

DATA VISUALIZATION



What is Data visualization?

- Data visualizations are surprisingly common in your everyday life, but they often appear in the form of well-known charts and graphs.
- Data visualization refers to showcasing data, numbers, and statistics through images and charts.

Why is data visualization important?

- Data visualization is especially helpful when you're presenting data to others.
- It's much easier for people to understand data when it's presented visually.
- Data visualization is important in identifying trends, answering questions, proving theories easily.

Why Does Data Visualization Matter?

- Better Decision Making
- Meaningful Storytelling
- Data Literacy

Why use data visualization?

- Make data easier to understand and remember
- Discover unknown facts outliers and trends
- Visualize relationships and patterns quickly
- Ask better questions and make better decisions

Visualizations



- Product prices
- Price Variation
- Price Prediction
- Expected yields vs cities
- Average yield Comparison with planting and harvesting weeks
- Yield comparison on different farming methods

Products Considered

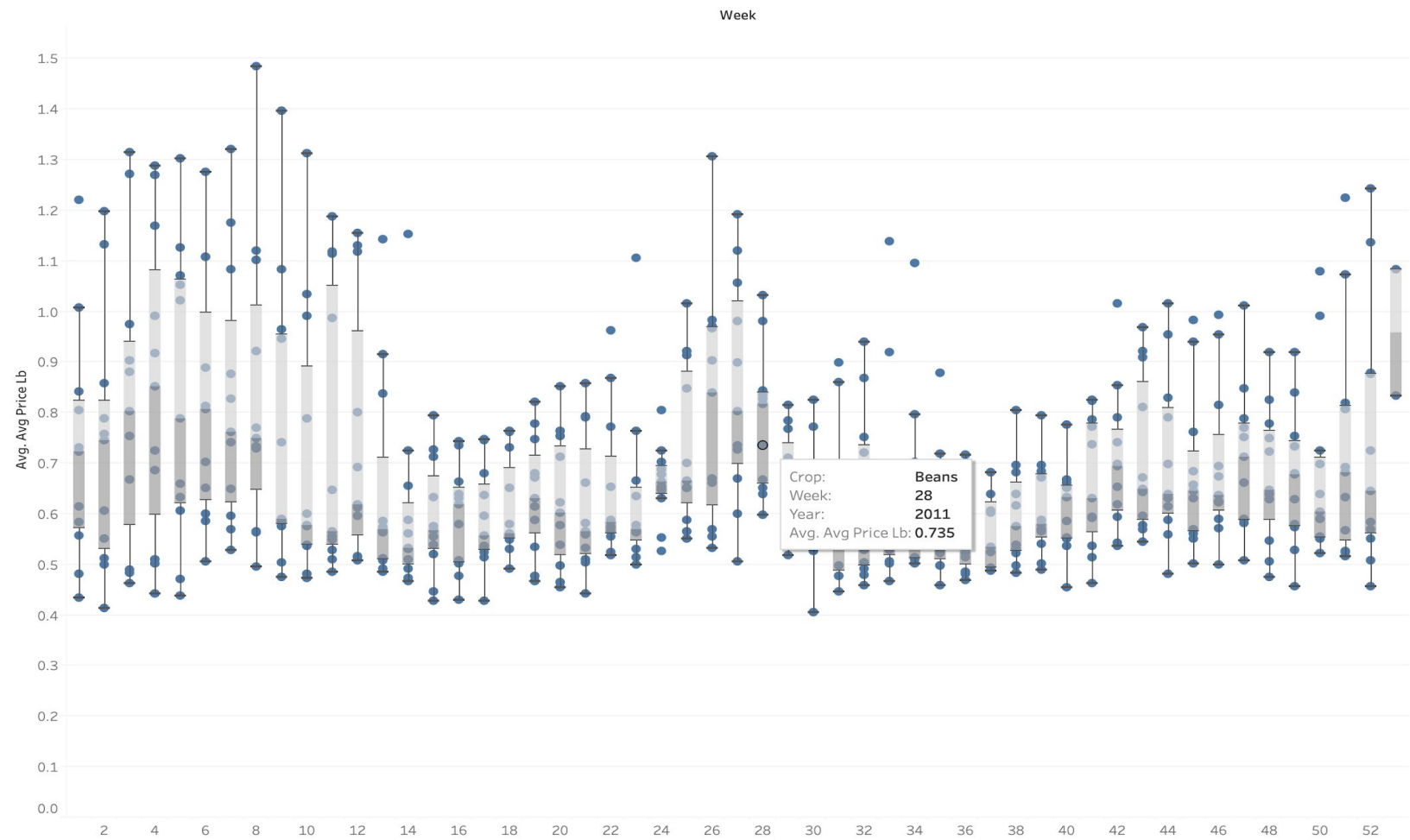


- Beans
- Lettuce
- Pepper
- Tomato
- Celery
- Cauliflower

Historical Price Variation - Years

- This plot depicts the distribution of average price of products in different years.
- In this graph we can see that the price of beans in week 28 year 2011 lies in between the median and lower quartile.
- Similarly, we can see the distribution of prices of different products by using the filter on the upper right side of the panel.

Weekly Price graph - Year



Crop

- (All)
- Beans
- Lettuce
- Pepper
- Tomato

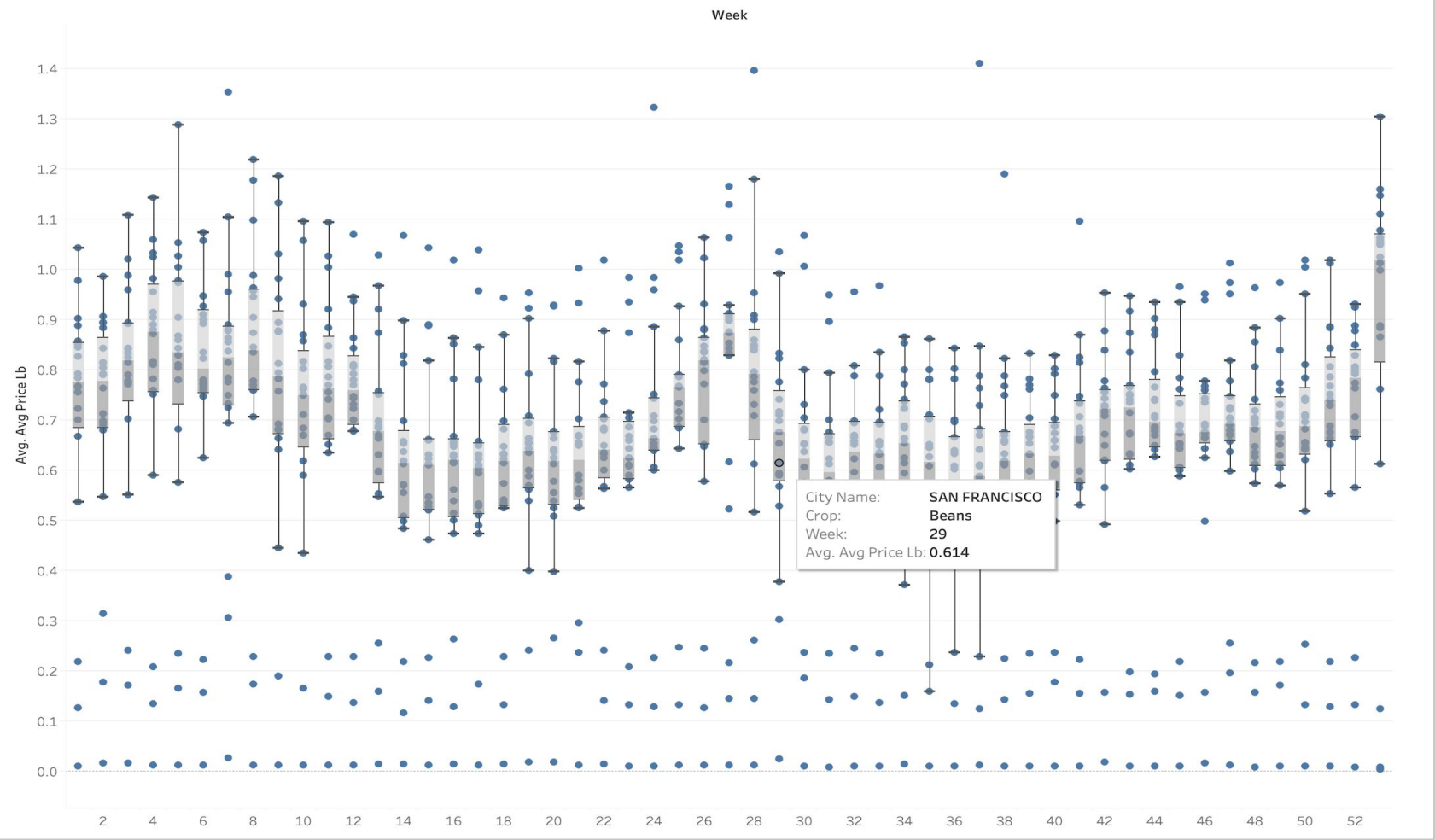
Crop

- Beans

Historical Price Variation - Cities

- This plot depicts the distribution of average price of products in different cities.
- In this graph we can see that the price of beans in week 29 in San Francisco is 0.614 \$/lb and it lies in between the median and lower quartile.
- Similarly, we can see the distribution of prices of different products by using the filter on the upper right side of the panel.

Weekly Price graph - Cities



Crop

- (All)
- Beans
- Lettuce
- Pepper
- Tomato

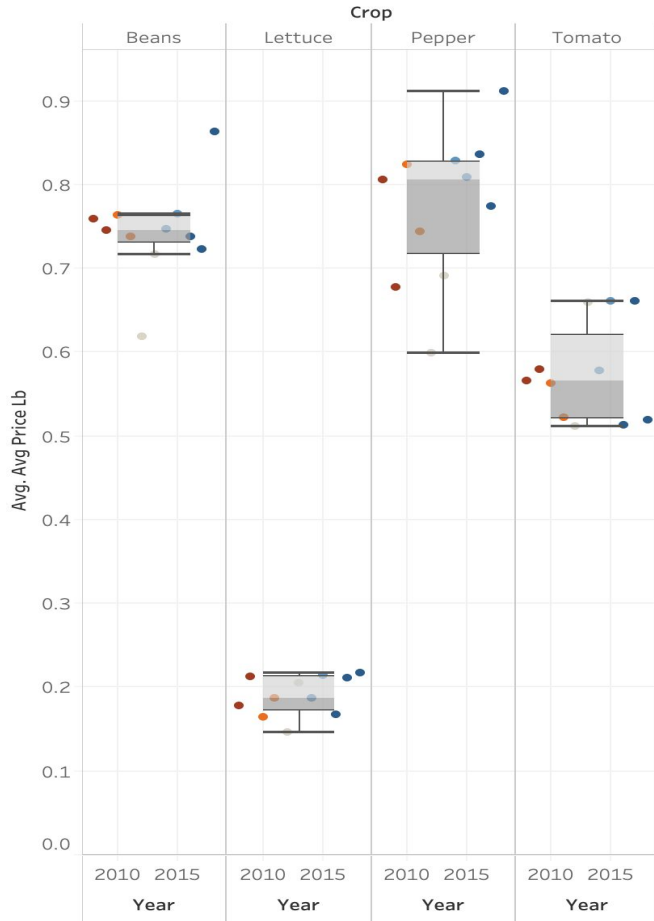
Crop

- Beans

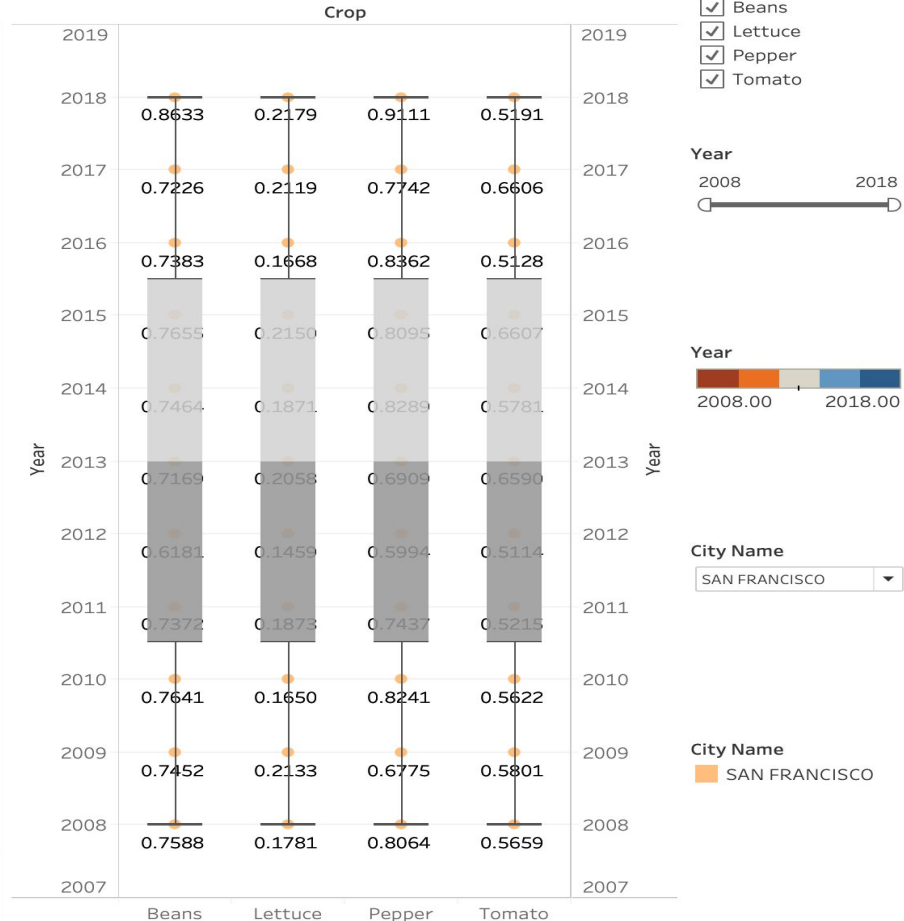
Prices of products in different years and Cities

- This graph depicts the variation of prices of different products in different cities.
- In this graph the values are filtered on the San Francisco city.

Avg_Prices vs Year



Product vs year (filter city)

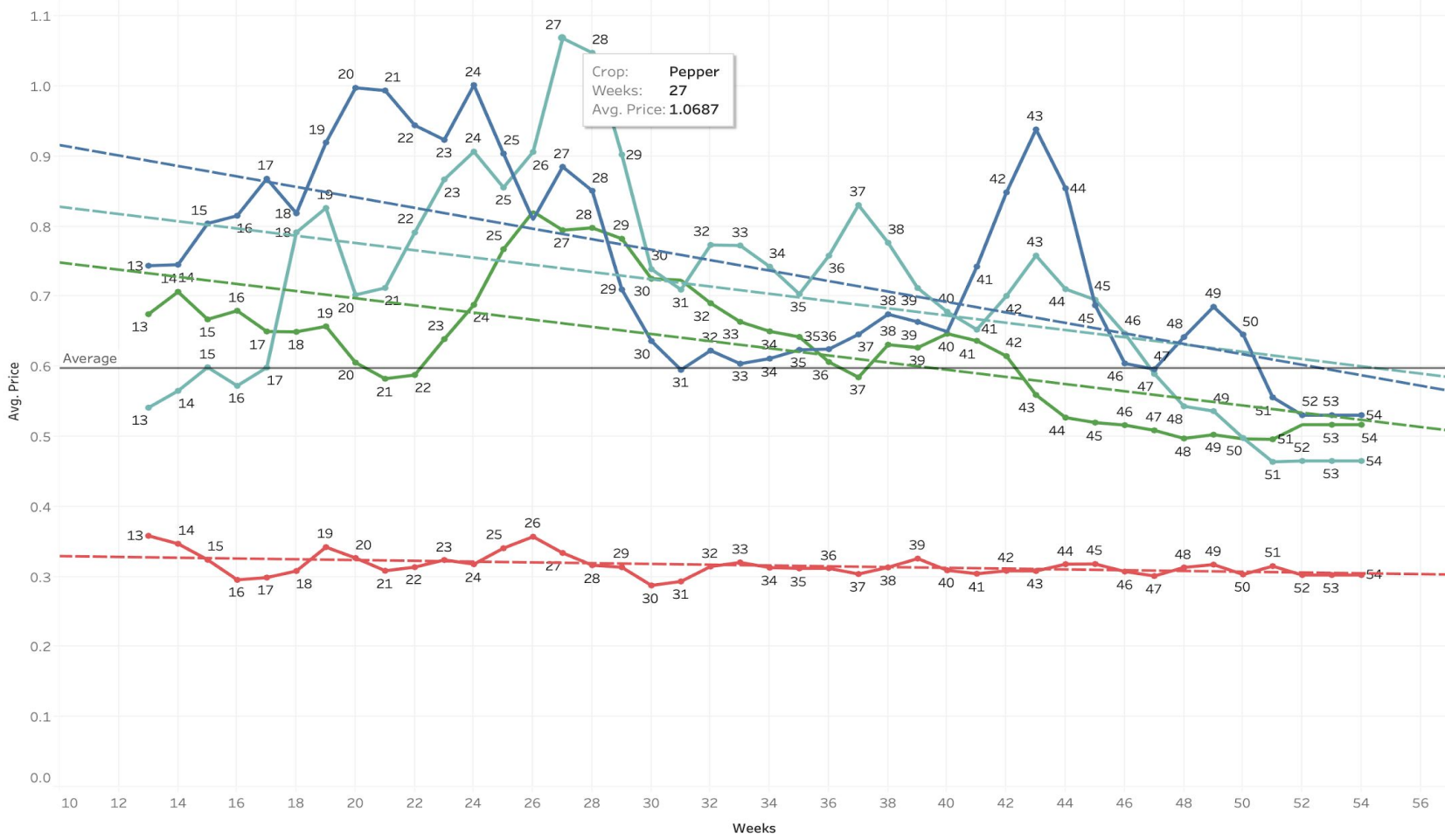


Predicted Prices

- Based on the analysis of the historical data from USDA website, predicted prices per week
- For example, the predicted price of pepper is maximum at near week 27. This helps farmers to decide and plan their produce in that time frame to get the maximum profits.
- Prediction intervals will be added as bounds for the predicted prices.

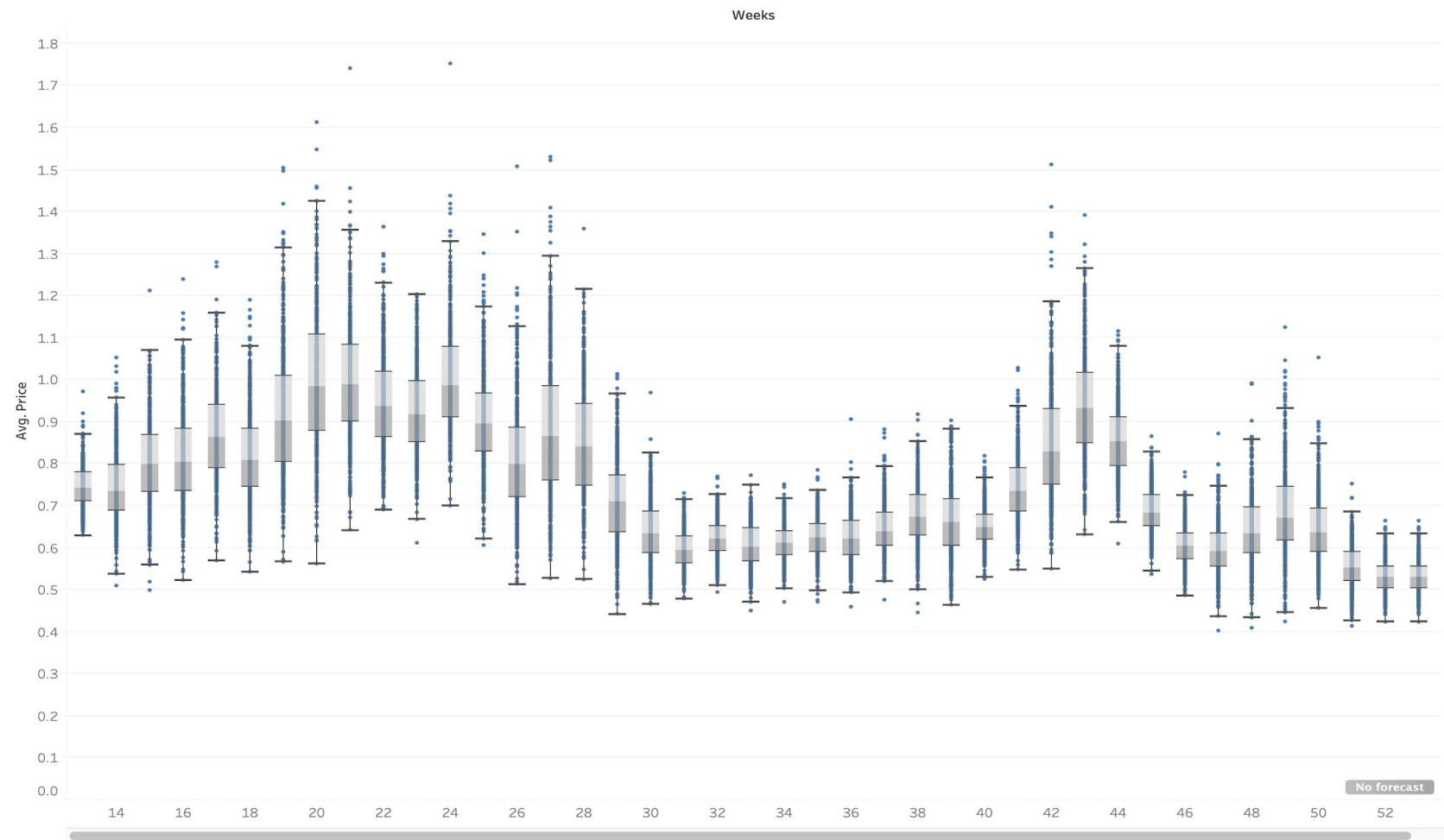
Predicted Prices on scenarios

- Beans
- Lettuce
- Pepper
- Tomato



Crop: **Pepper**
 Weeks: **27**
 Avg. Price: **1.0687**

Variation of Prices based on scenarios



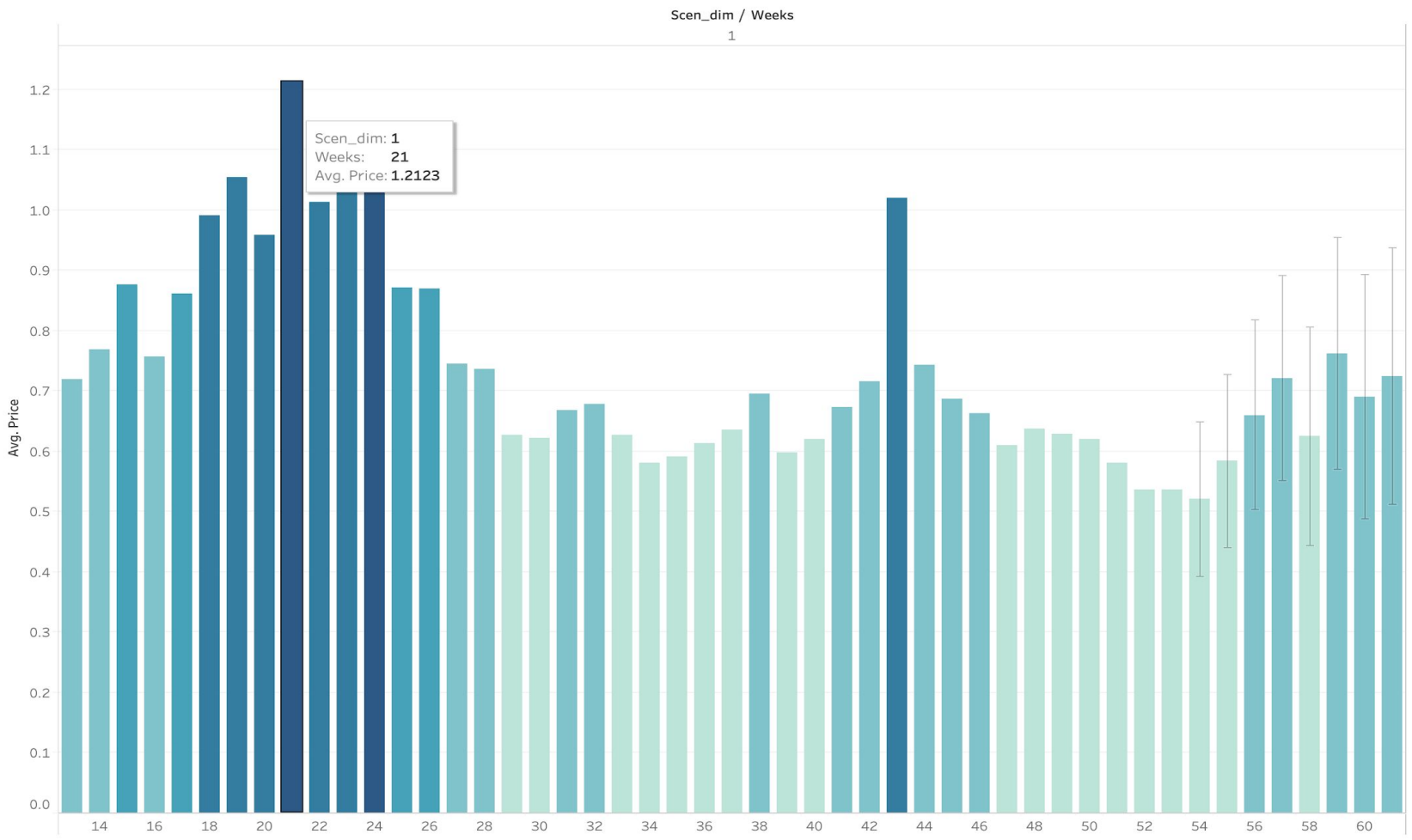
Scen_dim

- (All)
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
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- 10
- 11
- 12
- 13
- 14
- 15
- 16
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- 26
- 27
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- 31
- 32
- 33
- 34
- 35
- 36

Crop

- (All)
- Beans
- Lettuce
- Pepper
- Tomato

Variation of Prices based on scenarios



Scen_dim

- (All)
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
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- 11
- 12
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- 26
- 27
- 28
- 29
- 30

Crop

- (All)
- BNS
- CUX
- LET
- PEP
- TOM

AVG(Price)

0.5209 1.2123

**Cities
considered
for predicting
yields**

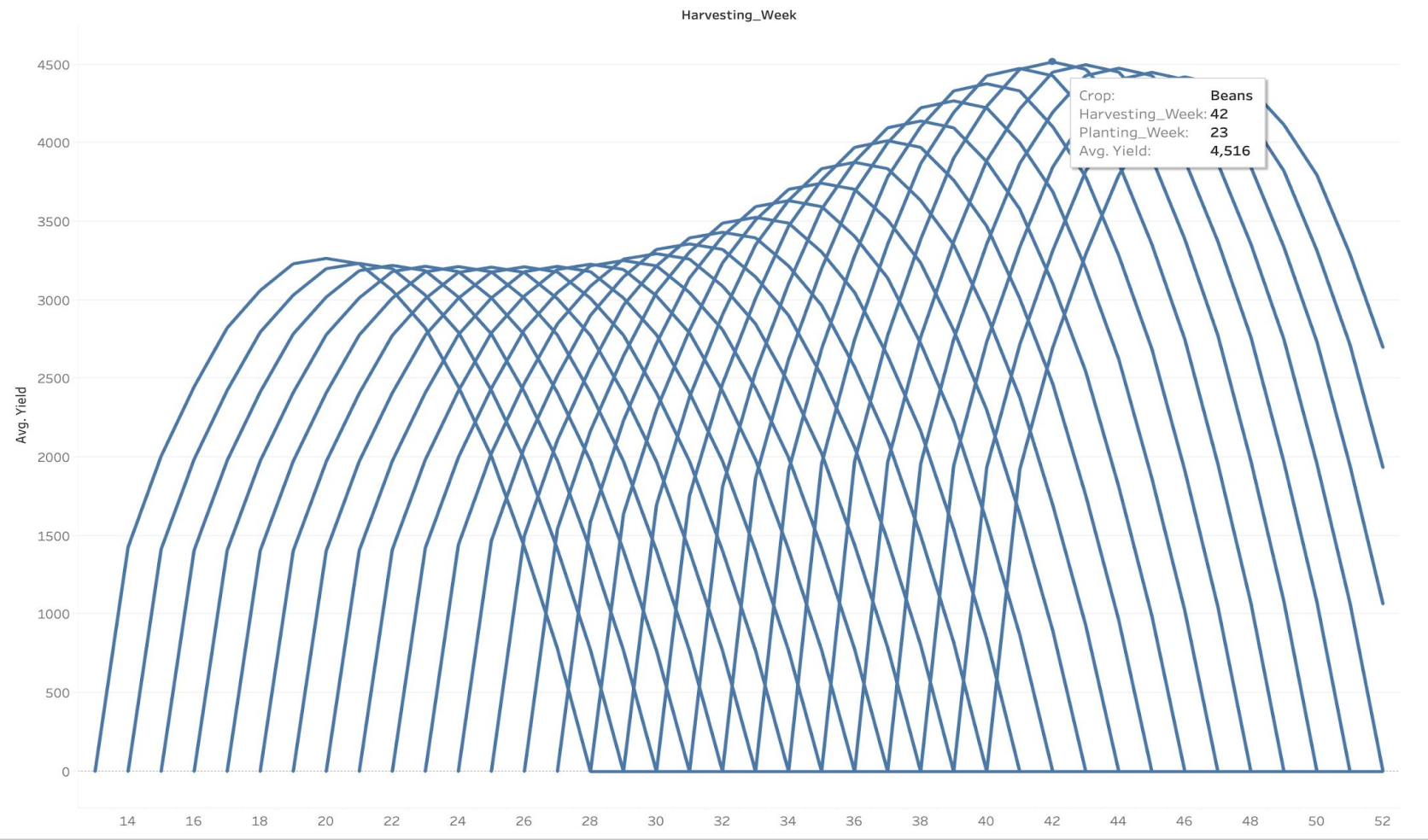


- Albuquerque
- Gallegos
- Phoenix
- Santa Fe
- Tucson

Predicted yields vs Cities

- Predicted yield based on planting and harvesting weeks in different cities .
- Factors considered are temperature, precipitation.
- For example, if we plant beans in Albuquerque in week 23 and harvest in week 42, according to our model we get the maximum yield of 4,561 lbs.

Expected Yield



Crop: Beans
Harvesting_Week: 42
Planting_Week: 23
Avg. Yield: 4,516

- Zones
- (All)
 - ALBUQUERQUE
 - Gallegos
 - PHOENIX
 - SANTA FE
 - TUCSON

- Crop
- (All)
 - Beans
 - Cauliflower
 - Celery
 - Lettuce
 - Pepper
 - Tomato

- Crop
- Beans

Predicted yields vs Cities

- This is another ways of visualizing the previous graph in detailed and clear manner.
- As we can see this tabular data predicts that in Phoenix area, if we plant Cauliflower in week 6 and harvest in week 25 the yield will be maximum, i.e. 5,752 lbs

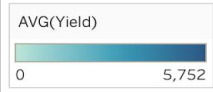
Yield Harvesting VS Planting Week

Zones	Harvesting_Week	Planting_Week																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
PHOENIX	13	0																		
	14	2,285	0																	
	15	3,209	2,355	0																
	16	3,917	3,308	2,418	0															
	17	4,515	4,036	3,397	2,471	0														
	18	4,896	4,653	4,145	3,472	2,508	0													
	19	5,168	5,045	4,779	4,237	3,523	2,516	0												
	20	5,222	5,326	5,182	4,884	4,299	3,535	2,515	0											
	21	5,168	5,382	5,470	5,296	4,956	4,314	3,533	2,497	0										
	22	4,896	5,326	5,527	5,590	5,374	4,973	4,312	3,507	2,460	0									
	23	4,515	5,045	5,470	5,649	5,672	5,392	4,971	4,280	3,455	2,406	0								
	24	3,917	4,653	5,182	5,590	5,732	5,692	5,390	4,934	4,217	3,380	2,342	0							
	25	3,209	4,036	4,779	5,296	5,672	5,752	5,689	5,350	4,861	4,125	3,290	2,275	0						
	26	2,285	3,308	4,145	4,884	5,374	5,692	5,310	5,510	5,034	4,756	4,015	3,196	2,201	0					
	27	1,251	2,355	3,397	4,237	4,956	5,392	5,310	5,510	5,034	5,157	4,628	3,900	3,093	2,143	0				
	28	0	1,289	2,418	3,472	4,299	4,973	5,443	5,019	4,496	3,774	3,011	2,098	0						
	29	0	0	1,324	2,471	3,523	4,314	5,500	5,297	4,875	4,351	3,674	2,947	2,055	0					
	30	0	0	0	1,353	2,508	3,535	5,443	5,353	5,146	4,717	4,235	3,597	2,887	2,008	0				
	31	0	0	0	0	1,373	2,516	3,533	4,280	4,861	5,157	5,297	5,200	4,980	4,593	4,146	3,524	2,821	1,971	
	32	0	0	0	0	0	1,378	2,515	3,507	4,217	4,756	5,019	5,146	5,032	4,848	4,496	4,062	3,442	2,768	
	33	0	0	0	0	0	0	1,377	2,497	3,455	4,125	4,628	4,875	4,980	4,899	4,746	4,405	3,968	3,379	
	34	0	0	0	0	0	0	0	1,367	2,460	3,380	4,015	4,496	4,717	4,848	4,795	4,649	4,303	3,895	
	35	0	0	0	0	0	0	0	0	1,347	2,406	3,290	3,900	4,351	4,593	4,746	4,698	4,542	4,223	
	36	0	0	0	0	0	0	0	0	0	1,318	2,342	3,196	3,774	4,235	4,496	4,649	4,590	4,458	
	37	0	0	0	0	0	0	0	0	0	0	1,283	2,275	3,093	3,674	4,146	4,405	4,542	4,505	
	38	0	0	0	0	0	0	0	0	0	0	0	1,246	2,201	3,011	3,597	4,062	4,303	4,458	
	39	0	0	0	0	0	0	0	0	0	0	0	0	1,206	2,143	2,947	3,524	3,968	4,223	
	40	0	0	0	0	0	0	0	0	0	0	0	0	0	1,174	2,098	2,887	3,442	3,895	
	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,149	2,055	2,821	3,379	
	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,126	2,008	2,768	
	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,100	1,971	
	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,079	
	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Harvesting_Week: 25
 Planting_Week: 6
 Zones: PHOENIX
 Avg. Yield: 5,752

- Zones
- (All)
 - ALBUQUERQUE
 - Gallegos
 - PHOENIX
 - SANTA FE
 - TUCSON

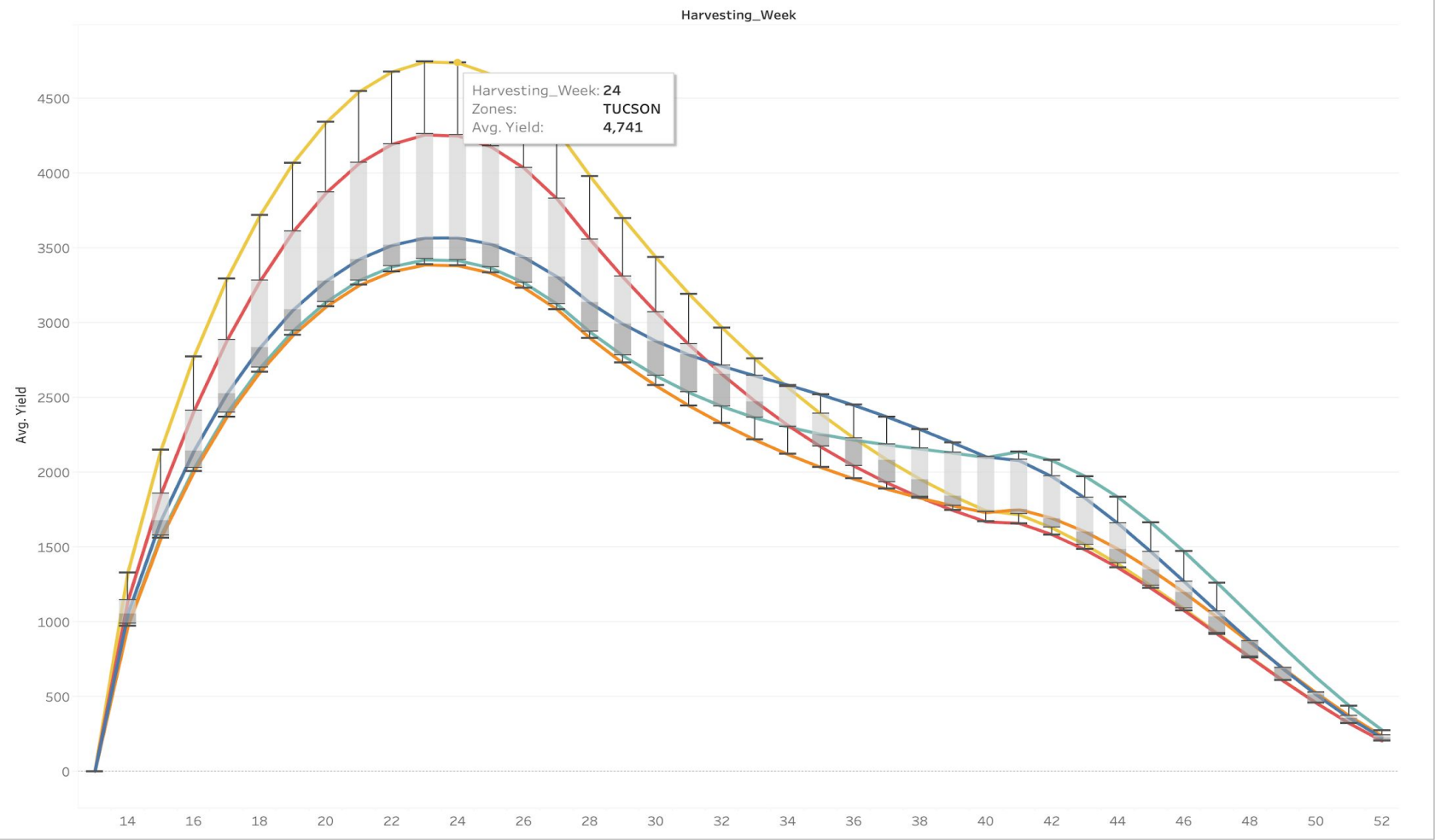
- Crop
- (All)
 - Beans
 - Cauliflower
 - Celery
 - Lettuce
 - Pepper
 - Tomato



Expected yields vs Cities

- This graph depicts the amount of produce in different cities in different harvesting weeks.
- As we can see that Tucson has the maximum produce with a huge variation in the production of cauliflower with respect to other cities.

Yield vs Zones



Zones

- (All)
- ALBUQUERQUE
- Gallegos
- PHOENIX
- SANTA FE
- TUCSON

Crop

- (All)
- Beans
- Cauliflower
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- Lettuce
- Pepper
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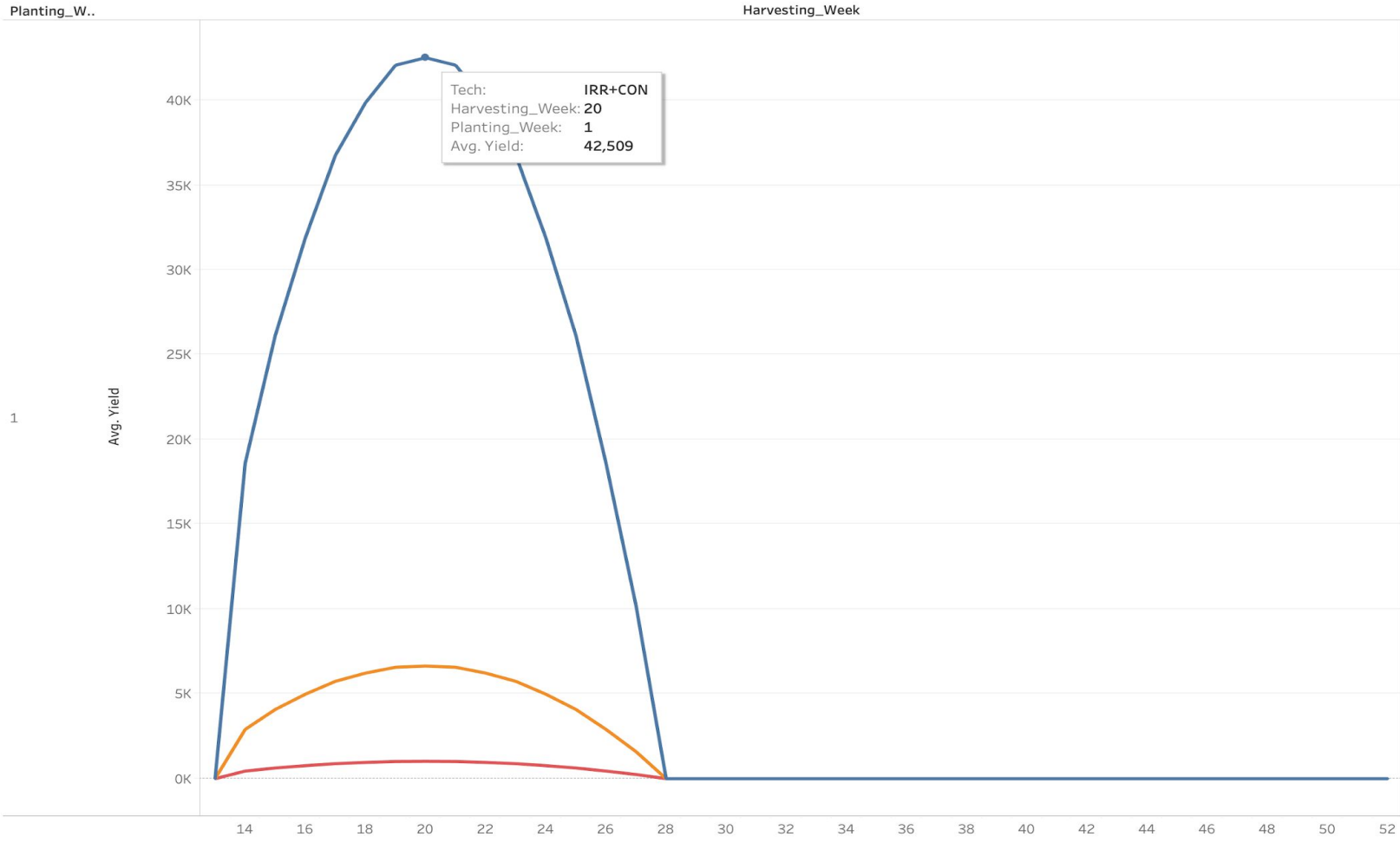
Zones

- ALBUQUERQUE
- Gallegos
- PHOENIX
- SANTA FE
- TUCSON

Yield comparison on different farming methods

- This graphs depicting the variation of yield using different technologies.
- As we can see that the produce(Celery) is up by 7 times when controlled irrigation technology is used, when compared to greenhouse.

Planning on Yield



- Crop
- (All)
 - Beans
 - Cauliflower
 - Celery
 - Lettuce
 - Pepper
 - Tomato

Future Work

- Other factors need to be considered like rainfall, amount of water supply, kind of irrigation(eg: open field, green house, controlled)

Sources of Datasets

- **NOAA**
 - Minimum and maximum temperatures and precipitation
- **USDA**
 - Crop prices, transportation costs