

Vegetable Demand and Greenhouse Cost Park County, Colorado

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PROJECT INTRODUCTION

- Park County is over 2200 square miles with a population of less than 18,000.
- The majority of that is rough mountainous terrain, with little land able to be effectively cultivated for agriculture.
- Much of Park County's land is used for livestock ranching.
- Roads in and out are steep, narrow, and frequently affected by severe weather.
- All of this means that fresh produce is hard to come by; once it can be shipped to the county's single grocery, high prices, freshness and lack of variety tend to be an issue.
- This has an affect on the diet and health of residents.
- In order to address this issue, the Park County government is considering building one or more production focused greenhouses to get fresh produce to the residents of park county as well as foster community support and wellness.
- My job was to do a cost benefit analysis.

APPLICATION TO EDUCATION

- I wanted to do this internship because I hoped to get some field experience designing, administering, and analyzing the data from a consumer survey to help solve a community resource problem.
- I had the incredible opportunity to work alongside and learn from highly educated and experienced professionals in the interconnected fields of resource economics and greenhouse horticulture.
- Functioned as a real life application of many of the principles I've learned in economics; travel costs, WTP, survey design, cost estimation, cost benefit analysis, etc.
- I've learned that I enjoy working with economics outside a classroom setting as much as I do in a classroom setting, however in terms of my overall goal of helping to solve resource problems I found this to be a very hands off approach. I'd like to explore a more hands on approach as well.
- Possibly because of COVID, but I really felt like the majority of the work I did on my own. While this was excellent for my confidence to successfully apply the concepts I had learned to real life work independently, I felt as though I wasn't able to learn as much as I could have had this experience been more hands on.

WHAT YOU DID

- US Census demographic analysis to define market
- Travel cost calculations to determine optimal drop of locations (gas cost + opportunity cost)
- Interpreted nationwide vegetable demand data at a local level
- Visited each town of Park County
- Determined types of produce that are reasonable and cost effective to grow in a production focused greenhouse given Park County's climate limitations
- Designed, tested, and administered an online and paper consumer survey to the residents of park county
 - To determine local demand for types of produce
 - To determine where/how park country residents buy their produce, and how often
 - To determine what park county residents look for when purchasing produce
 - To determine a rough willingness to pay estimate for locally grown produce
- Compared demographics of sample population to demographics of county
- Analyzed response data
- Calculated estimated greenhouse costs using USDA Virtual Grower and Cornell CEA cost accounting tools.
- Calculated estimated market penetration based on town populations
- Calculated enterprise budget under 2 different types of greenhouses (tomato greenhouse, lettuce greenhouse), 3 different cost scenarios for each, and 6 different market size scenarios for each cost; a total of 36 scenarios
- Analyzed 36 cost/benefit scenarios to determine optimal greenhouse size and production
- Finalized recommendations for Park County board.

WHAT YOU LEARNED

- I learned that there was an overwhelmingly positive response to the idea of locally grown produce from a product aspect and a community support aspect.
- I learned some of the things that work in a consumer survey and some of the things that don't.
- I learned that appropriately and succinctly conveying the message and end-goal of the survey is essential to getting quality responses.
- I learned how to do rough greenhouse cost estimation given the tools at my disposal.
- I learned how to successfully communicate ideas between different stakeholders

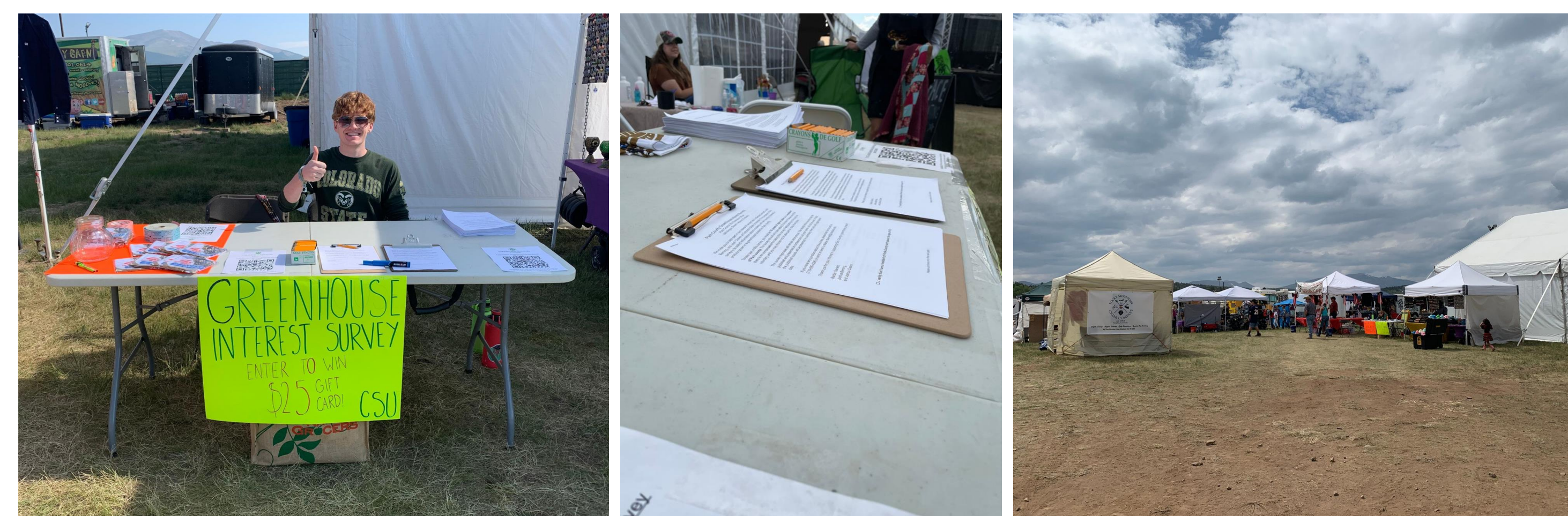
Final Scenarios

Top 5 vegetables RANKED	Importance - Purchasing produce						WTP		
	Cost	Freshness	Organic	Shelf life	Pre-packaged	Locally grown			
Tomatoes	69.8%	Not important	4.4%	0.0%	24.4%	4.5%	69.77%	6.7%	
Onions	60.5%	Slightly important	16.6%	2.2%	22.2%	18.2%	16.3%	4.4%	Yes/Yes (20%)
Lettuce	58.1%	Moderately Impor	46.7%	6.7%	20.0%	34.1%	4.7%	35.6%	Yes/No (10%)
Cucumbers	46.5%	Very important	13.3%	40.0%	11.1%	31.8%	4.7%	24.4%	
Spinach	37.2%	Extremely import	20.0%	51.1%	22.2%	11.4%	4.7%	28.9%	
Broccoli	34.9%								
Bell peppers	32.6%								
Strawberries	32.6%								
Spicy peppers	30.2%								
Carrots	30.2%								
Kale	20.9%								
Celery	16.3%								
Squash	14.0%								
Cabbage	9.3%								
Other	8.9%								
Basil	7.0%								
Bok Choy	4.7%								
Collard greens	4.7%								
Mint	2.3%								
Rosemary	2.2%								
Baby Dill	2.2%								
Chives	0.0%								
Parsley	0.0%								

Fairplay	% population	number of people		TOMATOES		LETTUCE	
		0.5	2,537	% buying	number buying	% buying	number buying
			1269	69.8%	885	58.1%	737
	0.35	2,537	888	69.8%	620	58.1%	516
	0.25	2,537	634	69.8%	443	58.1%	368
	0.125	2,537	317	69.8%	221	58.1%	184
	0.0625	2,537	159	69.8%	111	58.1%	92

	Wholesale lettuce (\$0.90/head)			
	given by spreadsheet		given by virtual grower	
	Revenue	Variable Costs	Additional Costs	Net
High demand (no delivery)	\$142,534	\$49,373	\$48,522	\$44,638
High demand (with delivery)	\$213,800	\$71,480	\$69,201	\$73,119
Med demand (no delivery)	\$71,267	\$27,457	\$28,034	\$16,776
Med demand (with delivery)	\$99,782	\$36,207	\$36,175	\$27,400
Low demand (no delivery)	\$34,201	\$15,981	\$16,241	\$1,979
Low demand (with delivery)	\$51,302	\$27,210	\$21,746	\$2,346

Survey Booth at County Fair in Fairplay



NEXT STEPS

- The next steps of this project are to take the feedback from Park County and to create a more grounded cost benefit analysis for the chosen greenhouse scenario based on actual costs instead of estimated costs.
- Some key decisions will have to be made; type of greenhouse (fruiting vs leafy), type of produce, price point, size/annual production, location of sale, number of drop off locations, etc.