



# *Feasibility of Small Farms Growing Hops & Specialty Grains Profitably in Howard County*



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Andrew Roehl

# Agenda

Introduction

Market Overview

Feasibility Analysis

Next Steps

Discussion



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# Consulting Team



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# Client Relationship



- POC: James Zoller
  - Owns 75 acre family farm
  - Began growing 1 acre of hops 2 years ago



# Problem: Hops/Grains Feasibility

- Small farms (5-20 acres) are not making a profit
- Existing and new farmers in the county looking for new, more profitable opportunities
- The county has selected hops and specialty grains as two products for further research
- Determine if hops and grains are viable profitable products for smaller farms in Howard County



# Research Methodology



## Primary

- 17 breweries, distilleries, home brew shops, farm breweries
- 6 professors and extension agents
- 5 Howard County Farms and farmers

## Secondary

- USA Census Data; Cornell University and University of Vermont hops research

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# Feasible in Future but Not Today

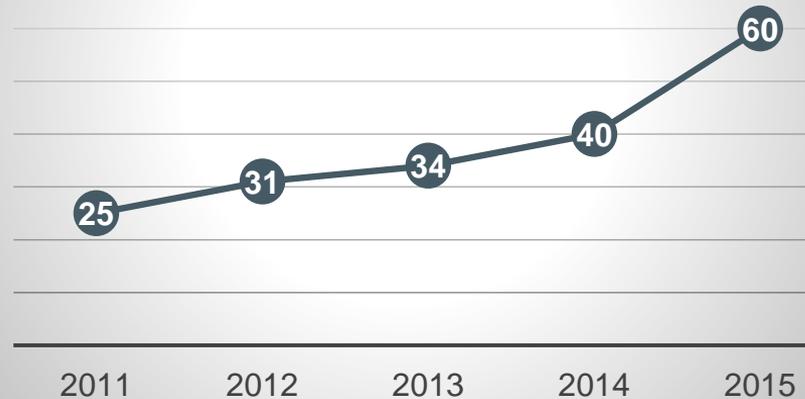
- Howard County small farmers unlikely to be profitable in current markets
- Significant barriers to entry for both markets
- Buying local not enough
- High quality and consistent yields valued by breweries and distilleries



# The Market for Beer and Spirits

- **MD and D.C. Breweries:**
  - 70 Breweries (60 MD) (10 D.C.)
  - 10 farm breweries (grow/brew in same location)
  - 7 distilleries
  - 5 homebrewing shops
- MD and D.C. breweries source ingredients from Europe, Canada, and rest of U.S.A.

## Number of MD Breweries



Introduction

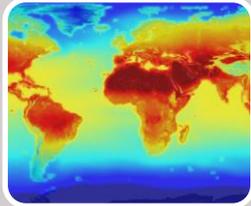
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# What does HC need to grow Hops?



Ideal  
Climate



Ideal Soil



Rhizomes  
Designed  
for NE



Hops  
Knowledge



Equipment



Processing

Introduction

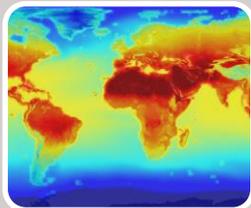
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# Howard County is Not Ready



Ideal  
Climate

Yes/No



Ideal Soil

Yes/No



Rhizomes  
Designed  
for NE

No



Hops  
Knowledge

No



Equipment

No



Processing

No

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# One Run of Beer Requires 3 Acres Hops

- For average annual run of one type
- Assumptions
  - 1 ounce -  $\frac{1}{2}$  lb dry hops per 5 gal; assume 1.5lb dry hops per barrel
  - 1500lb yield dry hops per acre in NW;  $\frac{1}{6}$  yield in MD
  - 500 barrels average annual run of a beer for microbrewery



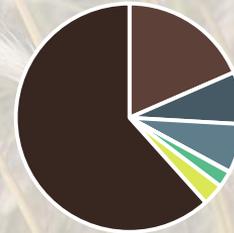
# How Much Will 3 Acres Cost?

Farm Set-Up  
\$25,019



- Poles
- Cable
- Trellis String
- Irrigation
- Rhizomes
- Trellis Rigging
- Orchard Ladder

Processing  
\$64,850



- Harvester
- Dryer
- Moisture Probe
- Hops Analysis
- Compactor
- Vacuum Sealer
- Pelletizer

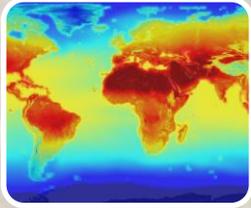


# Will 3 Acres Make Money?

- ~\$7,500 revenue by 3<sup>rd</sup> Year
- ~\$23,000 potential annual expenses (including labor)
- **Assumptions**
  - 250 lbs of hops per acre production
  - \$10 per lb to sell pelletized Cascade hops
  - Harvest: 1<sup>st</sup> Year: 0%, 2<sup>nd</sup> Year: 50%, 3<sup>rd</sup> Year 100%



# What Does Howard County Need to Grow Grains?



Ideal  
Climate



Ideal Soil



Grains  
Designed  
for NE



Grains  
Knowledge



Equipment



Processing

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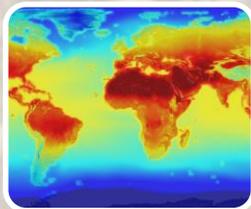
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# Howard County is Not Ready



Ideal  
Climate

Yes/No



Ideal Soil

Yes/No



Grains  
Designed  
for NE

Yes/No



Grains  
Knowledge

Yes



Equipment

Yes/No



Processing

No

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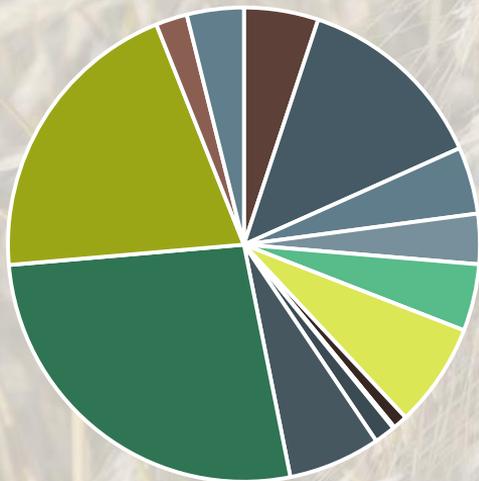
# One Run of Liquor Requires 6.5 Acres of Grain

- For average annual run
  - Need less for beer
- Assumptions
  - 67 bu/acre wheat, barley, or rye
  - 55 lb/bu wheat, barley, or rye
  - 1 ton/month required for average annual run of liquor at small distillery



# How Much Will 6.5 Acres Cost?

Annual Cost  
\$2,450



- Seed
- Fertilizer
- Chemicals
- Custom Operations
- Fuel, lube, and electricity
- Repairs
- Other Variable Expenses
- Interest on Operating Capital
- Hired Labor
- Opportunity Cost of Unpaid Labor
- Capital Recovery of Machinery and Equipment
- Opportunity cost of land (rental rate)
- Taxes and insurance
- General farm overhead

Malting Processing  
Estimates Unavailable



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# Will 6.5 Acres Make Money?

- ~\$2,450 cost
  - ~\$2,400 straw revenue
  - ~\$14,400 malted grain revenue
  - Ability to malt unknown; malted grain revenue questionable
- **Assumptions**
    - \$375 production cost per acre wheat, barley, or rye
    - \$200 per ton to sell straw
    - \$0.60 per lb to sell malted grain



# Next Steps to Improve Feasibility

- Additional research into growing and production; development of breeding program
- Hops equipment co-op to reduce start-up costs
- Supply chain to source hops-growing materials not currently sold in Maryland
- Building/funding processing facilities in Howard County

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# Potential Partners for Existing Hops Farmers

Establishment	Location	Opportunity
Barley and Hops Grill and Microbrewery	Frederick	Chinook, Columbus, Cascade hops
Frisco Taphouse and Brewery	Columbia	Setting up system in summer 2016 to enable whole leaf brewing
Maryland Homebrew	Columbia	Smoked malts Whole leaf hops: Warrior, Target, Nugget, Tettnang
Nepenthe Homebrew	Baltimore	Seeking small hops purchases: 30 ounces every 3 weeks
MISCellaneous Distillery	Mount Airy	Specialty grains (buckwheat, other)
Twin Valley Distillers	Rockville	Unmalted grain in 50lb bags; purple corn
Lost Ark Distilling Co	Laurel	Malted rye; willing to experiment with small batches of local grains (blue corn, teff)
New Columbia Distillers	DC	Malted barley

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# Questions?

# Thank You!

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A photograph of a vast field of golden wheat under a cloudy sky. The wheat stalks are in the foreground, and the field extends to the horizon. In the distance, there are some buildings and trees. The sky is filled with grey and white clouds.

# Appendix

# Farming Hops

- Bittering hops commodity; aroma hops differentiated
- 96.7% of U.S. hops is farmed in Pacific Northwest
  - 2015 hops production: MD (15 acres); U.S.A. (43,633 acres)
- Grown/Processed using specialized equipment (\$40K - \$100K)
- Mechanized process required to be profitable
- Takes up to 4 years to get full yield
- Requires specific environmental conditions, such as latitude of 35-55 degrees
  - Howard County is at 39 degrees latitude

# Farming Specialty Grains

- **Barley/Rye/Wheat**

- Used to make beer and whiskey
- Grow fairly well locally
- Local yield (bu/acre) is higher than in North Dakota (leading grain producer)
- Use same equipment as for other typical grains (\$5K - \$100K)

- **Barley**

- Two-row and six-row used for alcohol (two-row better yield)
- Six-row grows better on East Coast

# Hops in Demand

- **Hops varieties most common in craft brews**
  - **Generally:**
    - Bittering: nugget, columbus, tomahawk, zeus, warrior
    - Aroma: cascade, crystal, willamette
    - Dual: citra, centennial, chinook, simcoe
  - **Locally:**
    - Bittering: nugget, columbus
    - Aroma: cascade, amarillo, Czech saaz
    - Dual: citra, centennial, chinook

# Hops Farming in Maryland

## Strengths

- May be able to fetch high price in homebrew shops (pelletized)
- Local interest in quality product (interest does not necessarily equate to sales)

## Opportunities

- Howard County Agricultural Grants
- Brewpubs, homebrew shops (smaller producers that do not can or keg)
- Popular/Grows well locally: Chinook, Cascade, Nugget, Centennial
- Partner with UMD Extension School or MD Brewers Association Agricultural Resources Committee
- Sell hops on Lupulin Exchange

## Weaknesses

- Local climate is not ideal for hops
- No processing facilities in Maryland
- Costly specialized equipment; labor intensive harvest
- Switching - 4 years to get full yield
- Cannot easily combine hops from different sources
- Lack specialty knowledge and proprietary hops possessed by multi-generational farmers in NW
- Must be competitively priced

## Threats

- Drought/insects/disease can wipe out whole crop
- Existing contracts in place for breweries
- Larger hops farms in NW producing cheaper hops with higher reliability of supply

# Specialty Grain Farming in Maryland

## Strengths

- Winter wheat/rye can be grown as cover crops
- Likely possible to mix local grains with others
- Local demand for quality product (interest does not necessarily equate to sales)

## Weaknesses

- No processing facilities in Maryland
- Not so simple to add alcohol quality grains into crop rotation
- Switching - costly equipment to grow only a few acres of grain
- Consistency is questionable
- Must be competitively priced

## Opportunities

- Distilleries may take unmalted grain
- Winter wheat desired for pastry making in PA

## Threats

- Drought/insects/disease can wipe out whole crop
- Existing contracts in place for breweries/distilleries
- Larger farms in NW producing cheaper and more consistent quality product

# (Un)Conventional Uses

- **Hops**

- Beer
- Soap (smells good)
- Pillow fill (relaxation, sleep aid)
- Herbal medicine (relaxation, sleep aid, antibiotic)
- Tea
- Edible shoots (tastes like spinach/asparagus)
- Livestock feed (reduces bacteria)

- **Specialty grains**

- Alcohol: beer, bourbon (51% corn), rye, wheat whiskey, vodka
- Baked goods
- Cereals
- Soups
- Livestock feed