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Local Hop Marketing

Establishing and Expanding Local Beer Value Chains

Aaron J. Staples
PhD Candidate
Agricultural, Food, and Resource Economics
Michigan State University
@aaronjstaples
staple71@msu.edu

Roadmap

01

Introduction

- The craft beer revolution
- America's hop industry
- Diversification of hop type and hop origin
- Local hopyards and their many challenges

02

Hopping Local

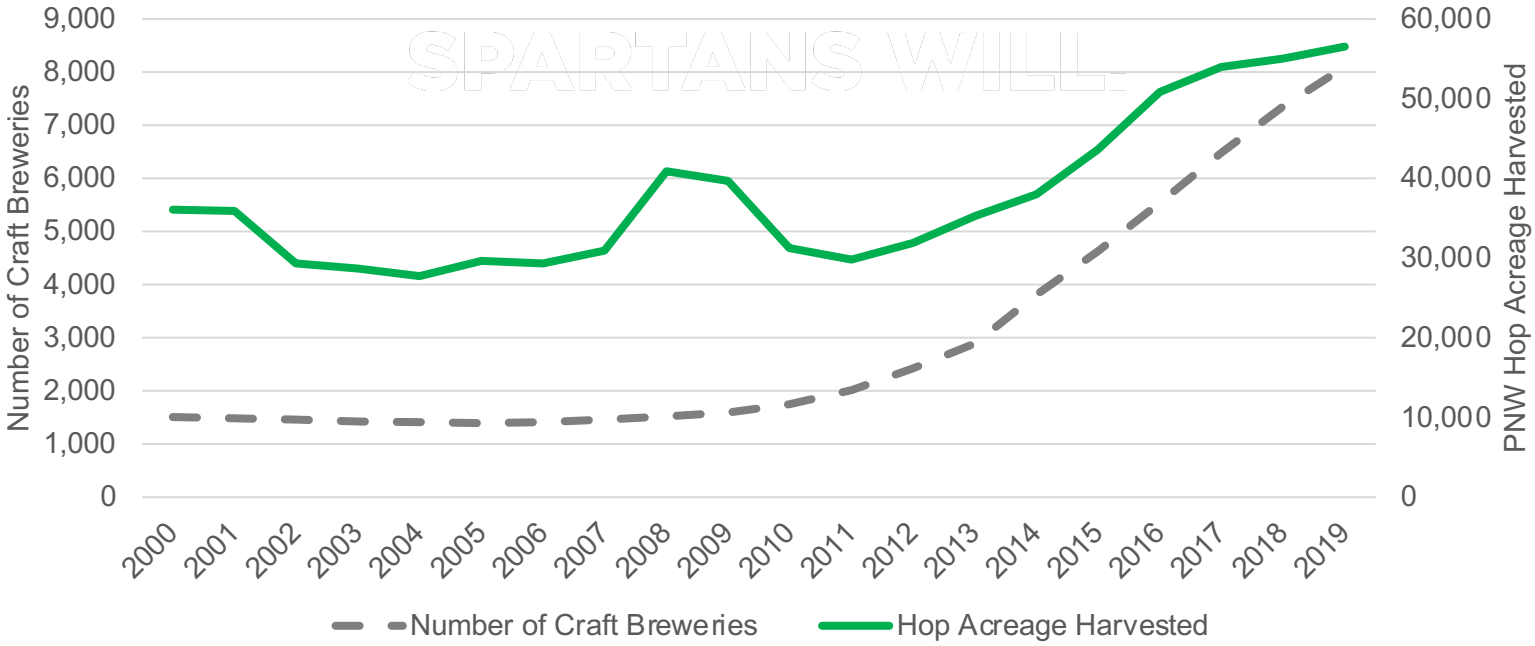
- What drives a brewer's decision to purchase local hops?
- Perceived consistency is key
- What opportunities exist for local hops?

03

Untapping Terroir

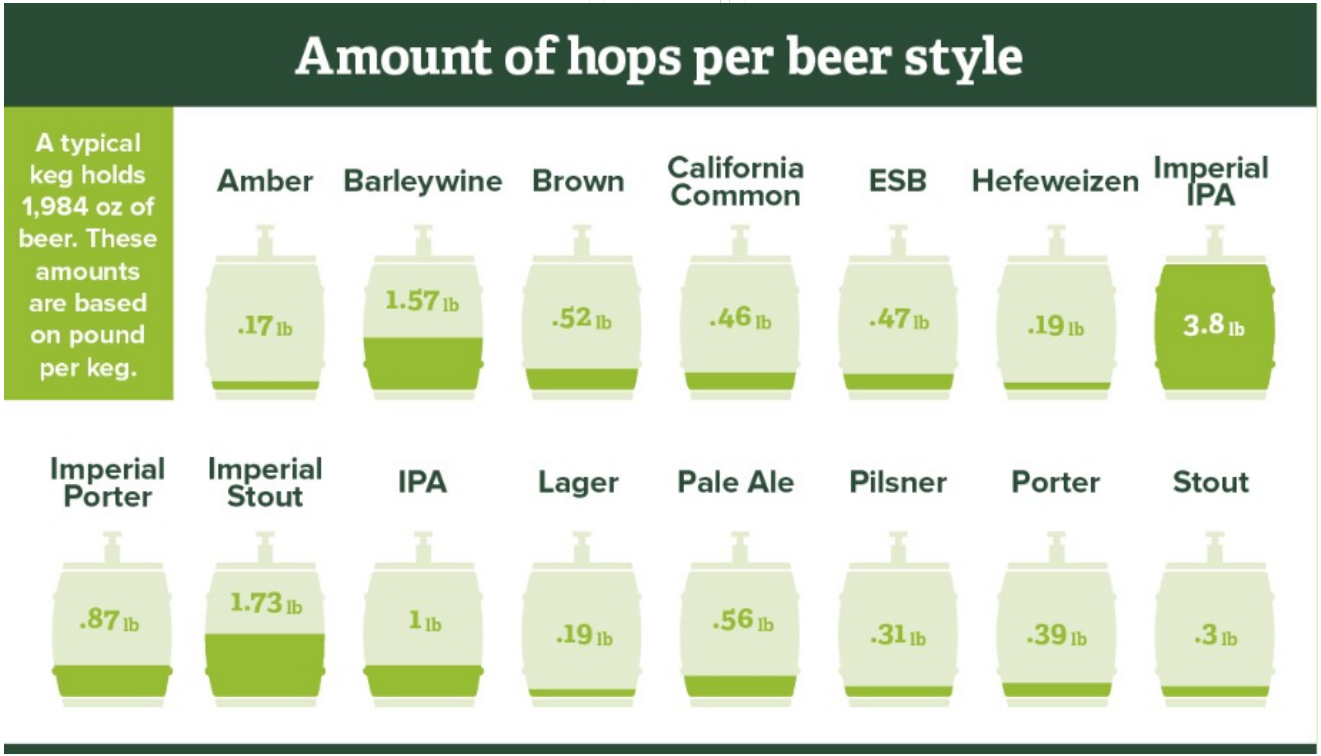
- Biophysical side of terroir: chemical analyses and blind taste tests
- Marketing side of terroir: brewer valuation, consumer preference, nested names

Hop production is driven by the craft beer revolution



Sources: Brewers Association (2020); Hop Growers of America (2020)

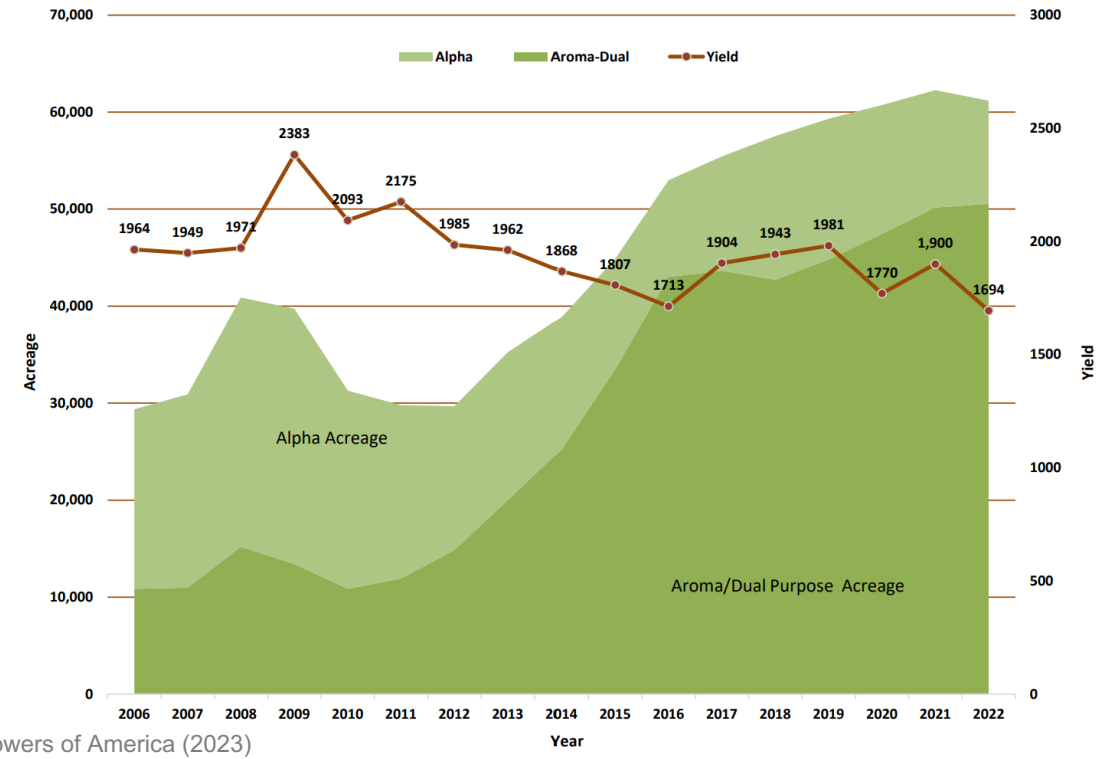
Hop production is driven by the craft beer revolution



Sources: Hop Growers of America (2020)

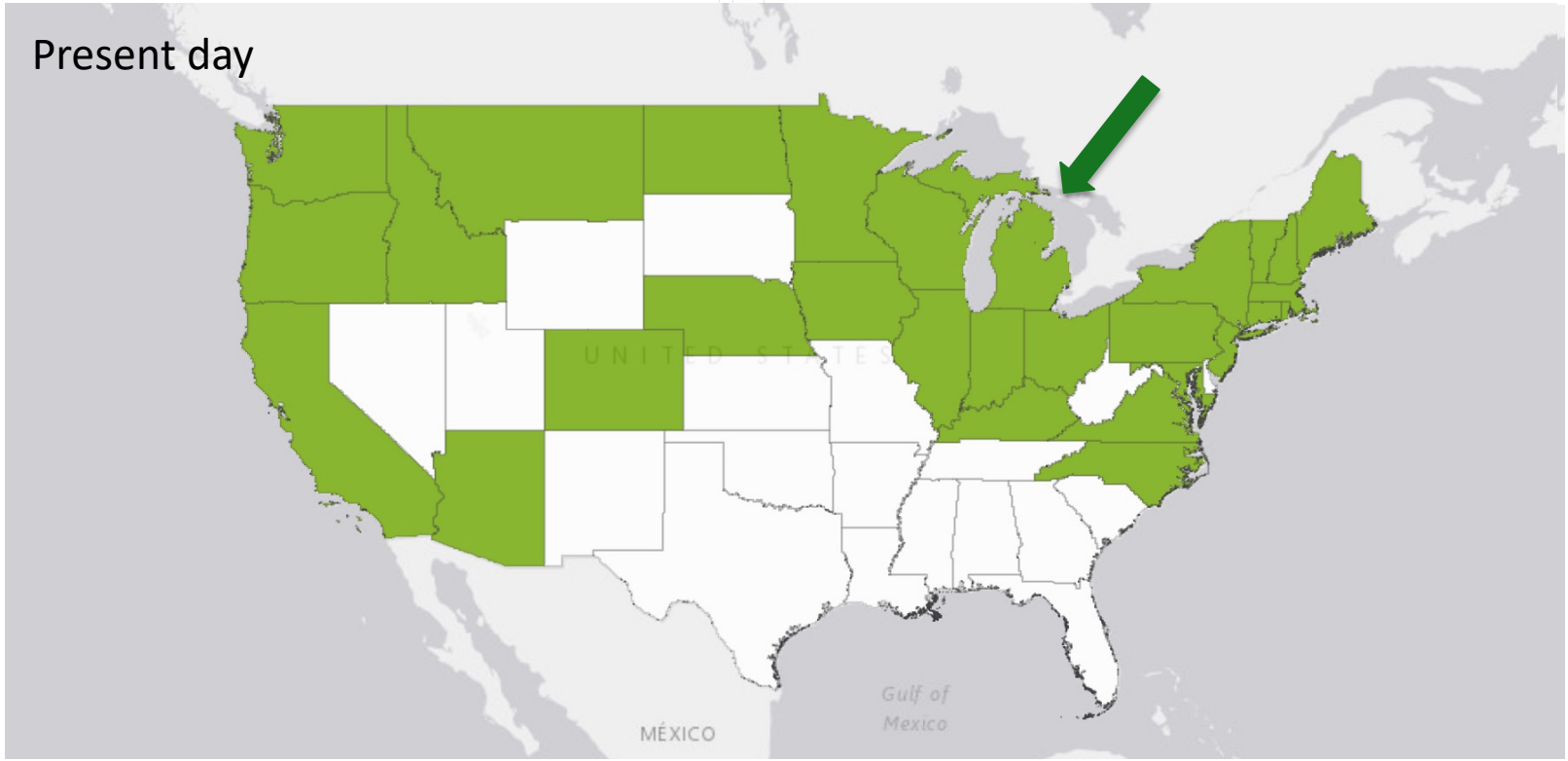
Hop production is driven by the craft beer revolution

U.S. HOP ACREAGE – AROMA/DUAL PURPOSE VS. ALPHA



Source: Hop Growers of America (2023)

Hop production is becoming more regionally diverse



Preference for local: 80% of adults live within 10 miles of a brewery

Local value chains can:

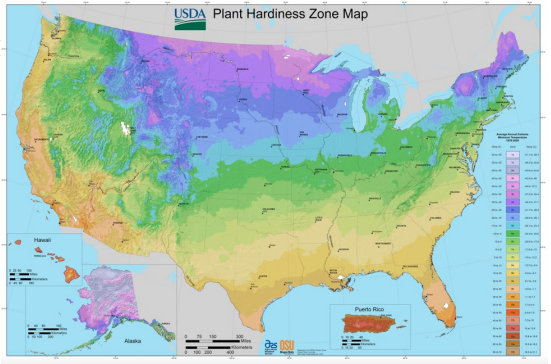
1. Increase consumer satisfaction
2. Diversify a farmer's revenue stream
3. Boost local economies

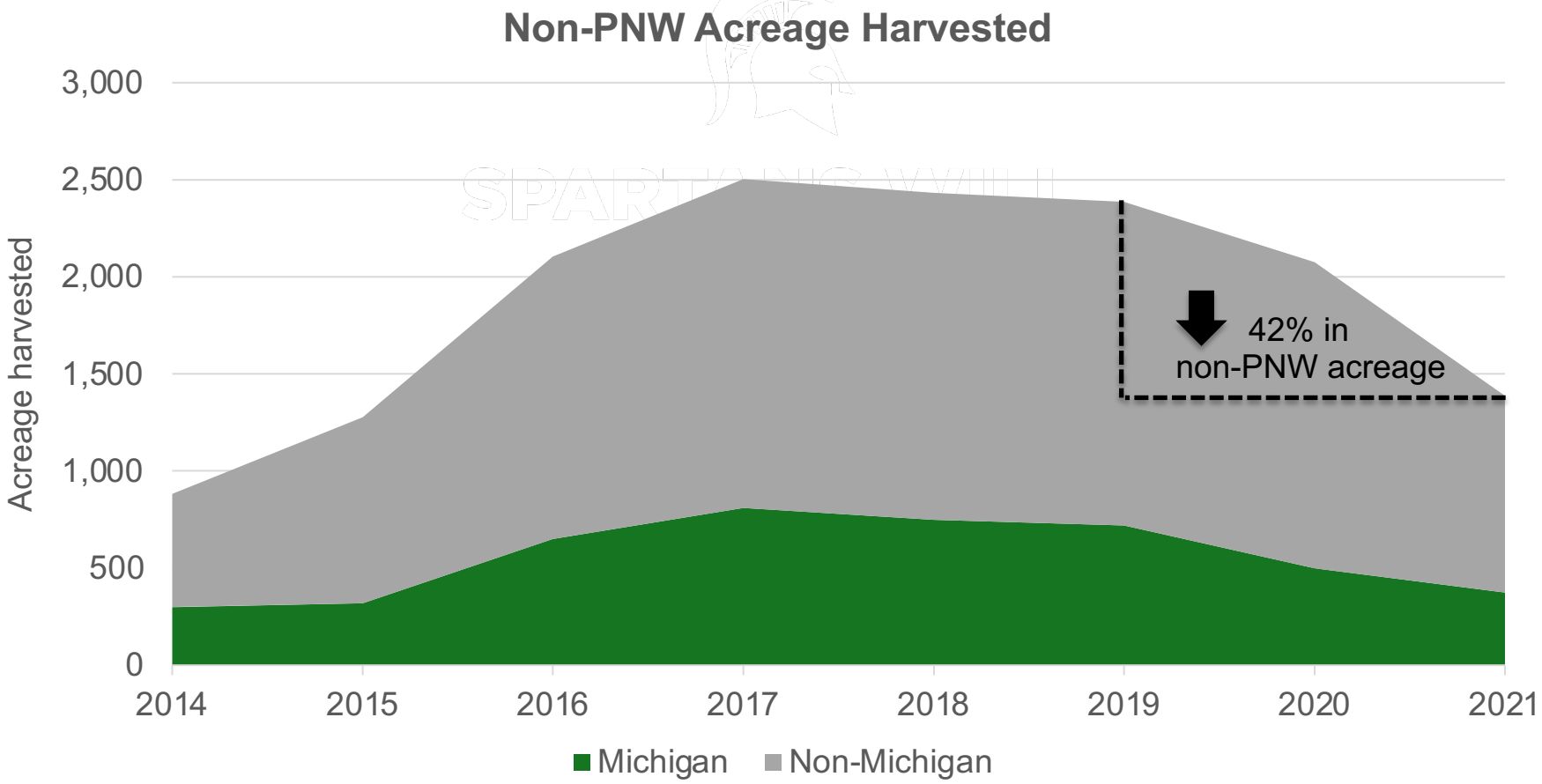
"The Michigan craft beer industry alone generated nearly $500 million in gross state product in 2016, contributing nearly $1 billion and 9,738 jobs to the state's economy."

– Miller et al. (2019)

Growing pains for hop growers outside PNW

- Higher production costs
- Crop insurance policies
- Lack of access to proprietary hops
- Pests and disease
- Sub-optimal growing conditions
- Forward contracts
- COVID-19 pandemic




Non-PNW Acreage Harvested
3,000
2,500
2,000
1,500
1,000
500
0
Acreage harvested
2014
2015
2016
2017
2018
2019
2020
2021
42% in
non-PNW acreage
Michigan
Non-Michigan

Who is the real consumer of hops?

- Beer drinkers are drinking the beer and they may be willing to pay a premium for local inputs
- But the brewery ultimately makes the decision about whether to purchase locally or not
- **Research question: What drives a brewery's decision to purchase state-grown hops?**

Survey to Michigan craft breweries

Ask about:

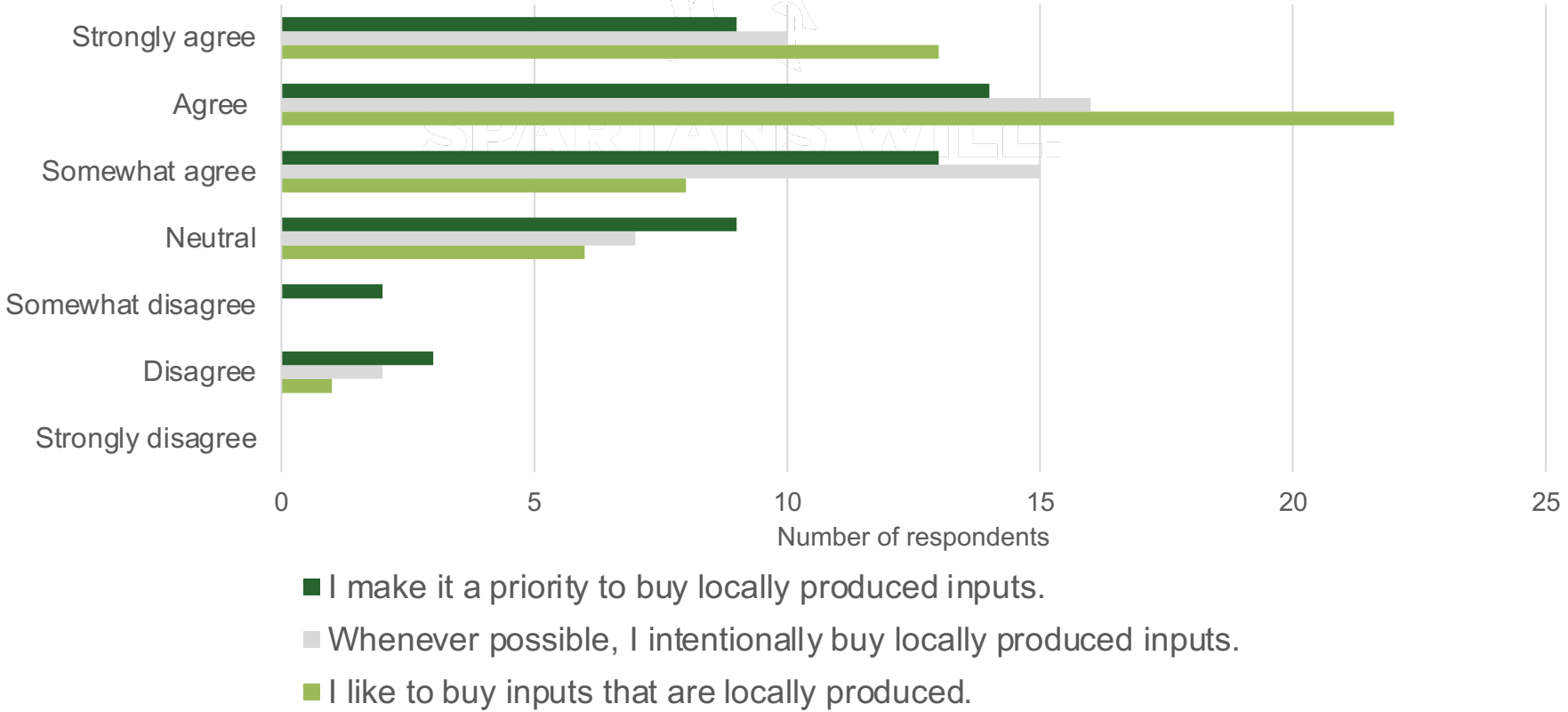
- Hop purchasing decisions
- Brewery characteristics
- Preferences for localness

Analyze survey responses to predict what drives a brewery's decision to purchase state-grown hops.

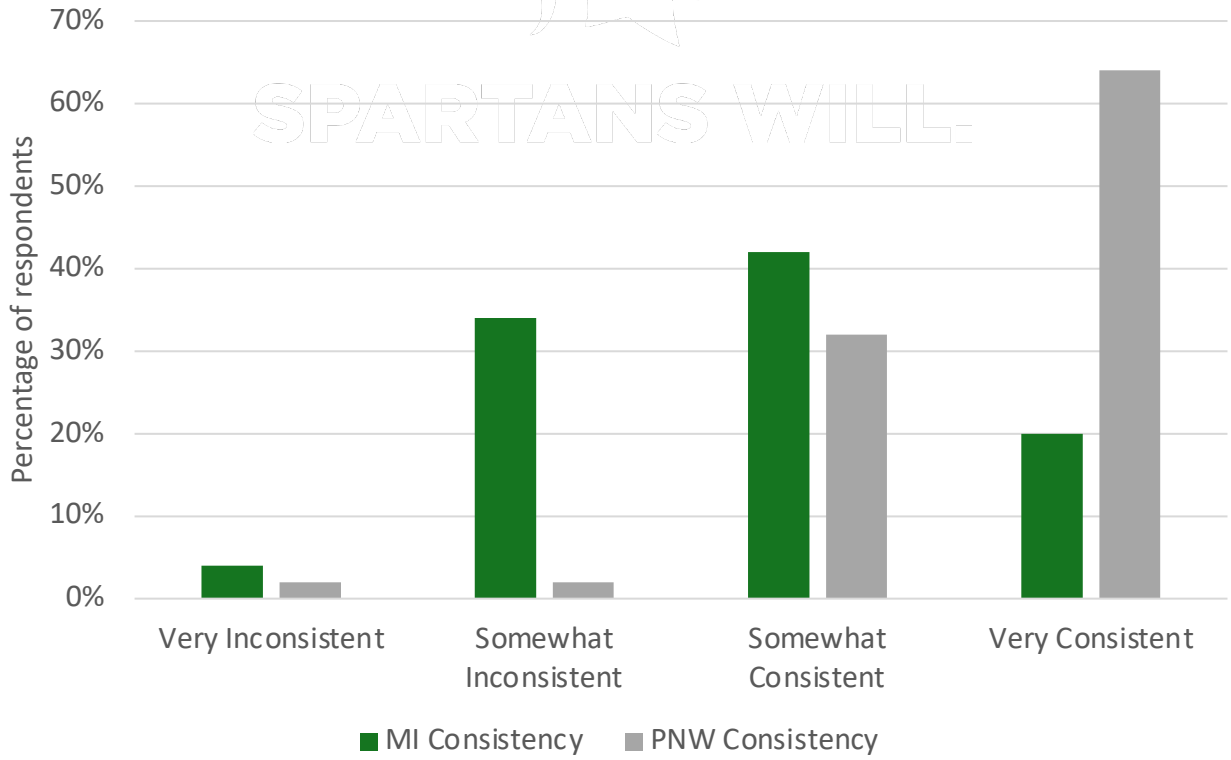
MICHIGAN
THE GREAT BEER STATE

MSU Extension

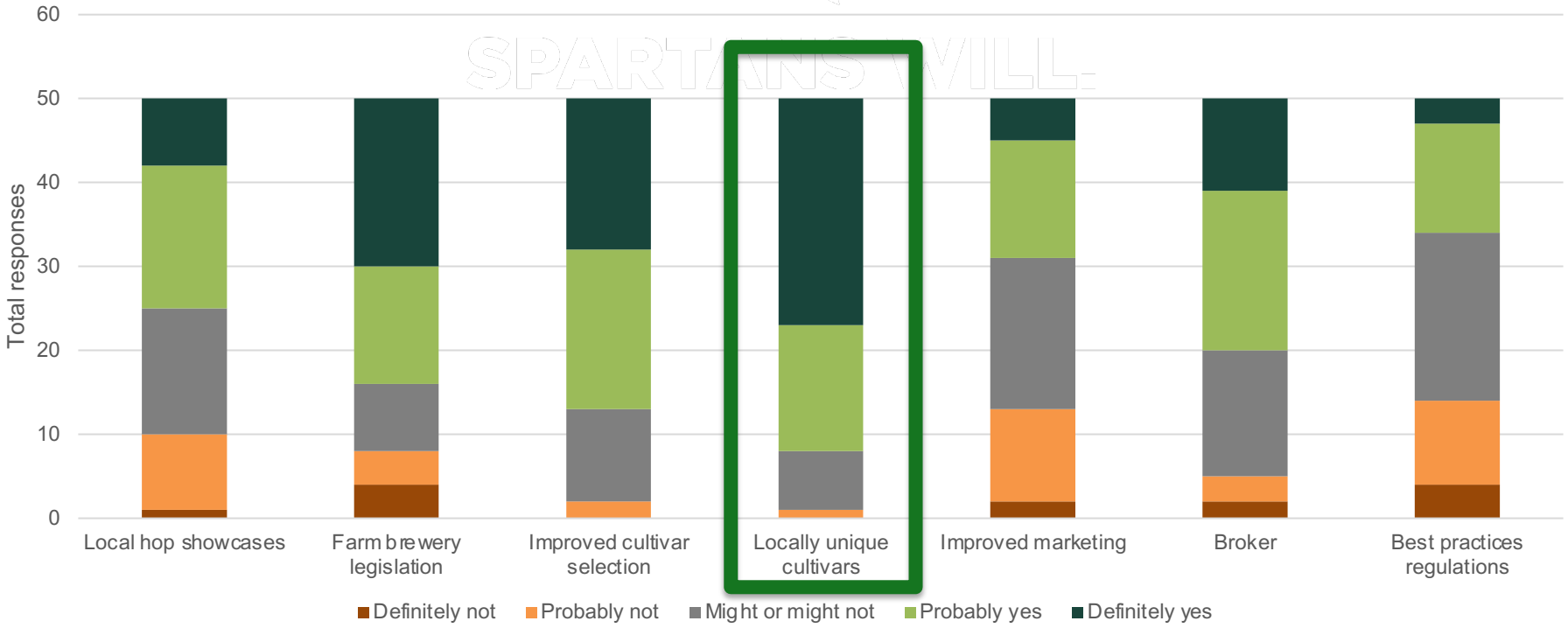
Brewers enjoy purchasing local (n=50)



Perceived consistency of Michigan v. PNW hops (n=50)



Would the following initiatives incentive you to use more local hops?



Unique cultivar selection

Developing local proprietary hops

Michigan Copper™

Unique cultivar selection

- Regional beer identities
- **Terroir:** tastes and flavors are a product of the environment from which a commodity is produced
- Studied extensively in grapes and wine but less so in hops and beer
- Could provide hop growers (and brewers) outside the traditional growing regions with a unique marketing avenue

Photo credits: Vivino (2020); Firestone Walker (2019)

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Untapping Terroir

Experimental Evidence of Regional Variation in Hop Flavor Profiles

Aaron J. Staples, Rob Sirrine, Alex Adams, Alec Mull, Scott Stuhr, and Trey Malone

Aaron J. Staples
PhD Candidate
Agricultural, Food, and Resource Economics
Michigan State University
@aaronjstaples

The Two Sides of Terroir

Biophysical

Marketing

Methodology: Multi-dimensional, exploratory analysis

Purchased four Chinook hop samples from various regions

- Two from the Pacific Northwest
  - One from Washington
  - One from Oregon
- Two from Michigan
  - One from Northwest Michigan
  - One from East Michigan

Why Chinook?

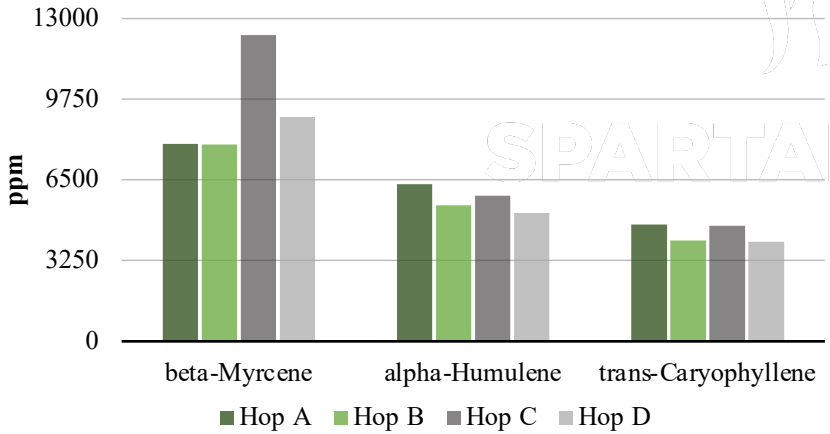
- 4th most planted public variety in the Pacific Northwest
- MI Chinook Cup

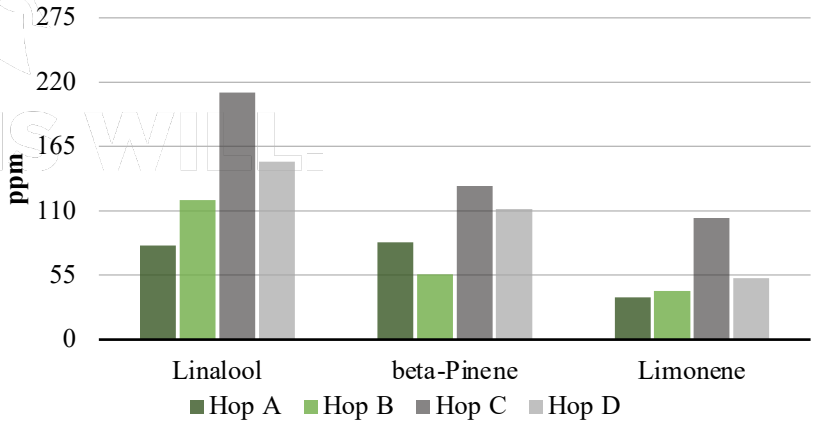
Photo credits: MSU CANR (2020)

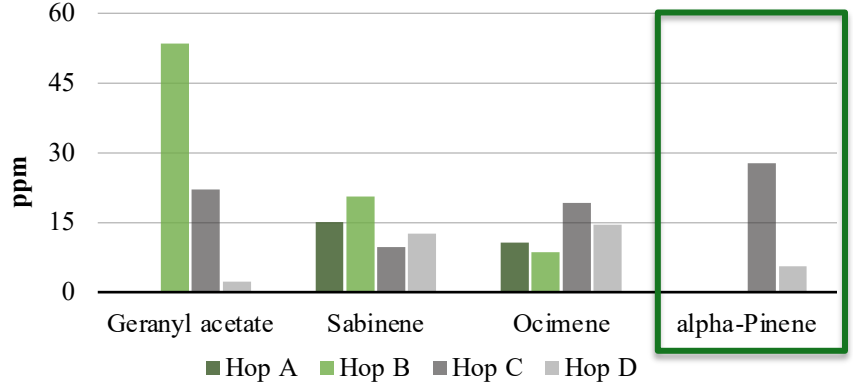
Methodology: Purchase four Chinook hop samples from four different eco-regions

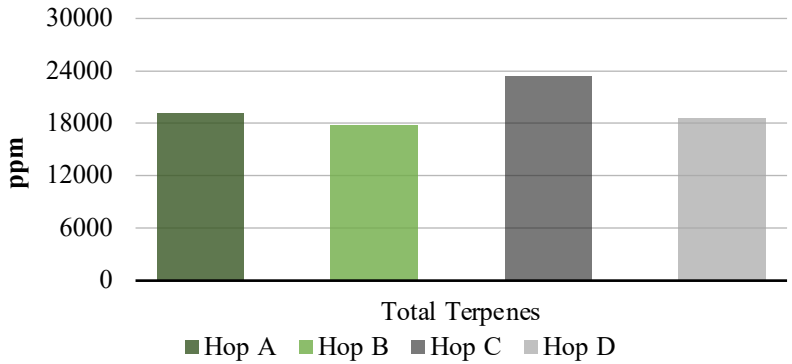
1. Chemical analysis
   - Professional tests examining hop terpenes, fruity esters, and secondary microbes
2. Blind taste test with sensory panel
   - Brew a 5 bbl baseline beer
   - Separate into smaller fermenters and *dry hop* with the hops from different regions
3. Hypothetical economic experiment
   - Brewer willingness to pay for local hops
   - Data collected in 2019 from 74 craft breweries

1. Chemical analysis: Terpene analysis









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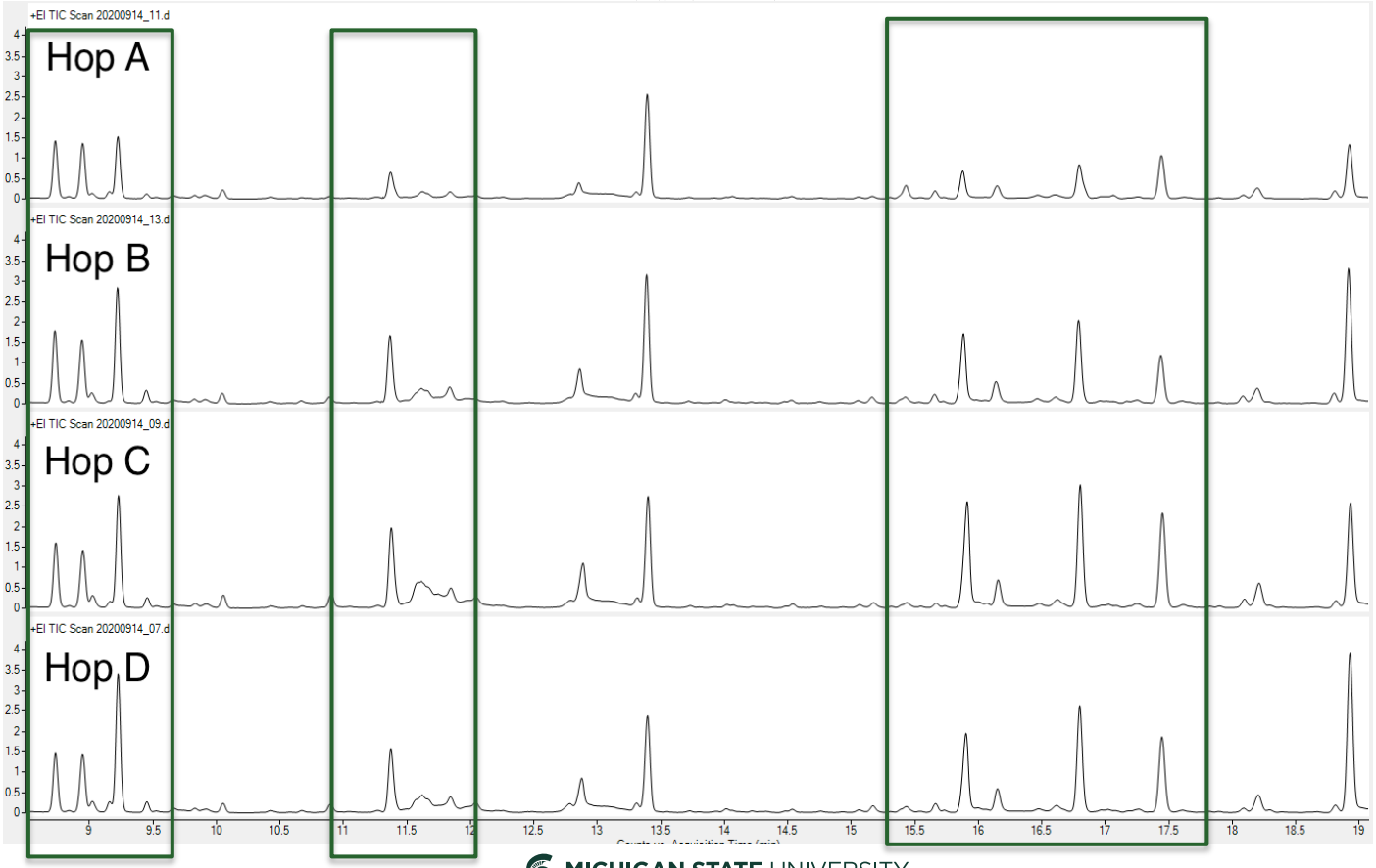
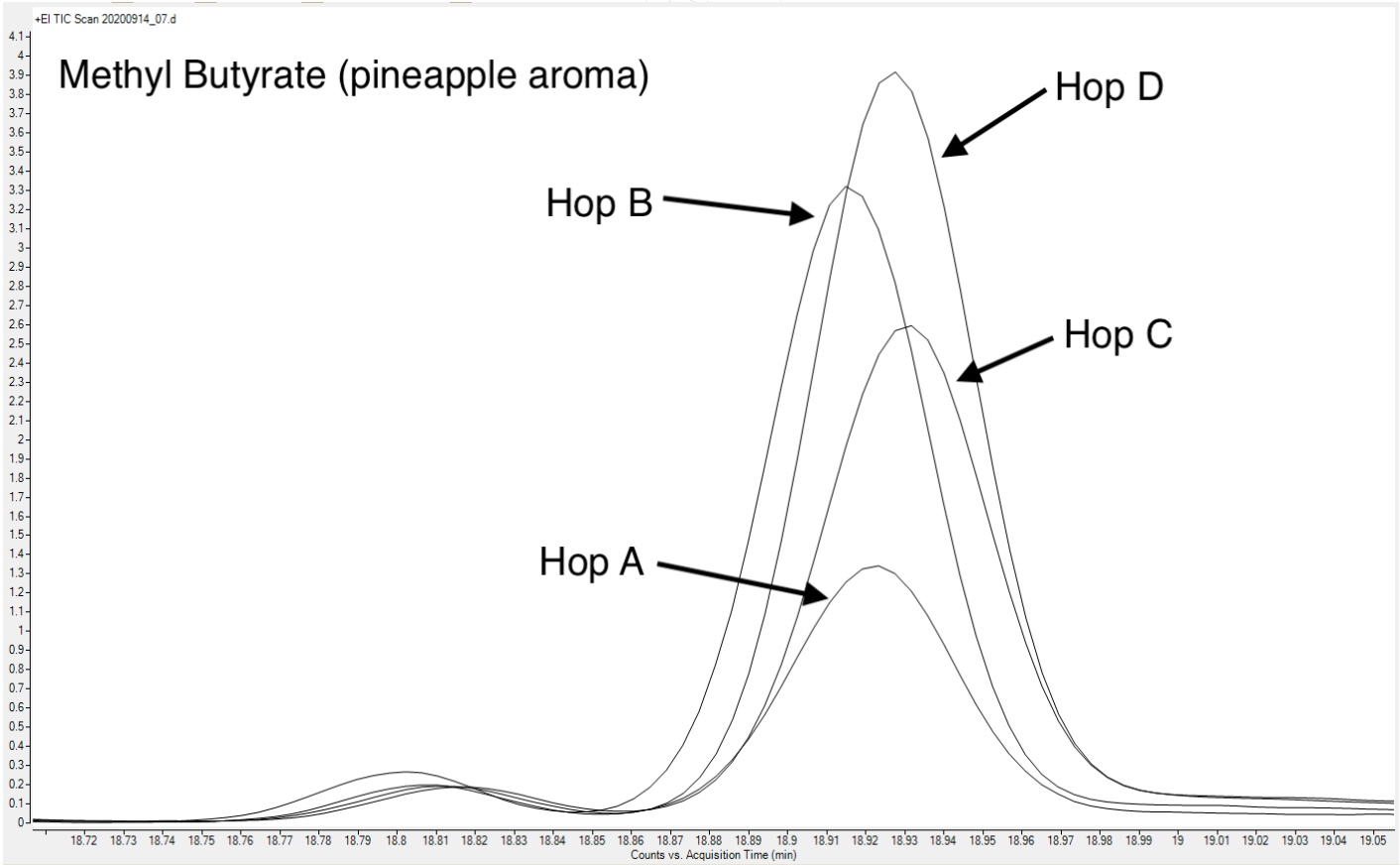
1. Chemical analysis: Unknowns analysis



1. Chemical analysis: Unknowns analysis



2. Blind taste test

- 5-barrel *baseline* beer
  - 95% Wayermann pale and 5% Simpsons Crystal light
  - 45 oz PNW Cascade at 7.2% alpha
- Fermentation, 001 yeast from White labs California Ale
  - 10 days at 67°F then down to 50°F
  - Fined with Biofine on day 12 and moved on day 14
- Transferred to 4, 1 bbl fermenters and dry-hopped Chinook 16 oz./bbl for 72 hours
  - Moved 50 degrees beer to walk-in cooler
  - Cooled to 34°F over the course of 1.5 days
- 5% ABV, 40 IBU

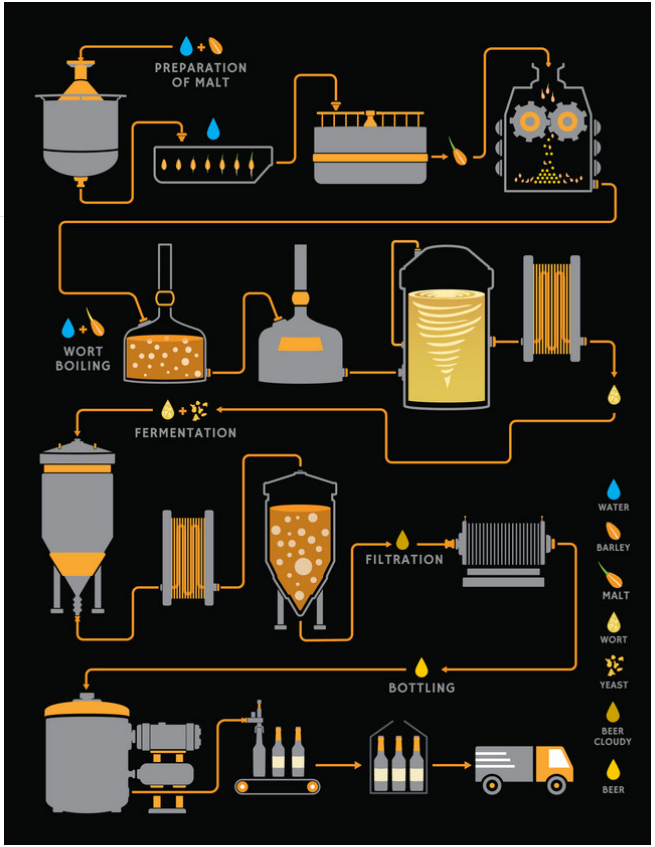


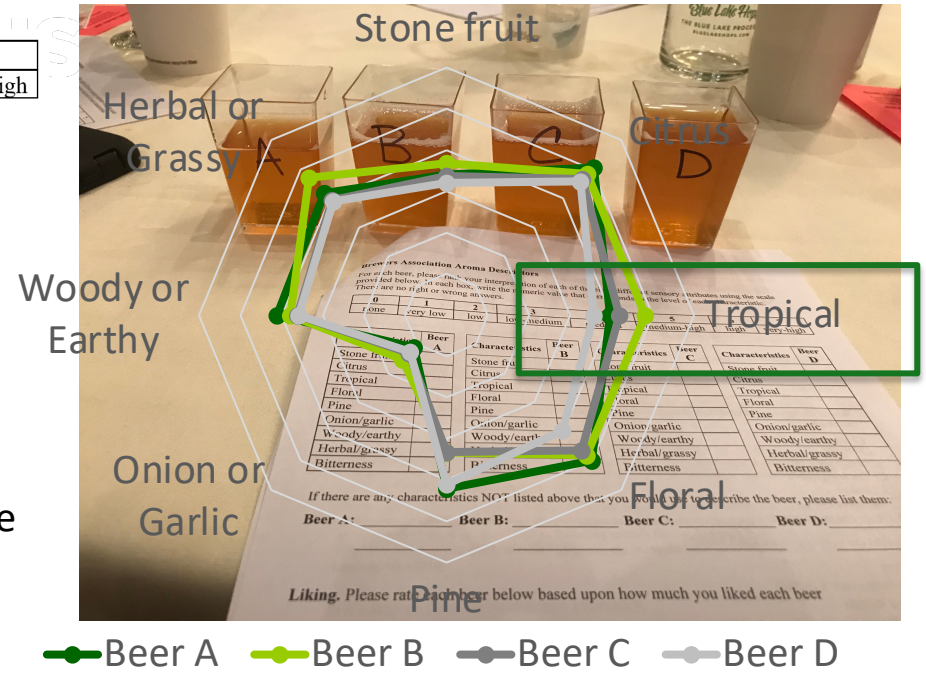
Photo credits: VectorStock (2020)

2. Blind taste test (n=55)

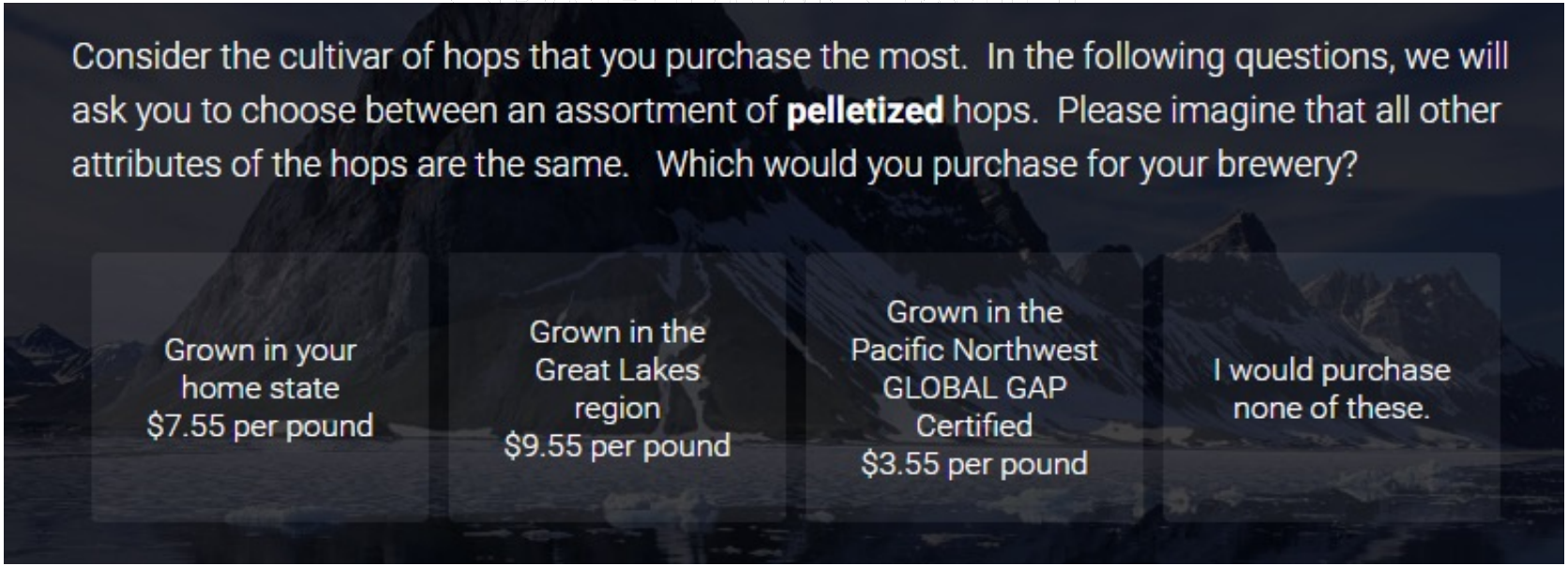
0	1	2	3	4	5	6	7
none	very low	low	low-medium	medium	medium-high	high	very high

Aroma characteristics	Beer A	Beer B	Beer C	Beer D
Stone fruit				
Citrus				
Tropical				
Floral				
Pine				
Onion/garlic				
Woody/earthy				
Herbal/grassy				
Bitterness				

Beer career industry professionals rated the presence of various sensory attributes in the four beers



3. Economic experiment (n = 74 craft brewers)



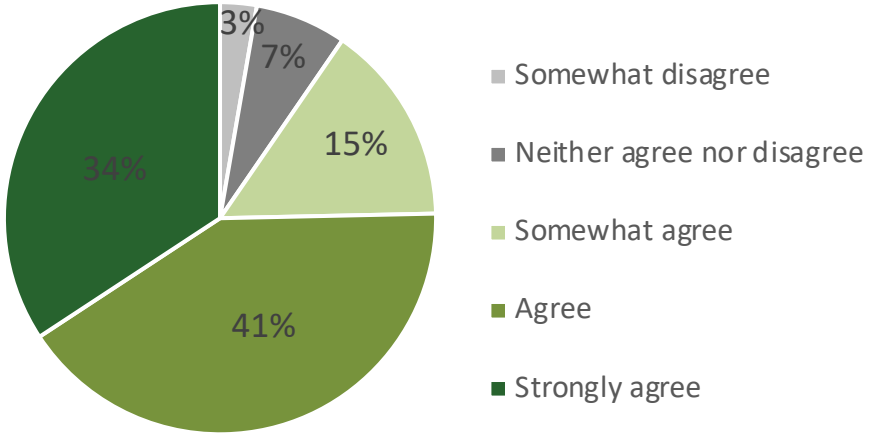
3. Economic experiment: Results

Holding all else constant, craft brewers are willing to pay 35% more for state-grown hops

What is driving this premium?

1. Brewer preference for localness
2. Expectation that consumers are willing to pay premium on beers using local hops
3. Perception that local hops taste different than non-local hops

To what extent do you agree or disagree with the following statement: Local hops taste different than non-local hops. (n=74 craft brewers)



Marketing

Nested Names in Wine

Chardonnay

White wine, dry, medium/full body… but what about flavors?

California Chardonnay

“Lemon zest and chalky minerality to baked apple and tropical fruits like pineapple” (Wine Mag)

Burgundy Chardonnay

“Meyer lemon, golden apple, golden pear, quince, and yellow plum. There's also usually a fresh, earthy aroma of white button mushroom or truffle” (Wine Folly)

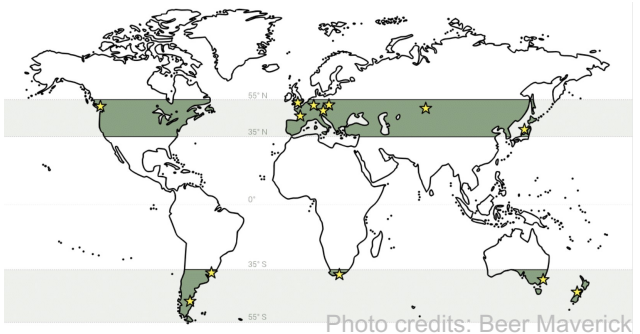


Photo credits: Beer Maverick

Marketing

Product Differentiation & Value-Added

Mitten Brewing Company

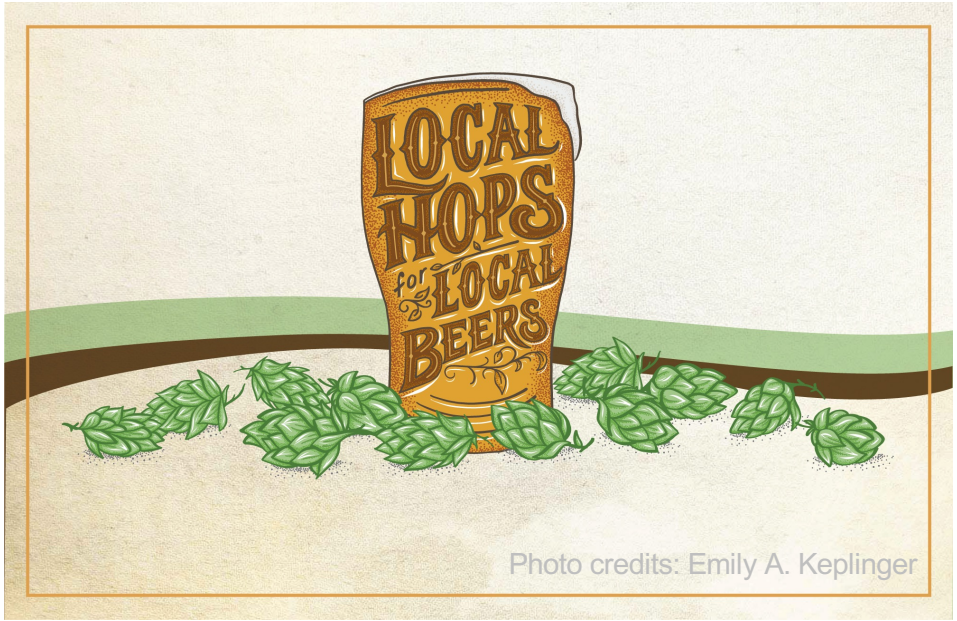


Photo credits: Emily A. Keplinger

Marketing

- Craft brewers are searching for ways to differentiate their product
- Hop growers are searching for ways to overcome production and marketing challenges
- BUT!!! You cannot sacrifice quality or consistency for localness

Localness
X Terroir
A Story

Main takeaways

1. **A changing hop landscape**: America's hop industry has diversified in the past decade, including an expansion in acreage, switch from alpha to aroma varieties, and a shift in geographical production
2. **Hop consistency is key:** One of the leading factors of brewery purchasing decisions is their perceived consistency of state-grown hops
3. **Marketing terroir:** Regional beer identities could play a larger role in hop marketing, particularly as more research on the topic becomes available

Interested in learning more?

Hopping on the Localness Craze

Untapping Beer & Hop Terroir

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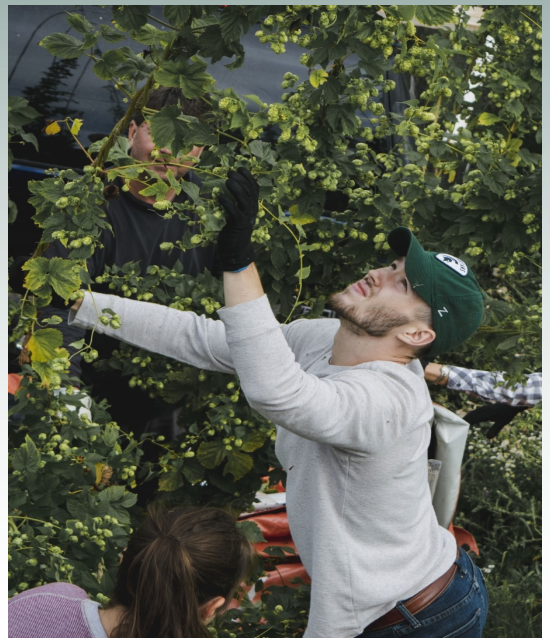
Cheers!

Aaron J. Staples
PhD Candidate
Agricultural, Food, & Resource Economics
Michigan State University
staple71@msu.edu
aaronjstaples.com
@aaronjstaples



Appendix: Propensity to buy local and beliefs about local scales

Statement	Mean Score (1-7)	Percentage of responses: Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neutral (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
Propensity to buy locally produced inputs								
I like to buy inputs that are locally produced.	5.78	0%	2%	0%	12%	16%	44%	26%
Whenever possible, I intentionally buy locally produced inputs.	5.46	0%	4%	0%	14%	30%	32%	20%
I make it a priority to buy locally produced inputs.	5.20	0%	6%	4%	18%	26%	28%	18%
Beliefs about locally produced inputs								
Buying locally produced inputs is good for the local economy.	6.38	0%	0%	0%	4%	4%	42%	50%
Buying locally produced inputs helps the environment.	5.30	0%	4%	4%	28%	12%	26%	26%
Buying local inputs means more money goes to the farmer.	5.22	0%	4%	4%	26%	16%	32%	18%

Footnotes: Statements were introduced by asking each of the 50 respondents, "To what extent do you agree or disagree with the following statements?"

Appendix: Initiatives to purchase local hops

Table 3. Brewer attitudes regarding the likely success of initiatives incentivizing local purchases

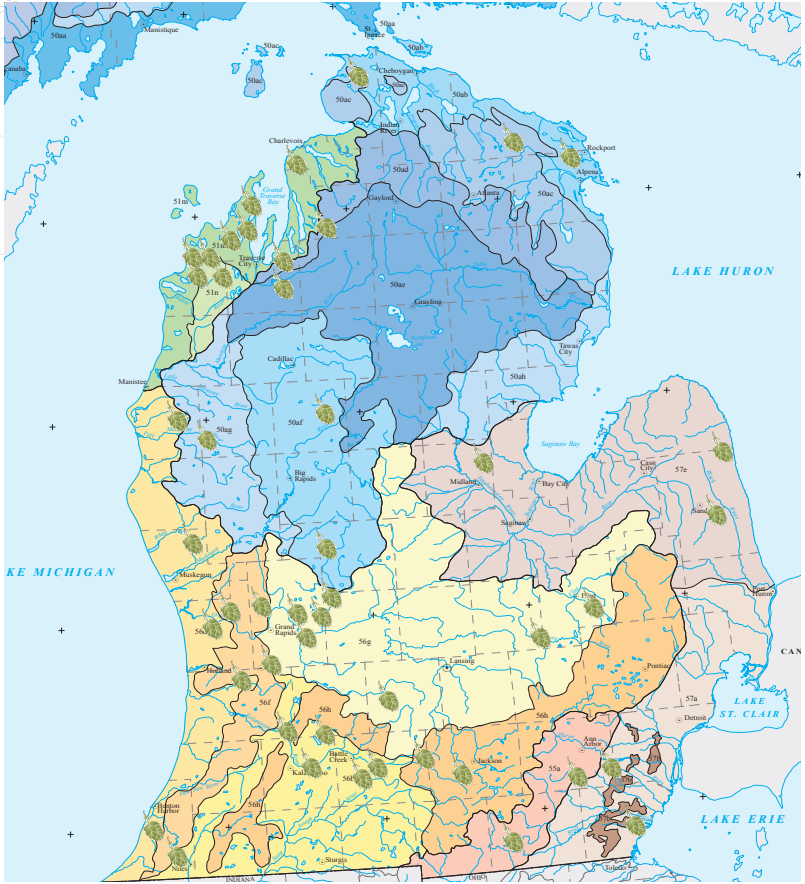
Attitudes towards incentivizing localness	Mean Score (1-5)	Percentage of respondents: Definitely Not (1)	Probably Not (2)	Neutral (3)	Probably Yes (4)	Definitely Yes (5)
A local hop showcase at a major brewer event.	3.44	2%	18%	30%	34%	16%
Farm brewery legislation that incentivizes the use of local ingredients.	3.84	8%	8%	16%	28%	40%
Improved cultivar selection.	4.06	0%	4%	22%	38%	36%
Locally unique cultivars.	4.36	0%	2%	14%	30%	54%
Improved marketing by growers.	3.18	4%	22%	36%	28%	10%
A local grower cooperative that functions as a broker to more cultivars and economies of scale.	3.68	4%	6%	30%	38%	22%
A quality and food safety verification program that emphasizes use of best practices.	3.02	8%	20%	40%	26%	6%

Footnotes: The initiatives were introduced by asking each of the 50 respondents, “Would any of the following help you decide to utilize or increase your use of local hops?”

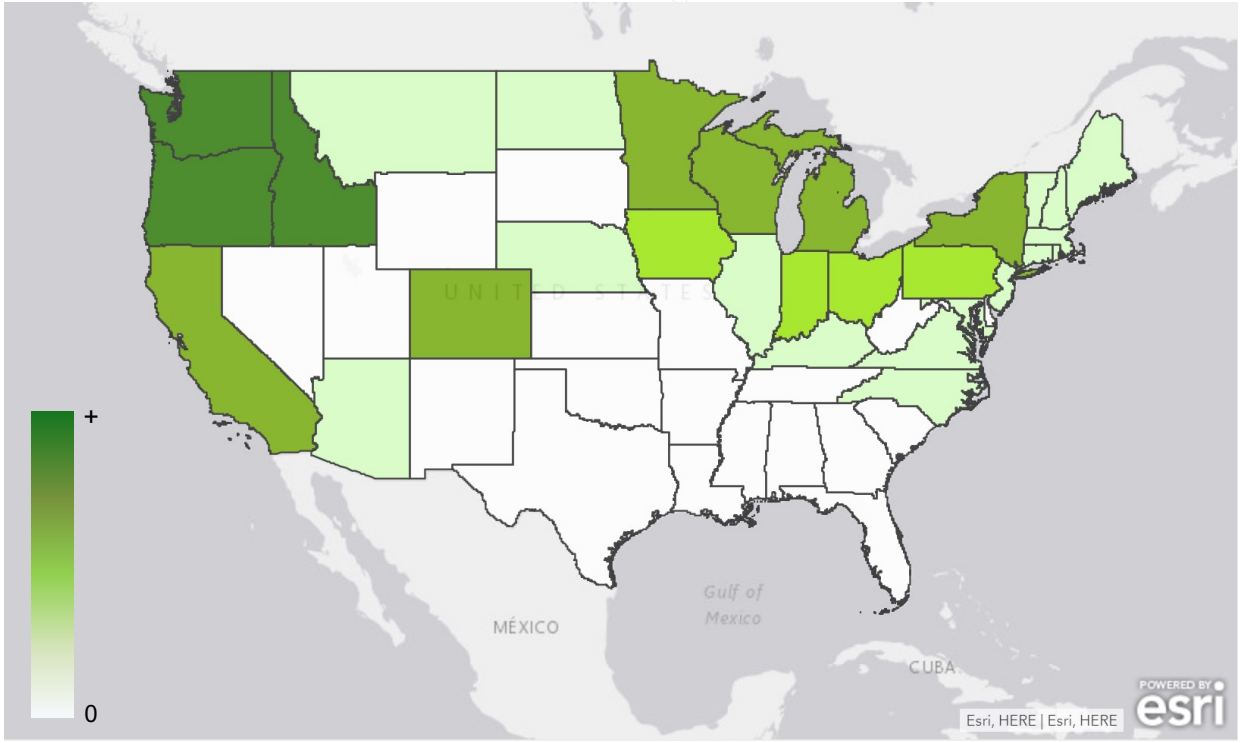
Appendix: MI eco-regions

Locations of MI hop farms in different Level III and IV Eco-Regions

EPA map overlayed with hop farm locations based on personal accounts



Appendix: Hop Acreage



Appendix: Power of Proprietary

Top 10 PNW Hop Varieties by Acreage:

Rank	2015	2016	2017	2018	2019	2020
1	Cascade	Cascade	Cascade	Citra®, HBC 394	Citra®, HBC 394	Citra®, HBC 394
2	CTZ	Centennial	Centennial	CTZ	CTZ	CTZ
3	Centennial	CTZ	Citra®, HBC 394	Cascade	Cascade	Mosaic®, HBC 369
4	Simcoe®, YCR 14	Citra®, HBC 394	CTZ	Centennial	Simcoe®, YCR 14	Simcoe®, YCR 14
5	Citra®, HBC 394	Simcoe®, YCR 14	Simcoe®, YCR 14	Simcoe®, YCR 14	Mosaic®, HBC 369	Cascade
6	Mosaic®, HBC 369	Mosaic®, HBC 369	Mosaic®, HBC 369	Chinook	Centennial	Centennial
7	Chinook	Chinook	Chinook	Mosaic®, HBC 369	Amarillo®, VGXP01	Pahto®, HBC 682
8	Summit	Summit	Willamette	Amarillo®, VGXP01	Chinook	Amarillo®, VGXP01
9	Willamette	Willamette	Summit	Pahto®, HBC 682	Pahto®, HBC 682	Chinook
10	Apollo™	Apollo™	Apollo™	Summit	Summit	El Dorado®

Source: Hop Growers of America (2021). 2020 Statistical Report. *USA Hops*.

Appendix: Results

Variable	QMLE coef. estimate[a] (rbst. std. error)
LogBrewSize	-0.376***
	(0.134)
MIConsistency	0.570***
	(0.214)
StateVarieties	0.209***
	(0.076)
BrewerRecommend	0.163
	(0.115)
PropensityBuyLocal	0.229***
	(0.069)
BeliefsAboutLocal	0.002
	(0.074)
Constant	-5.149***
	(1.536)
Log pseudolikelihood	-19.570
Number of observations	50

[a] Superscript ***, **, and * denotes statistical significance at the 1, 5, and 10 percent level, respectively.

	Marginal effect[a] (delta method std. error)	
Variable	OLS[b] (1)	GLM[c] (2)
LogBrewSize	-0.076***	-0.066***
	(0.025)	(0.023)
MIConsistency	0.097**	0.101***
	(0.042)	(0.038)
StateVarieties	0.040**	0.037***
	(0.017)	(0.013)
BrewerRecommend	0.021	0.029
	(0.019)	(0.020)
PropensityBuyLocal	0.038***	0.040***
	(0.013)	(0.011)
BeliefsAboutLocal	-0.002	0.000
	(0.014)	(0.013)

[a] Superscript ***, **, and * denotes statistical significance at the 1, 5, and 10 percent level, respectively.
[b] OLS R-squared is 0.576. Both OLS and GLM regression analysis accounts for heteroskedasticity using heteroskedasticity robust standard errors.
[c] Marginal effects are calculated at the mean predicted proportion of state hops (*StateHops* = 0.374)

Appendix: Results

Who are the brewers that find MI hops are as consistent as PNW hops?

On average:

- Buy a greater percentage of hops directly from the farm
- Less diverse revenue stream
- Smaller by approximately 400 bbls
- Higher percentage of hops from MI

Variable (%)	MI hops are of equal or greater consistency (Group A)	PNW hops are of greater consistency (Group B)	Combined
Where do you purchase hops?			
Broker	43.06	71.31	61.14
Farmer	38.61	21.75	27.82
Brewer	4.72	1.41	2.60
Third party	10.56	5.53	7.34
Other	3.05	0.00	1.10
Sales from following channels			
Taproom	82.00 [a]	76.74 [b]	78.60 [c]
Local Liquor stores	0.82 [a]	3.26 [b]	2.40 [c]
Grocery stores	2.05 [a]	2.68 [b]	2.45 [c]
Supercenter (e.g., Wal Mart)	0.82 [a]	2.74 [b]	2.06 [c]
Restaurants or bars	14.00 [a]	11.94 [b]	12.67 [c]
National chain	0.29 [a]	1.26 [b]	0.92 [c]
Pharmacy or Corner store	0.00 [a]	0.10 [b]	0.06 [c]
Other	0.00 [a]	1.29 [b]	0.83 [c]
Advertising strategies			
Social media	63.24 [a]	59.22	60.61 [d]
Word of mouth	30.59 [a]	25.59	27.33 [d]
Road signs	3.24 [a]	1.47	2.08 [d]
Local newspaper	2.94 [a]	10.44	7.84 [d]
Other	0.00 [a]	3.28	2.14 [d]
Bbls/year (mean)	1,369	1,726	1,598
Proportion of state hops to total hops (mean)	48.56	31.15	37.42
Number of observations	18	32	50

Footnotes: The number of observations for superscript *a* equals 17.
The number of observations for superscript *b* equals 31.
The number of observations for superscript *c* equals 48
The number of observations for superscript *d* equals 49

Appendix: Local hops and hopping rate

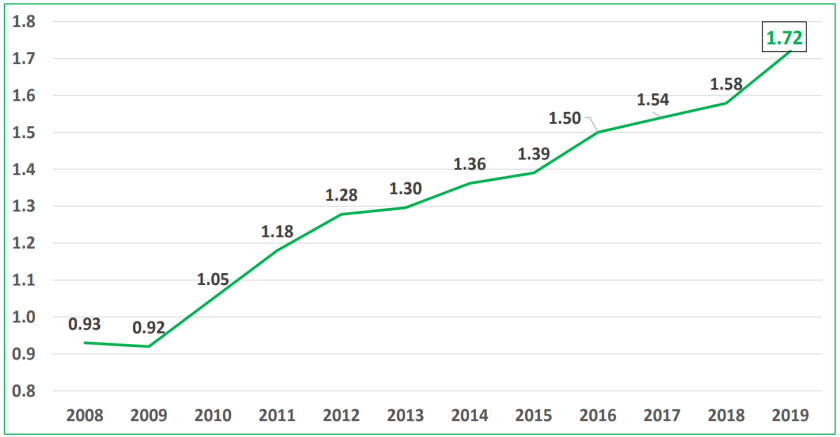
The Role of Craft Breweries in Expanding (Local) Hop Production

Elizabeth A. Dobis [a], Neil Reid [b], Claudia Schmidt [c] and Stephan J. Goetz [d]

Abstract

Hop production has expanded dramatically in recent years along with the number of local craft breweries, but to date the relationship between these two phenomena has not been explored systematically. Using a state-level pooled count data model with observations from 2007, 2012, and 2017, we examine the independent lagged effects of breweries on the number of hop farms and acres grown, holding constant fixed effects and key economic and geographic factors. Our results confirm that the number of breweries is associated with more hop production (farms and acres) five years later, while warmer temperatures and higher land prices discourage it. (JEL Classifications: L66, Q11, R30)

Average Hopping Rate (Pounds per Barrel)



Source: Swersey, C. (2020). Brewers Association 2020 Hop & Barley Industry Update. Presented at the *2020 Annual Great Lakes Hop and Barley Conference.*