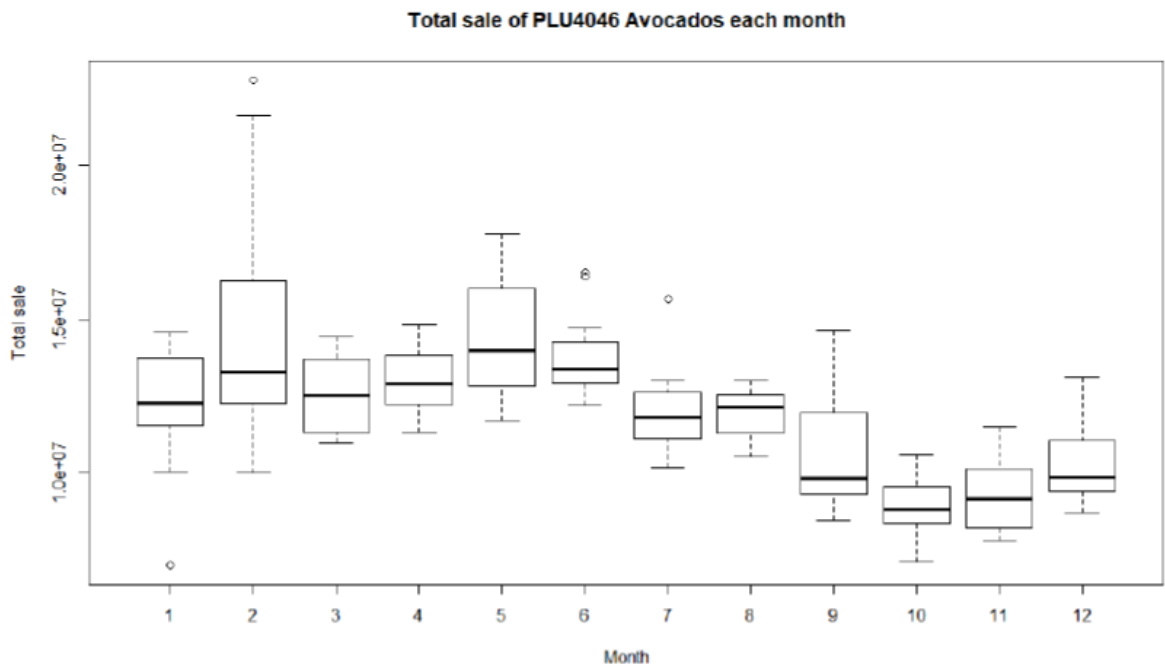
Few more wonderful facts:

- 🌿 This fruit can stay on the tree for long period of time without ripening, harvesting may overlap from year to year.
- 🌿 Avocados are harvested by hand; when the fruit is picked from the tree it is not ripe. As soon as it is picked, the ripening process begins.
- 🌿 The avocados are in season from January and can last up to October or early November.

Let us see what our data says ..



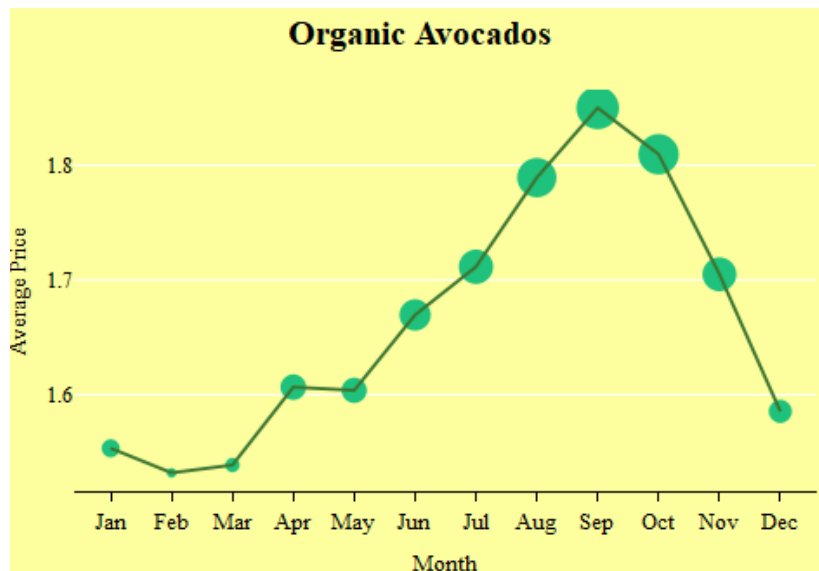
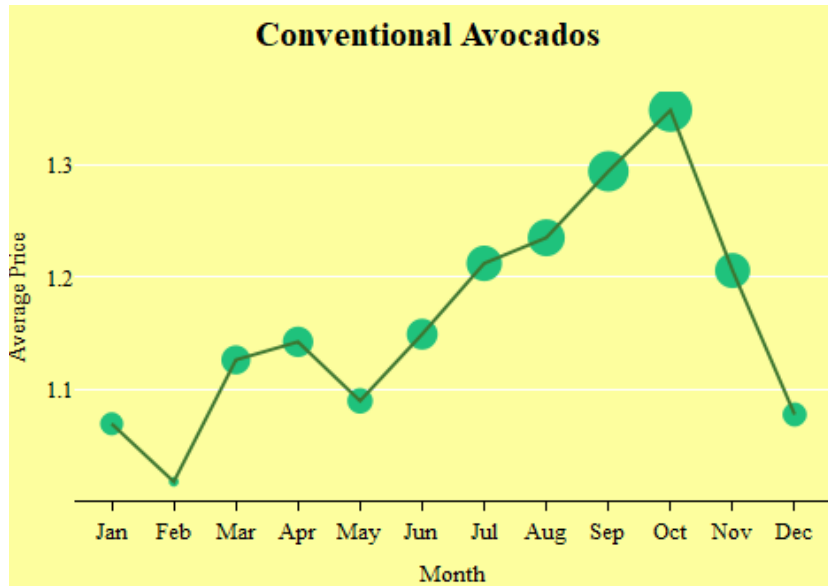
We can see that the month of February has the highest sale. Let us further explore using the boxplot and see if we find anything interesting. I will look at the observations belonging to year 2017.



When I looked at the details of the outlier point in the month of February, I found out that this point was **February 2nd**. Can you guess what happened on this exact date?

Aha! **The day of Super Bowl!** No doubt people LOVE chips and **Guacamole!** The sale was highest on 7th February 2016 for the same reason.

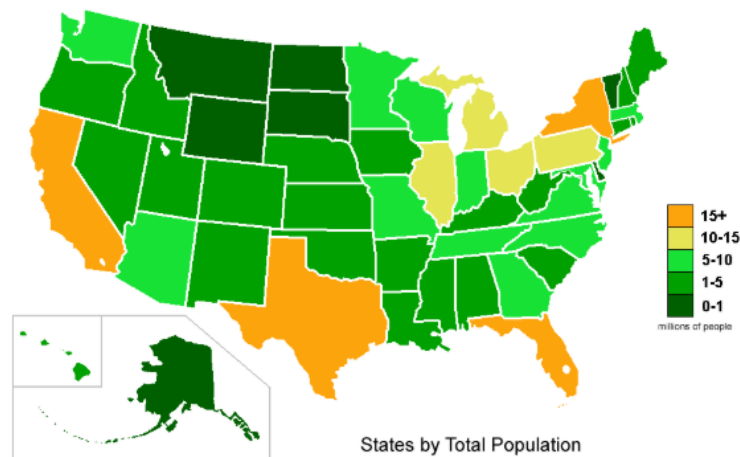
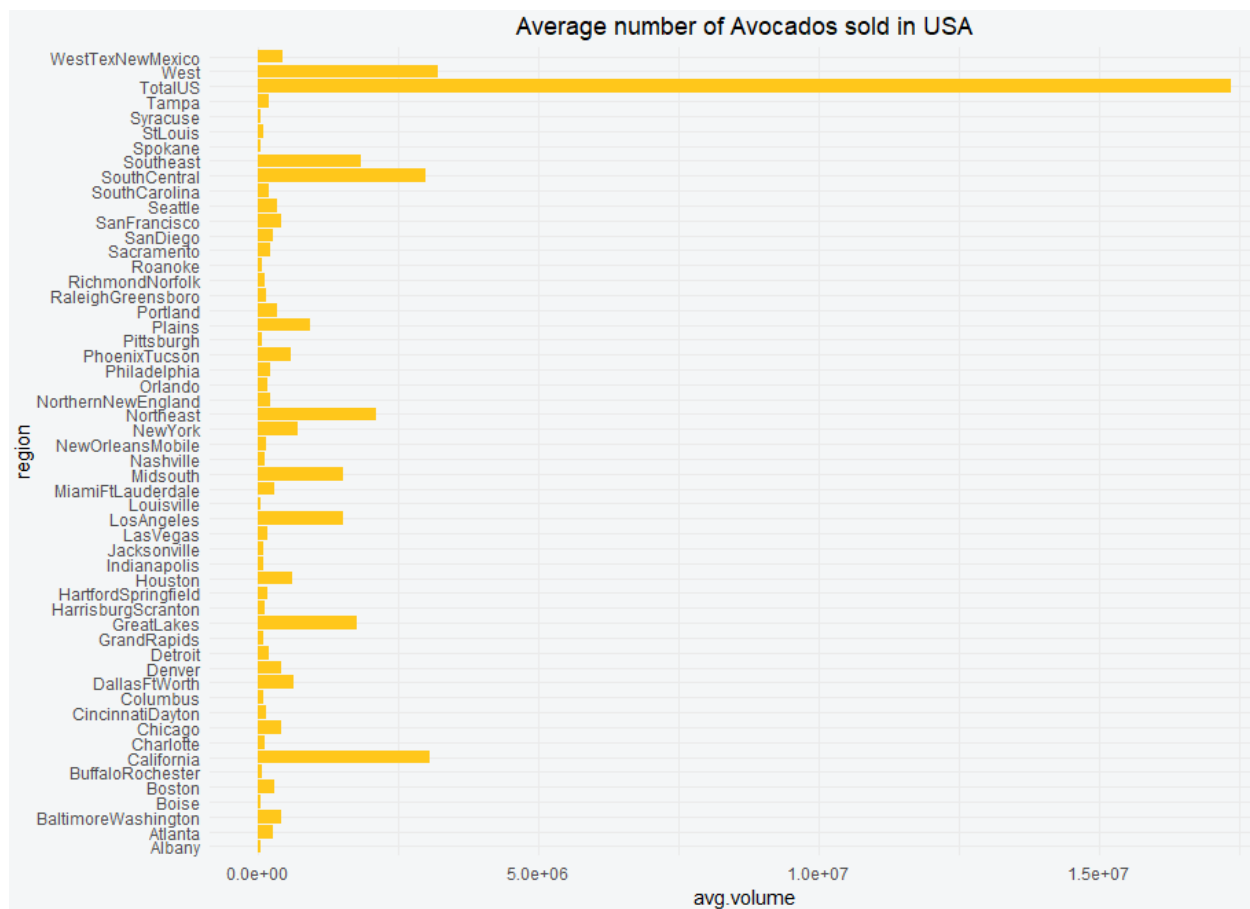
Since the sale is highest in the first quarter of the year, let us look at changes in the average price over months for each type of Avocado. We can see there is inverse relation between the price and sale of Avocado (We did expect that, right?)



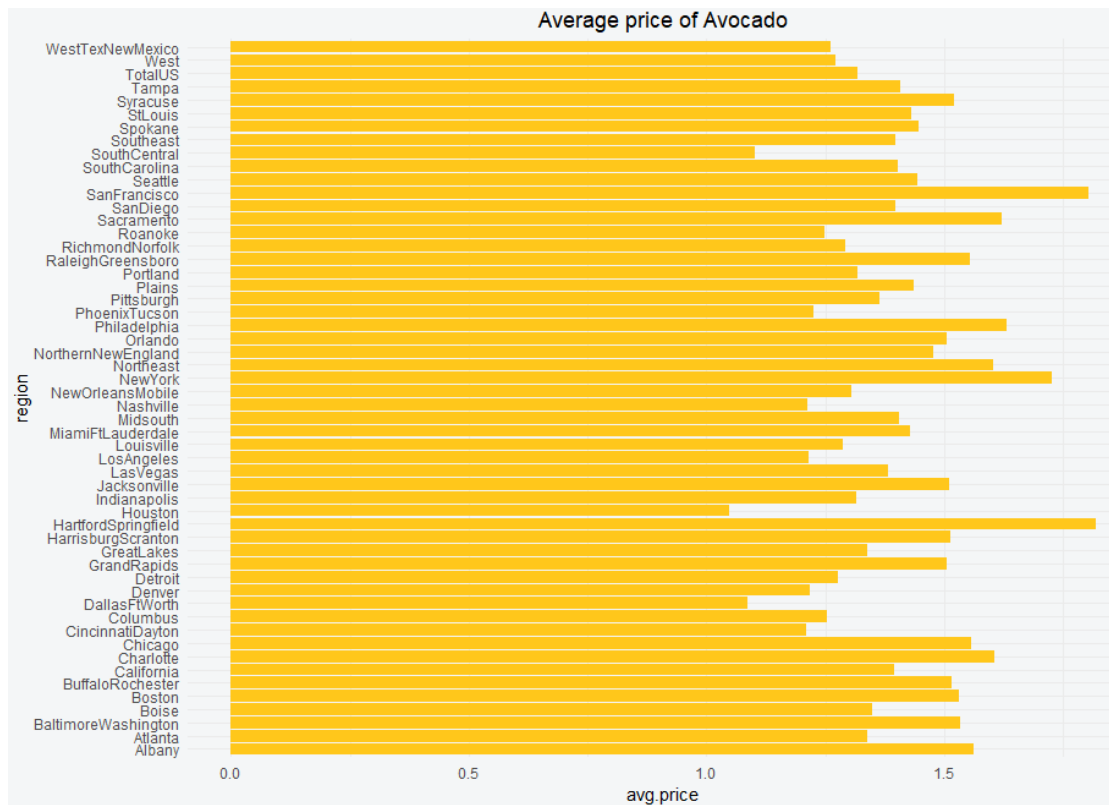
The green circle shows the average price of avocado. Bigger the circle, higher is the average price of Avocado.

Do you think the sale of Avocados is uniform in all the regions of the America?

Let us now look at the number of Avocados sold in each region/city of US.



We can see that the sale of Avocado is highest in the most densely populated regions/cities. No let us see how the average price varies in the regions/cities.



As California produces 90% of the Hass Avocados, we can expect the average price is lesser in the home state. The price is generally high in the colder regions/cities, why is that?

🌿 The avocado tree does not tolerate freezing temperatures and can be grown only in subtropical or tropical climates. It is crucial to cultivate most avocado species in climates without frost and little wind.

For this reason, we can say that including the cost of storage and transportation, the average price of Avocados is usually high in colder regions.

References:

- South Coast Organics available at <http://southcoastorganic.com>
- A food production wiki for public health professionals available at <http://fsi.colostate.edu/avocados/>
- Agriculture and Natural Resources Ventura County available at http://ceventura.ucanr.edu/Com_Ag/Subtropical/Avocado_Handbook/Harvesting/When_to_pick_avocados_/
- Data taken from <http://www.hassavocadoboard.com/retail/volume-and-price-data>