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2024 American Hop Convention Merchant Panel

Climate Change

Global Trends

- Huell Temperature
- Huell Precipitation
- Hop Industry Impact
- What can we do?

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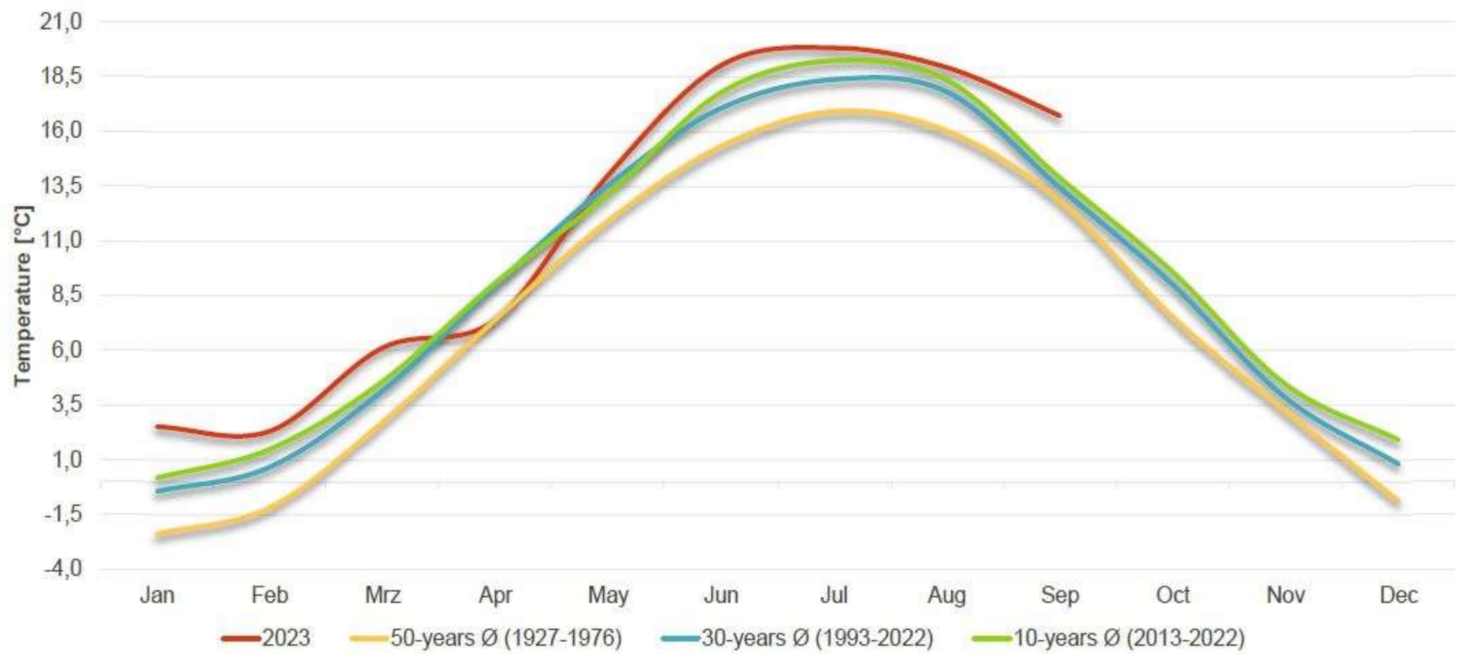
Climate data - Temperature (Hüll weather station)

Comparison 2023 with long-term average values



Climate data - Precipitation (Hüll weather station)

Comparison 2023 with long-term average values

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Industry Impact

What’s the impact to the global hop industry?

- European hop industry impact greater so far
- Irrigation limitations, ~**20% of hop area irrigated**
- Yield and quality impact
    - Legacy noble varieties, Hallertau MF, Saaz, etc.
- Alpha acid levels + associated challenges
- Breeding efforts underway

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US Industry Impact

Potential Implications for the US hop industry

- Estimated by climatologists that PNW likely less impacted than Europe
  - Eric Snodgrass University of Illinois

- 2021 heat dome, yields up
  - 2021 US yields ***1,900 pounds*** per acre
  - 2019-2023 average US yields ***1,852 pounds*** per acre

- Excess US capacity may be welcome to global alpha buyers interested in risk diversification at reasonable prices
  - FX considerations

- Saw this begin in 2023 – will this trend continue?

- PNW irrigation, water rights, regulations, snowpack, el nino, etc.

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US Industry Impact

"What a difference a few weeks make.

The winter storm that blasted Oregon recently brought the state's mountain snowpack from anemic levels all the way up to normal by Wednesday, allowing all of the state's ski areas to open and pushing back drought conditions. Oregon got between 40 and 70 inches of snow in the Cascade Range and is now at 99% of normal for snowpack and 97% of normal for precipitation.

It's a remarkable turnaround given the state's west side had just a few inches of snow in many places at the beginning of the month."

Source: Statesman Journal January 17, 2024

What Can We Do?

Practical things we can all do now

- Measure our impact (HGA started this recently)

- As an industry work on reducing impact / strategies
  - Kilning practices, automation, efficiencies, etc.
  - Irrigation, water conservation practices, technologies

- 3rd party audited programs, etc.
  - GLOBALGAP, SQF, Salmons Safe, etc.

- New genetics, revisiting old genetics
  - Craft lager beer, an opportunity for more US grown noble types?

- Keep doing what we are doing, multi generational sustainable family businesses


MRL's
Minimum Residue Levels
Cost of Growing Hops
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Why do we care about MRL'S?

- Pesticide Maximum Residue Levels (MRLs) are among the fastest growing trade challenges for agriculture exports.
- MRLs - upper levels of pesticide residues that are legally permissible in food
- Determined by comprehensive assessment of:
  - The active substance, the intended uses of the pesticide, good agricultural practice (GAP) and the lowest exposure necessary to protect vulnerable consumers
- MRLs are not established as a food safety standard, but instead indicate that a pesticide has been properly applied.

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The Challenges we are facing…

- Numerous export markets have established national MRLs; and those often differ from each other.
- A crop protection product used legally in one market will be out of compliance in another.
- When an export market changes an MRL it may result in inventory already produced that can no longer be shipped. This is the current situation in the EU.

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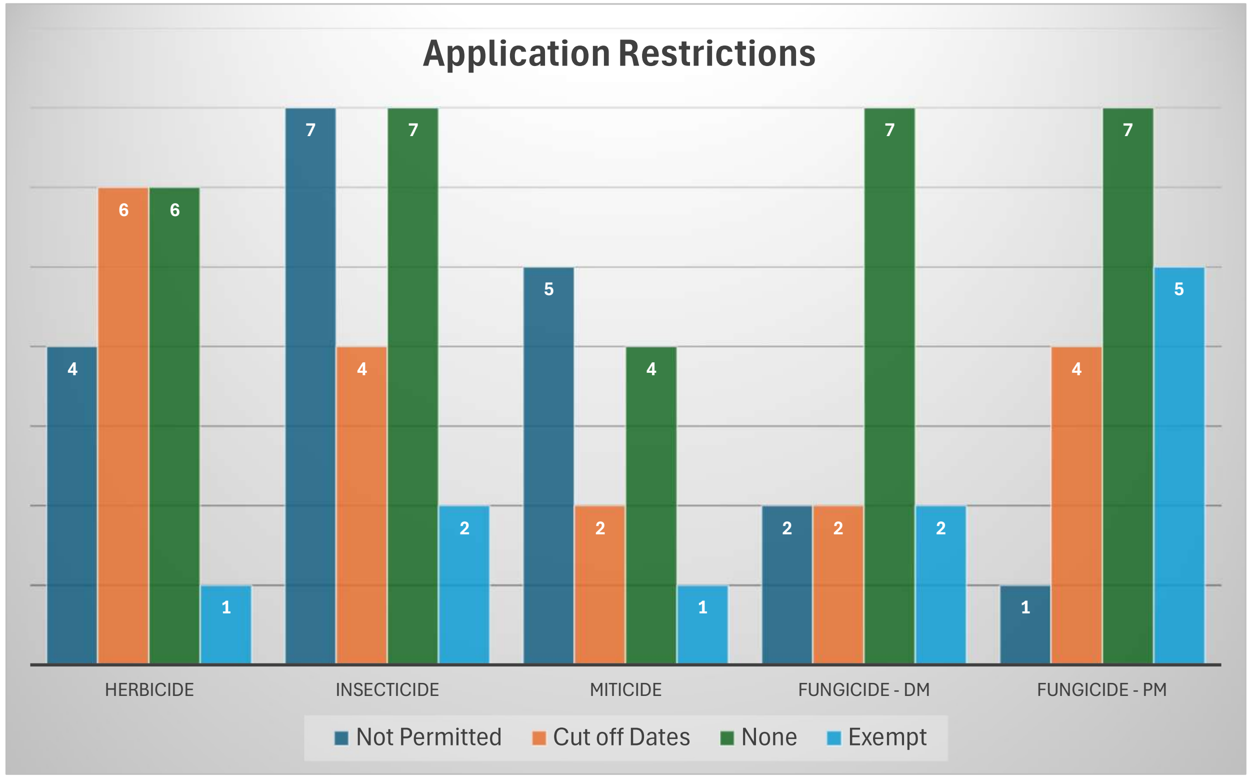
EU MRL Regulations are impacting how US Growers raise their hops

- Hop growers are dedicated to sustainable practices and integrated pest management

  Practices that protect the land for the next generation
- Restricting crop protection tools could cause
  - Resistant pests
  - Low yields, both in pounds and alpha
  - Low quality
- Responsible use of crop protection tools are necessary for the sustainability of the industry.



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The “B” word…

- Bifenazate MRL restriction scheduled for July 2024
- No Inventory with Bifenazate may be sold or used in brewing now
- Beers with shelf-life past July 2024 may have to be pulled
- New import MRL application submitted, takes 1.5-2 years to be established
- Inventories will have to be destroyed or shipped back to US

No room for bifenazate hops storage until new MRL is established

- Inventories will be several years old and past best before dates

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OTHER EU MRL UDPATES

Active Ingredient	Pesticide Type	Trade Name	EU MRL (ppm)	EU 2024 Pesticide Use Restriction
Etoxazole	Miticide	Zeal	15 ***Pending*** ***0.05*** ***Apr 08, 2024***	No channels of trade language included.
Bifenthrin	Insecticide	Capture, Brigade	20 ***Proposed*** ***0.05***	Restriction likely to take effect 2024.
Fenazaquin	Miticide	Magister	0.05 ***Proposed*** ***30***	MRL likely in 2024
Spirodiclofen	Miticide	Envidor	40	EU MRL proposed to be maintained after 2023 review. SCoPAFF in favor MRL likely in 2024
Thiamethoxam	Insecticide	Platinum	0.09 ***Pending*** ***0.05*** ***Mar 07, 2026***	EU granted 3-year transition period.

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Innovations for Success

Continuing to ship US Hops to EU will require innovated solutions

- Pest resistant varieties, better and faster breeding efforts
- Integrated Pest Management that includes organic strategies
- Continued emphasis on research of spray timings, effectiveness, and residues
- Merchants working with growers and customers to find common solutions
- Supporting research
- Increased education for customers
- Working with growers to find the balance of quality and compliance
- US and EU merchants and hop growing associations working together towards meaningful change in MRL policies

Beer is Community. May our solutions reflect that reality.

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Cost of Growing Hops
In the U.S.
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US Costs of Growing Hops

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- HOP ENTHUSIAST
- HOP FINDER
- NEWS & MEDIA
- GROWER TOOLS
- BREWER TOOLS
- RESEARCH & TECHNICAL

Cost of Production | Small Grower Council | Educational | Clean Plants | Industry Standards | Food Safety | Plant Protection | Supplier Directory

The *"2020 Estimated Cost of Establishing and Producing Hops in the Pacific Northwest"* published by Washington State University, is available below. We appreciate the efforts of the HGA Board of Directors who served as the committee to develop these figures. The user is able to enter their own anticipated costs and yields in the workbooks in order to determine breakeven prices.

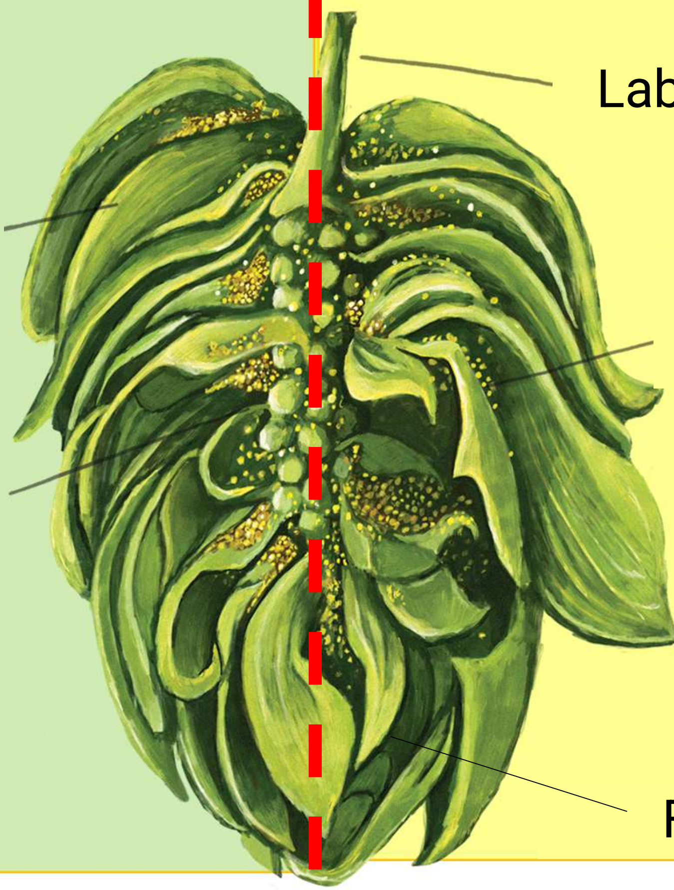
2020 WSU Hop Enterprise Budget Narrative

Conventional Hop Enterprise Budget Workbook

Organic Hop Enterprise Budget Workbook

https://www.usahops.org/growers/cost-of-production.html

US Costs of the Hop / Acre



Fixed Costs / acre

~$4,000. - $6,000.

Variable Costs / acre

~$6,000. – 7,500.

Washington State University, Pacific Northwest Hop Cost of Production Study

https://www.usahops.org/growers/cost-of-production.html.

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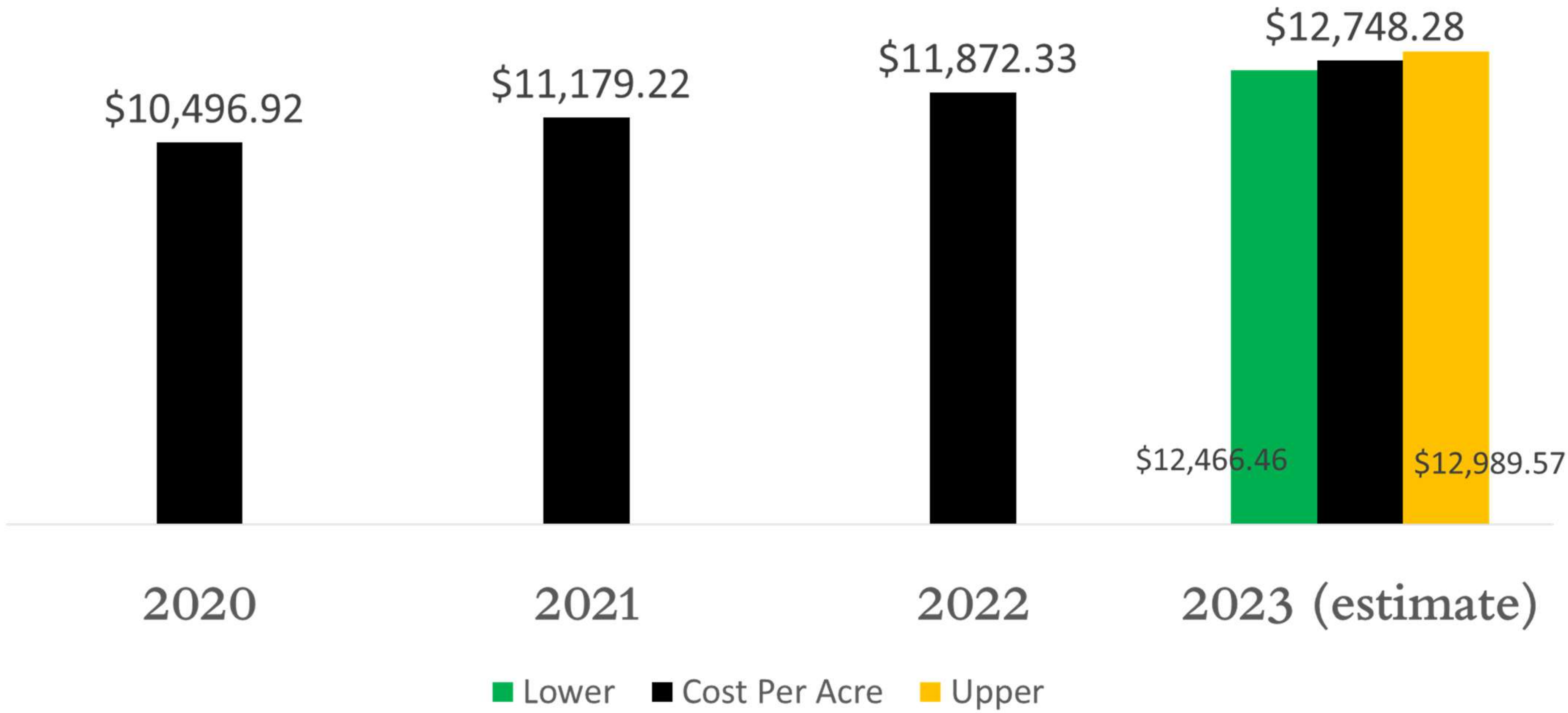
US Costs of the Hop / acre



Washington State University, Pacific Northwest Hop Cost of Production Study
https://www.usahops.org/growers/cost-of-production.html.

Labor Cost Increases

- **Overtime Threshold** down from 48 hours / week (ESSB 5172)

  40 hours/week in 2024

- Minimum Wage Increase: $15.74 / hour in 2023

  $16.24 / hour in 2024

- Adverse Effect Wage Rates (AEWR)** $17.95 / hour in 2023

  $19.25 / hour in 2024

*Does not include housing, food, and transportation costs.
** Does not include new (2024) H2A certificate fees.

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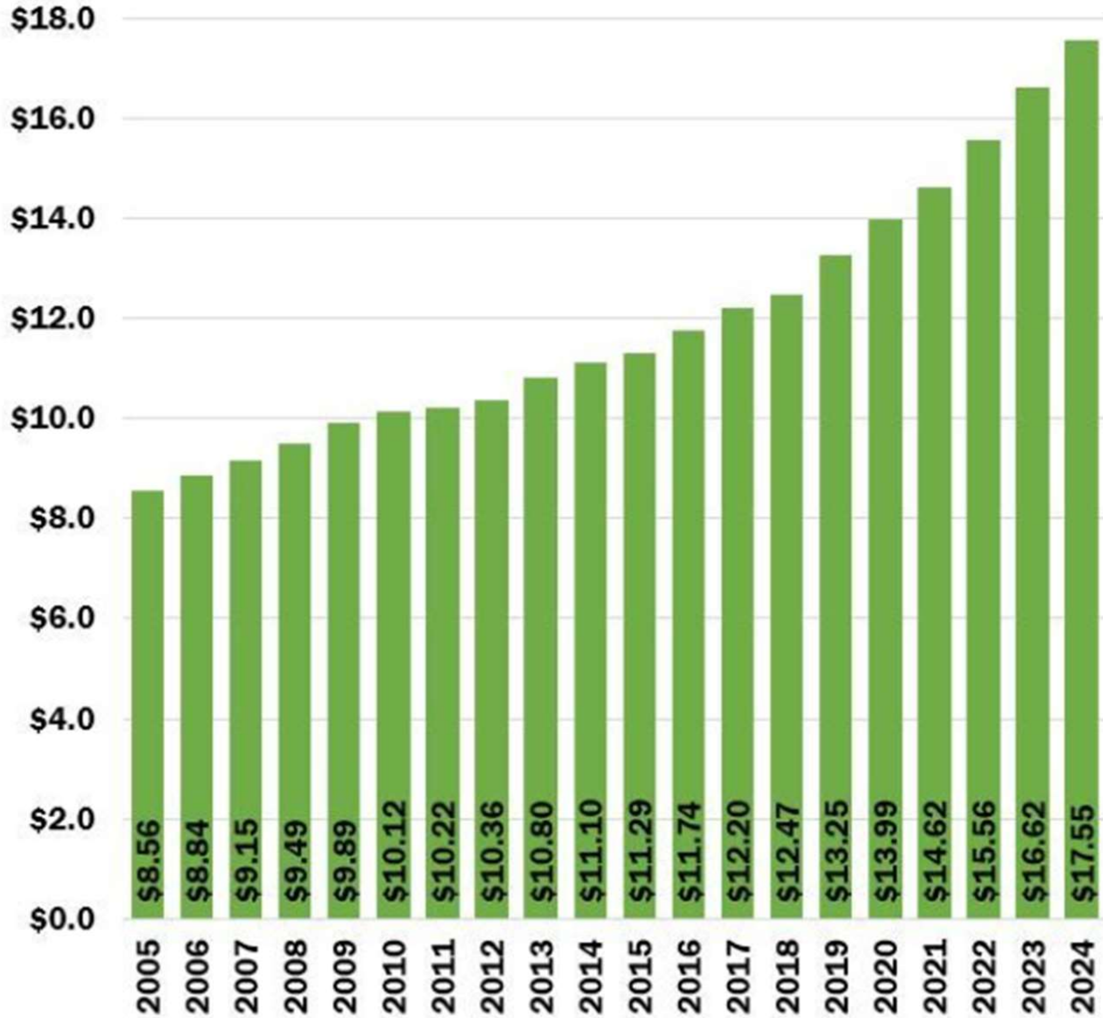
FY 2024 National Adverse (AEWR)

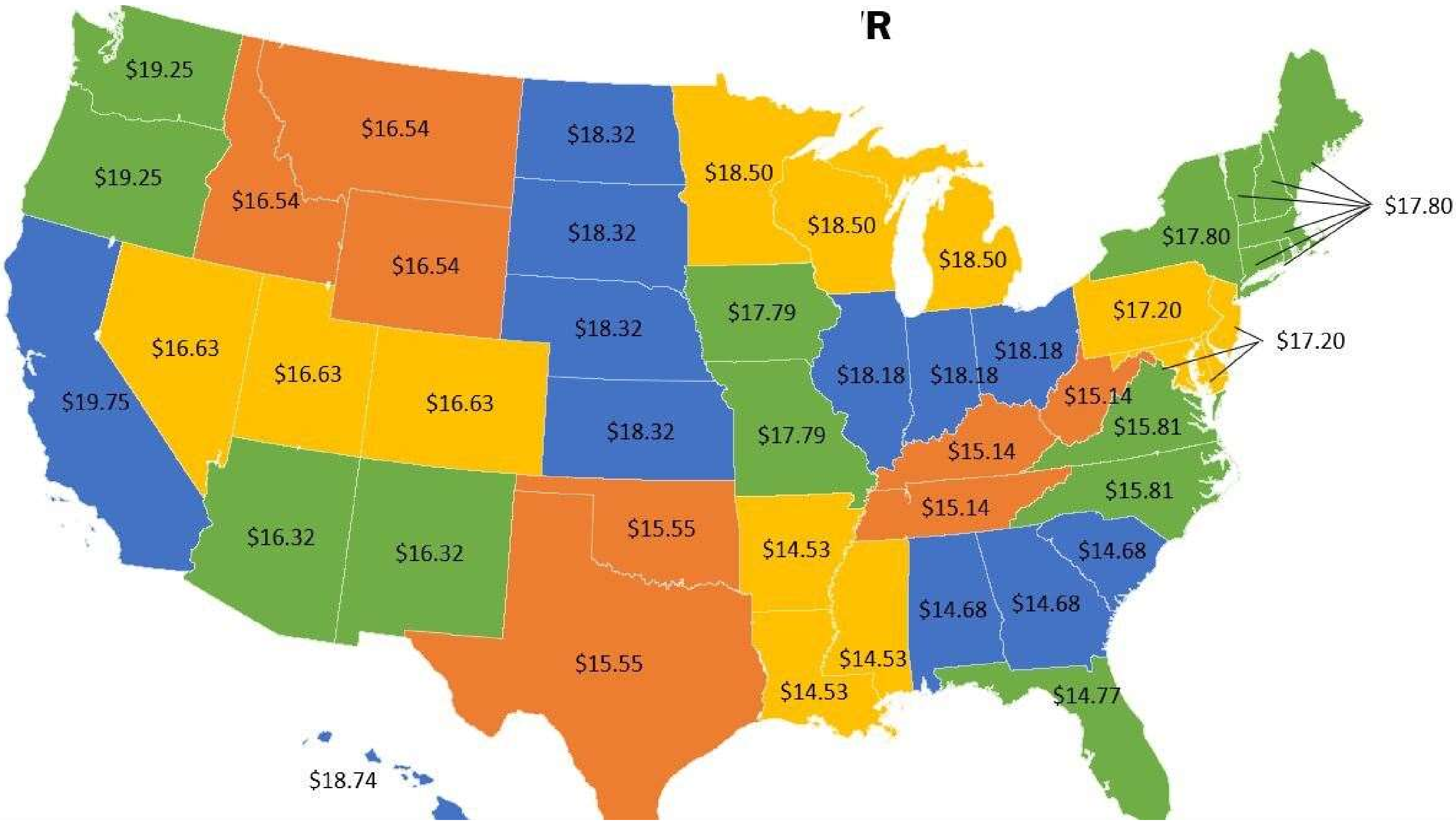


- With an increase/reliance on H2A contracts, AEWR is increasing local labor costs.
- National Inflation is currently 3.4%.
- National AEWR has increased 5.6% in the last year.

https://flag.dol.gov/wage-data

www.fb.org/market-intel/2024-h-2a-aewrs

FY 2024 Adverse Effect Wage Rates (AEWR)



www.fb.org/market-intel/2024-h-2a-aewrs-on-their-way-up

https://flag.dol.gov/wage-data

2024 Increases in Costs:

Fixed costs will increase in 2024 – Primarily due to interest rate increases.

- Increased fixed costs will be spread across fewer volumes.

Variable Costs:

- Labor costs will increase in 2024 – minimum of 7% increase from 2023.
  - Farm labor costs could increase more than rest of the supply chain.
- Fuel, Chemicals, and Fertilizers should remain flat in the US.
- Interest on operating lines will likely have a significant influence on increasing costs.

Beer is Community. May our actions reflect that reality.

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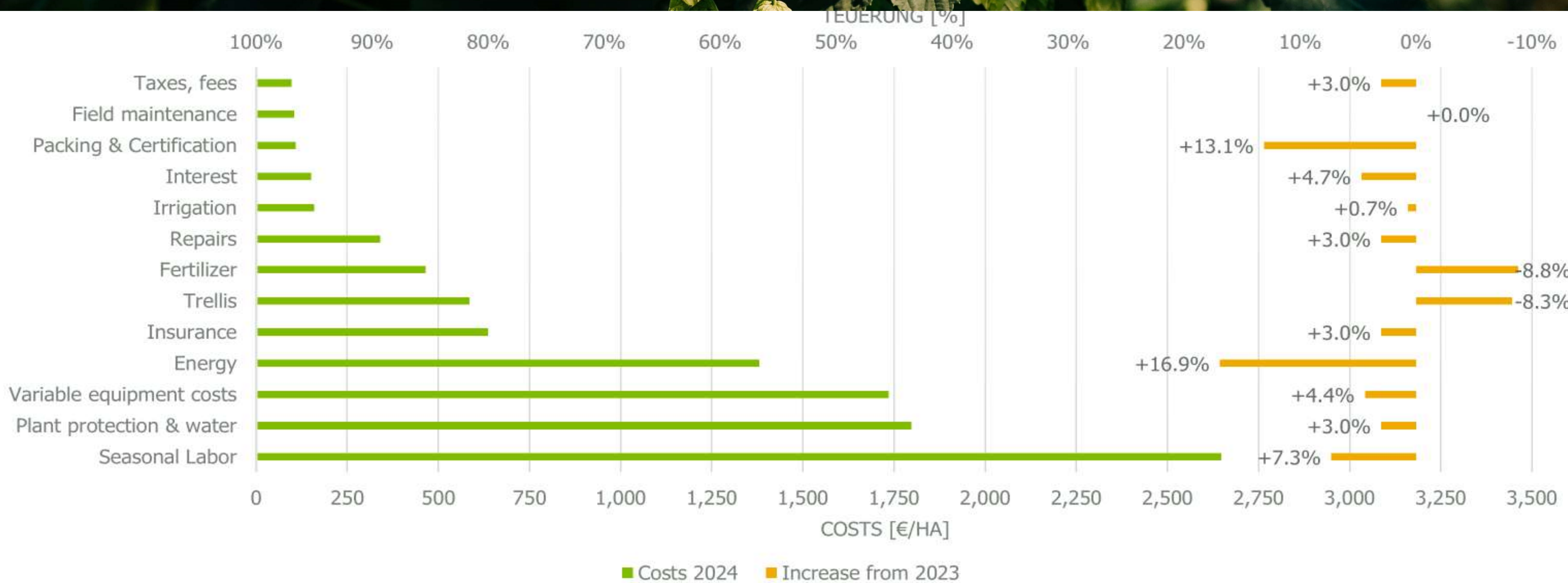
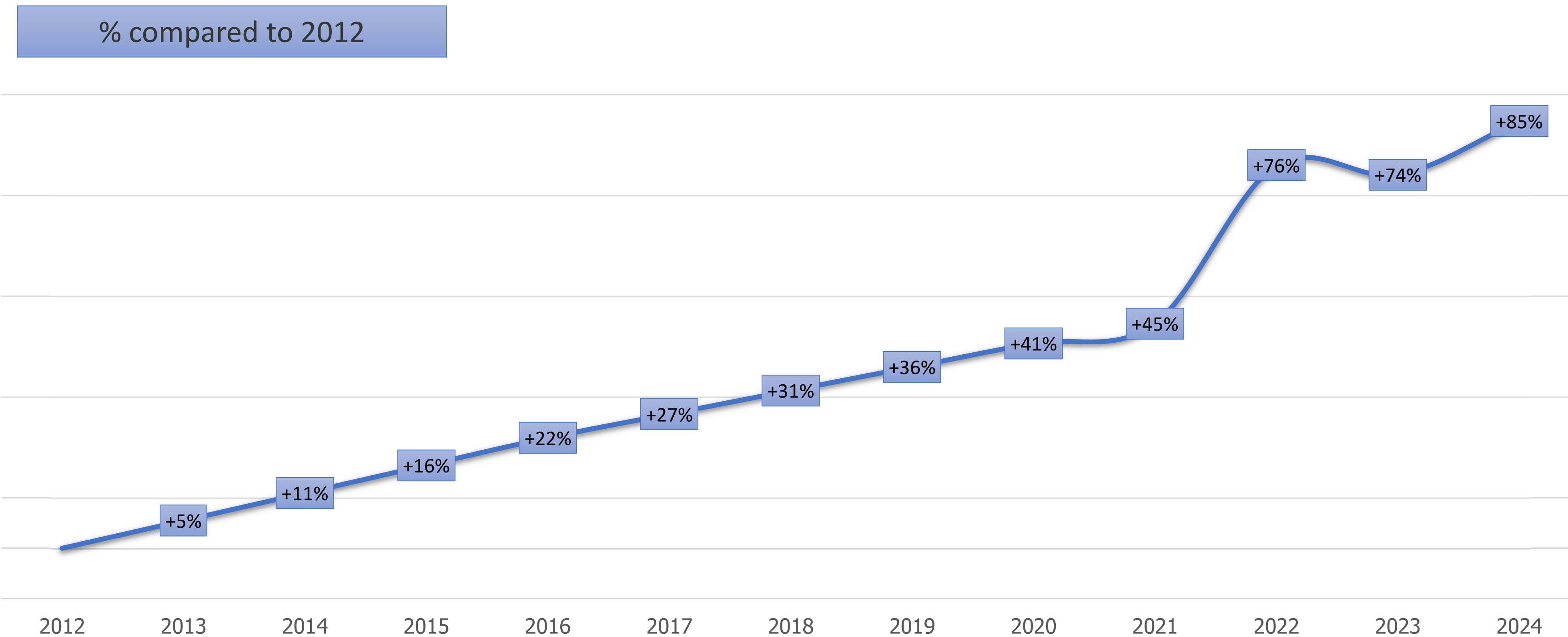
Variable costs – German hop growing



Inflation & German hop growing

2012-2024 (w/2024 Projected)



Farmer protests – Jan 8, 2024

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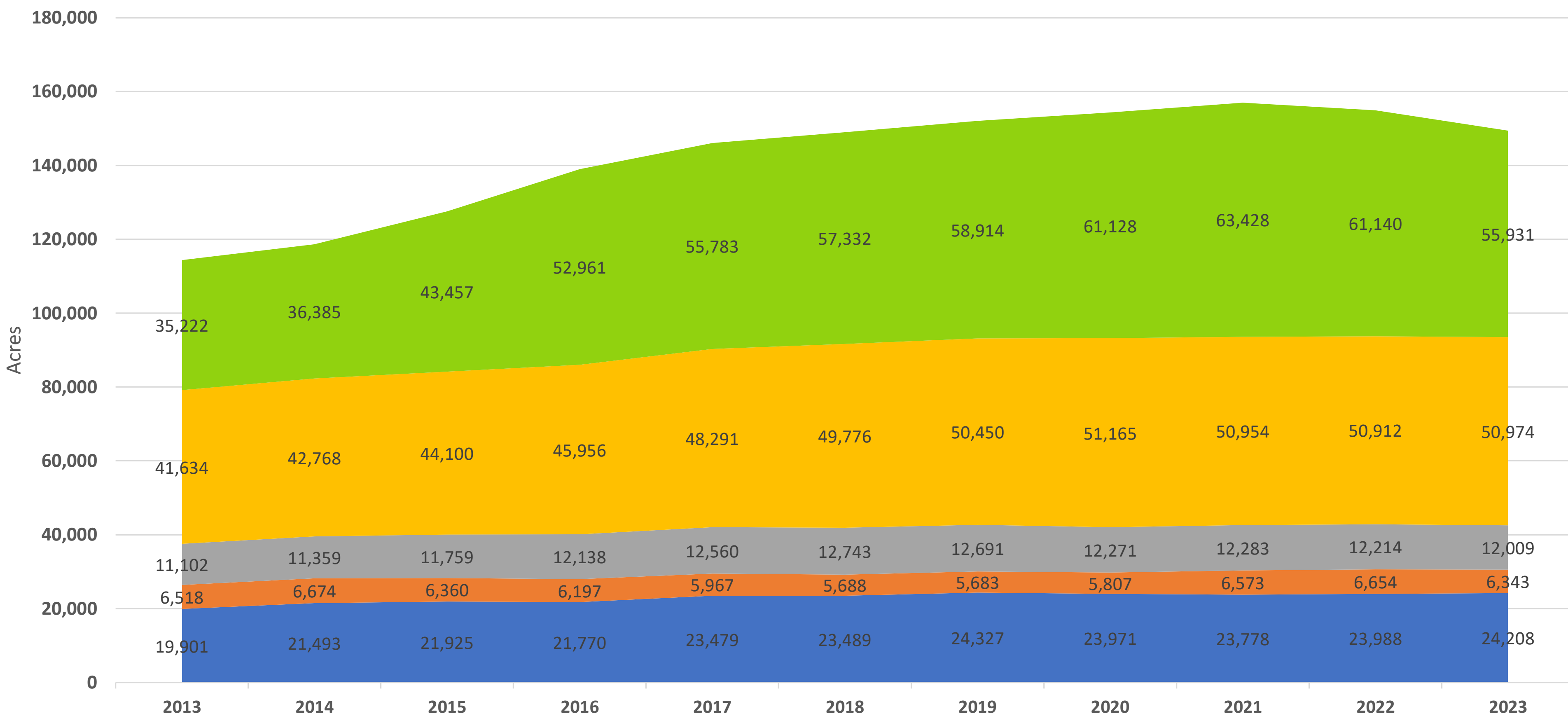
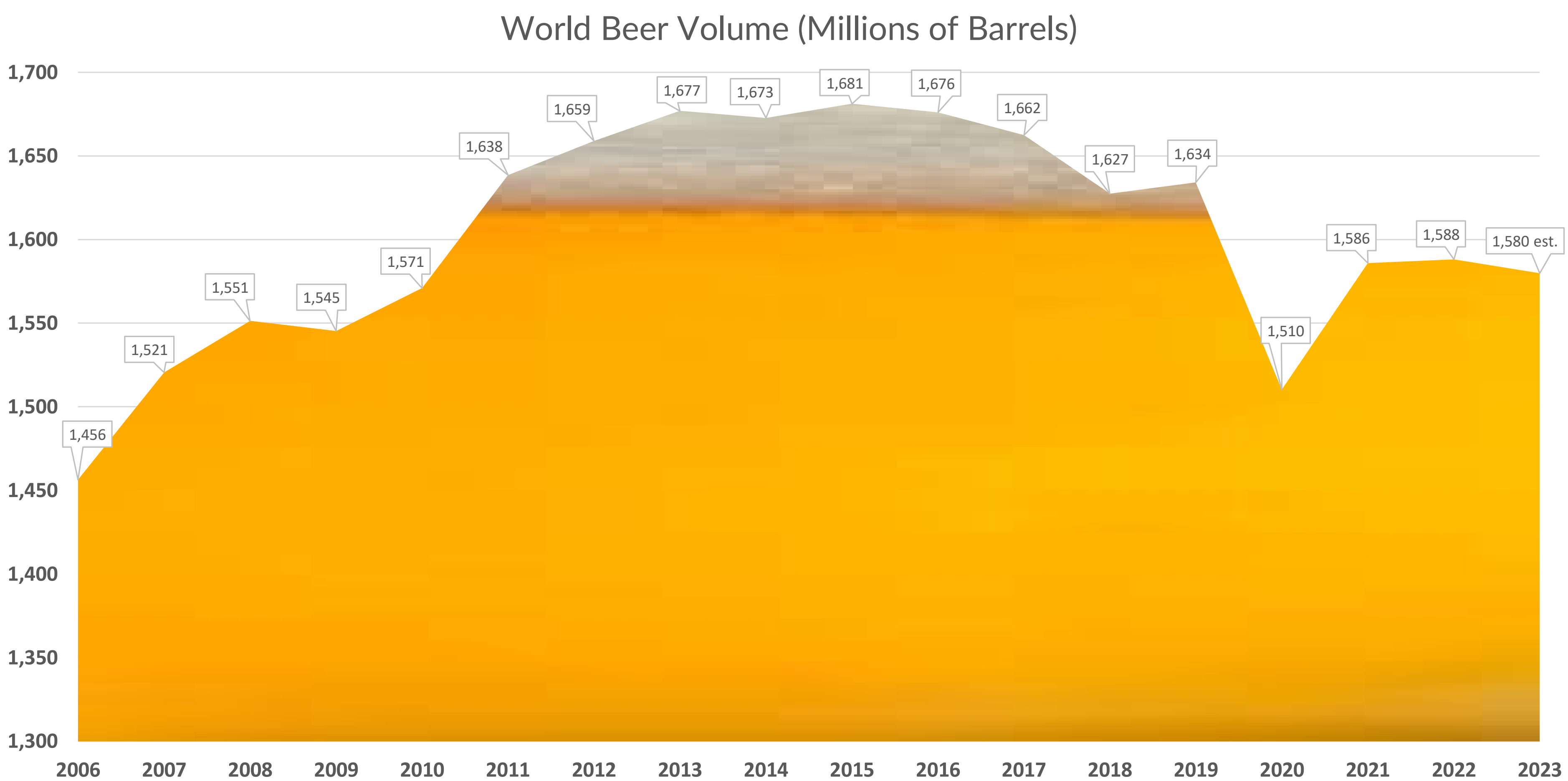
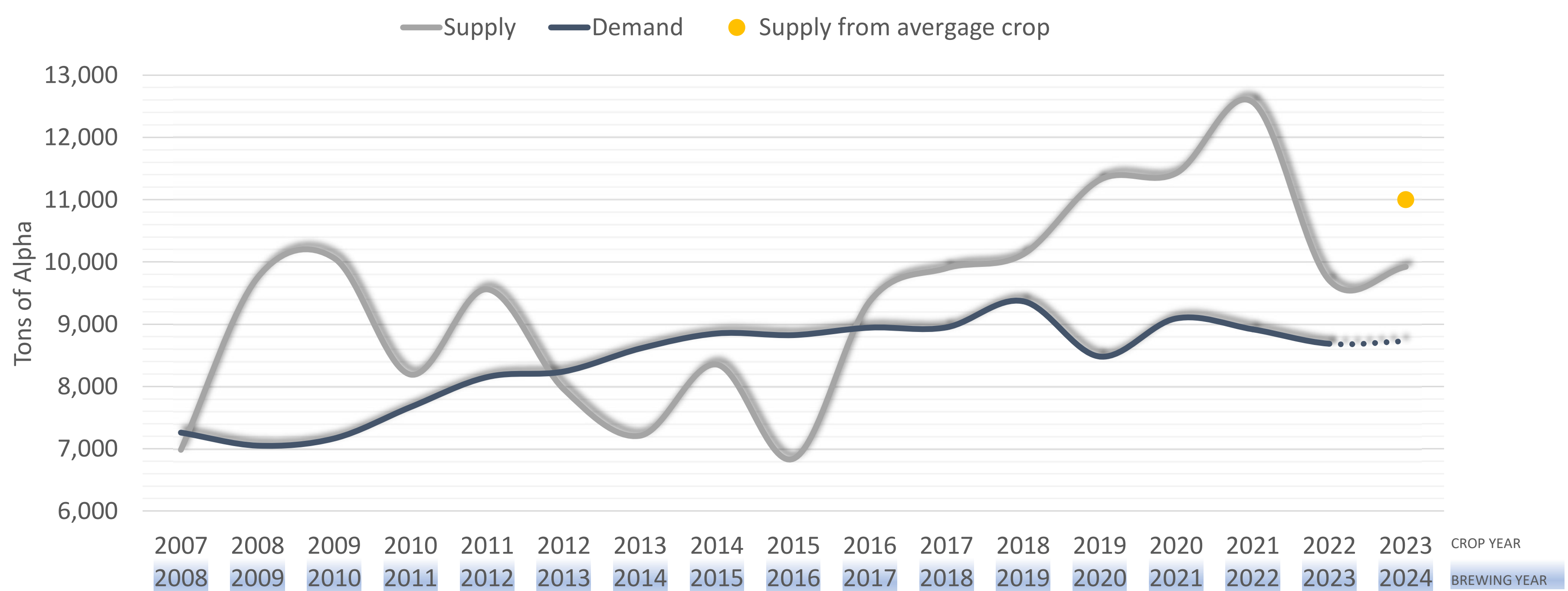
Global Hop Market – Acreage Development



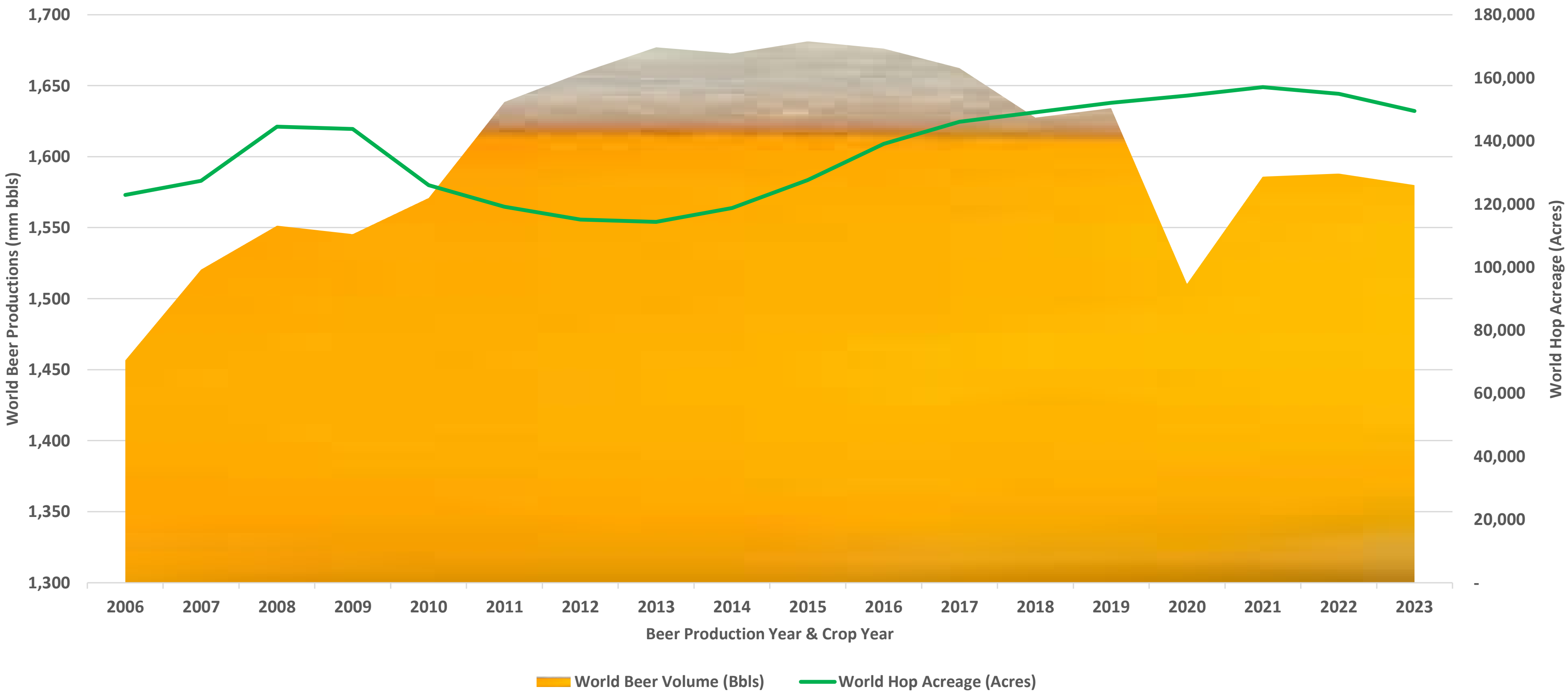
World Beer Production



World hop supply vs. demand

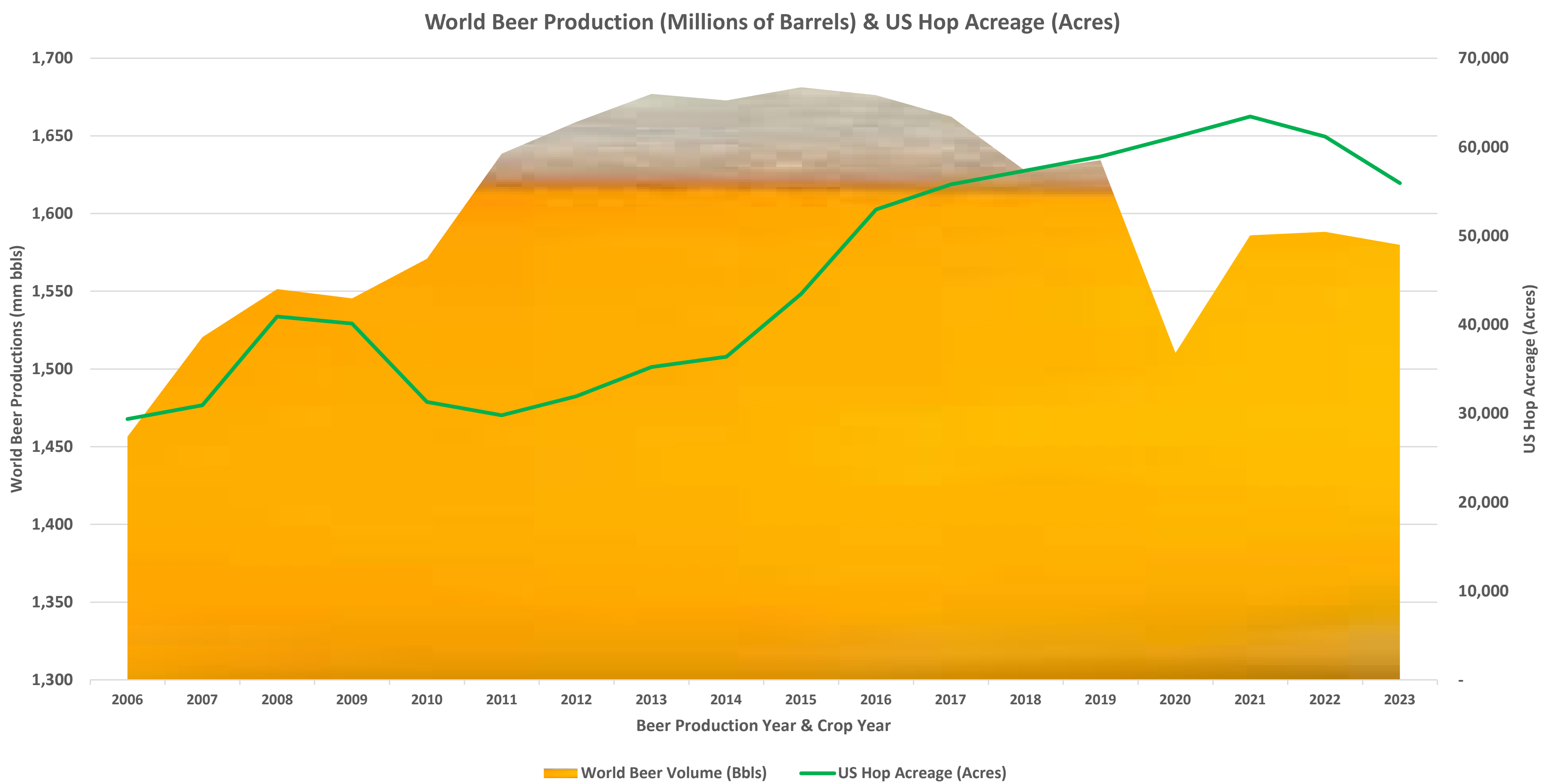


World Beer Production (Millions of Barrels) & World Hop Acreage (Acres)



Source: Hopsteiner Guidelines 2023

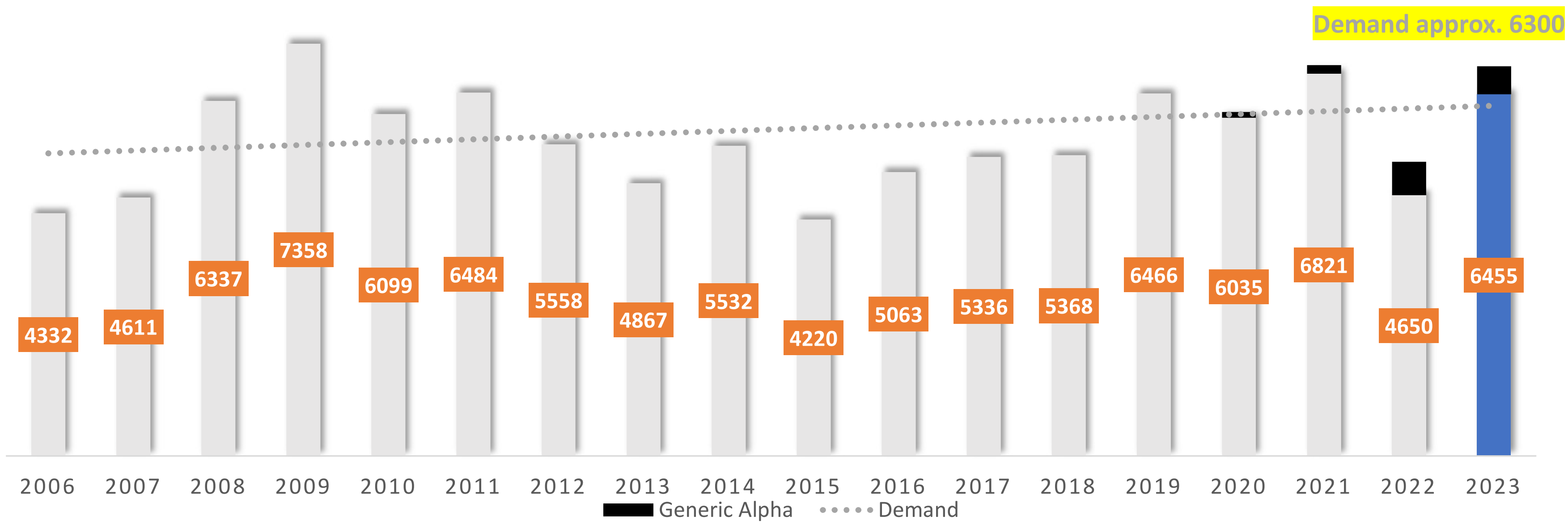
World Beer Production



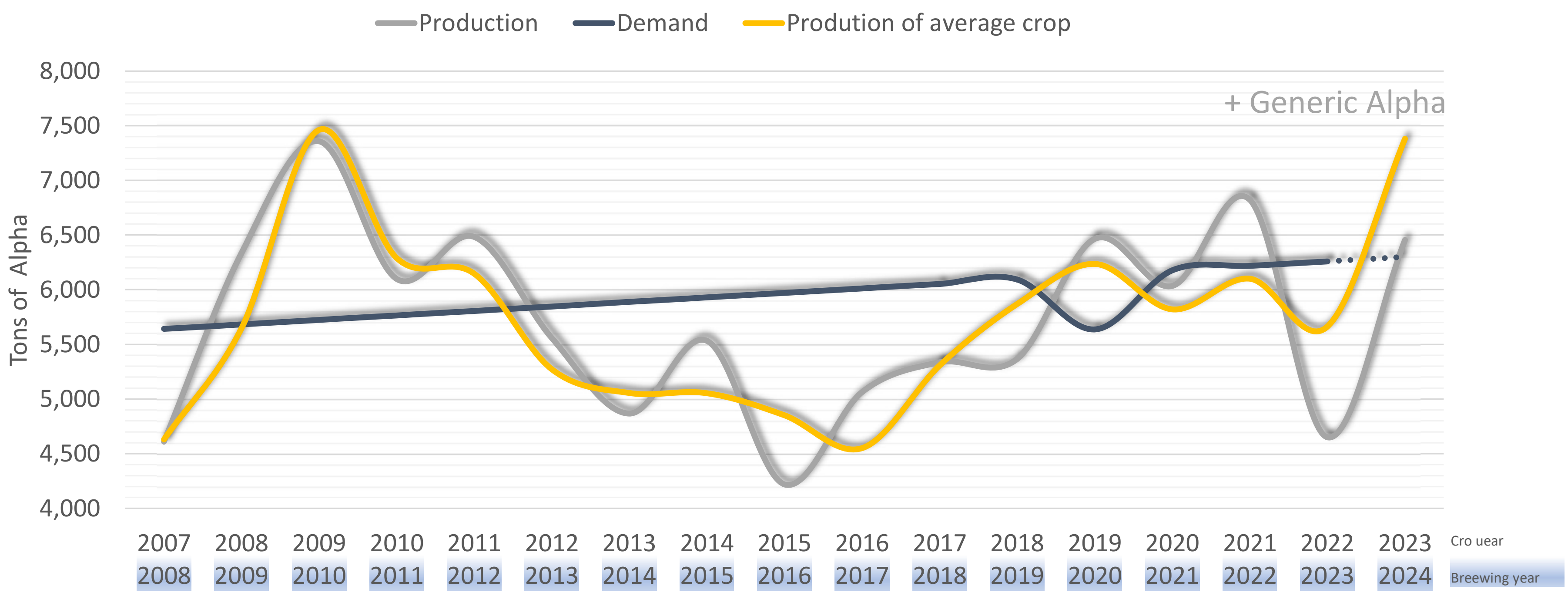
Source: Hopsteiner Guidelines 2023

USA + Germany bitter hop production

- Tons of alpha; approximately 1MT alpha = 14,000 lbs. hops



USA & Germany bitter hop overview



Long term Euro buying Dollar

Five years of Euro buying Dollar

CRAFT BREW NEWS

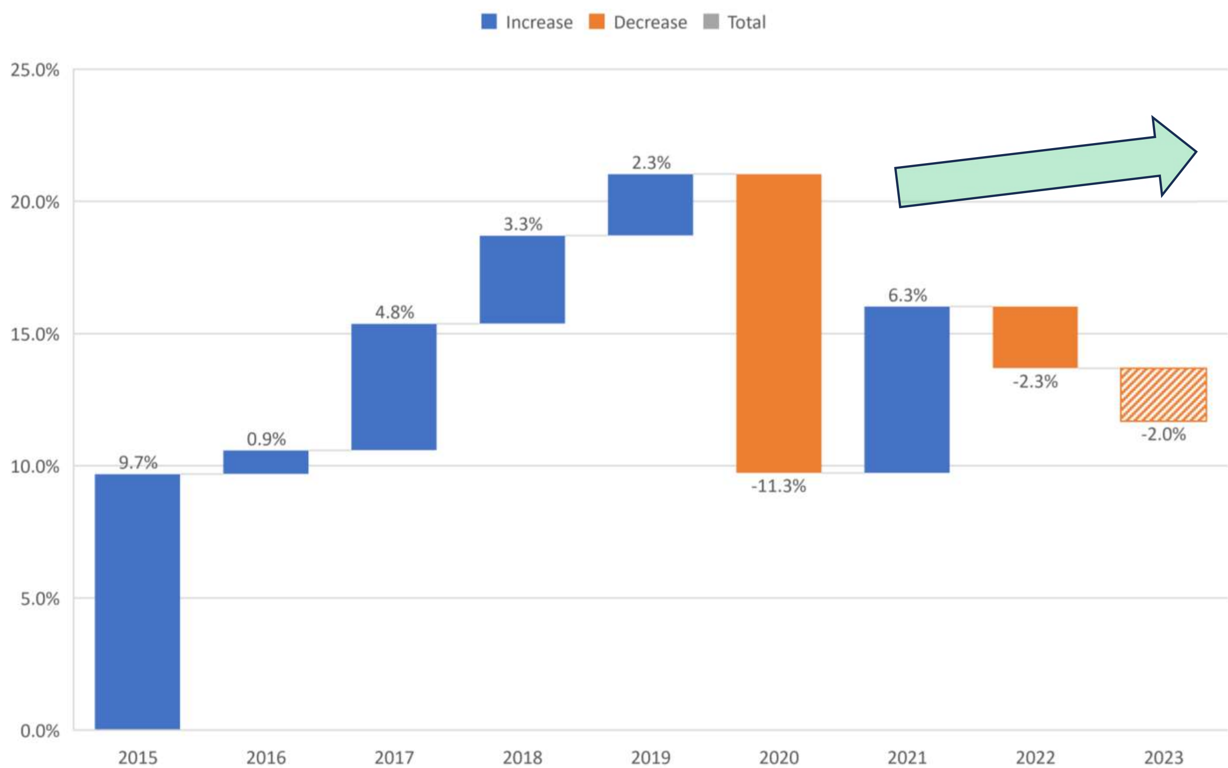
News, Numbers and More About the Craft Beer World
Vol 14 No 99 | December 28, 2023
Publisher: Beer Marketer's INSIGHTS, Inc.
Senior Editors: David Steinman & Christopher Shepard

A Look Back: Key Craft Developments in 2023

Craft Beer Volume Declined for 3rd Year Outta 4, We Estimate; Near 2016 Levels Craft beer shipments declined thruout 2023, currently on track to finish at its lowest level since 2016 (~23.5 mil bbls), available data suggests. Recall, craft beer volume sank in 2020 amid Covid-19 shutdowns and recovered considerably in 2021, only to backtrack again in 2022, CBN estimates. So volume dipped 3 outta the last 4 yrs. This also marks craft's 5th year in a row of share loss in off-premise scans as consumers are buying less craft beer and retailers reduce shelf space. Craft shed 0.4 share of beer $$ and 0.2 share of volume to 10.25 and 7.2, respectively, YTD thru Dec 3 in Circana multi-outlet + convenience data.

Craft bottles remain one of the biggest drags on segment sales. Bottles declined 15% while craft can growth slowed to +1.6% for 52 wks thru Dec 2 in separate NielsenIQ data. Then too, total beer keg shipments to wholesalers declined 4% thru Sep, still well below pre-Covid levels, disproportionately impacting craft. And taprooms are declining for the first time in over a decade thru 9 mos of available TTB data (TTB taproom stats may be revised considerably upward once finalized due to annual filers, but currently listed down double-digits). Notably, taproom volume is no longer getting much of a net boost from new breweries as the brewery count became “static” in 2023, Brewers Assn chief economist Bart Watson continues to point out.

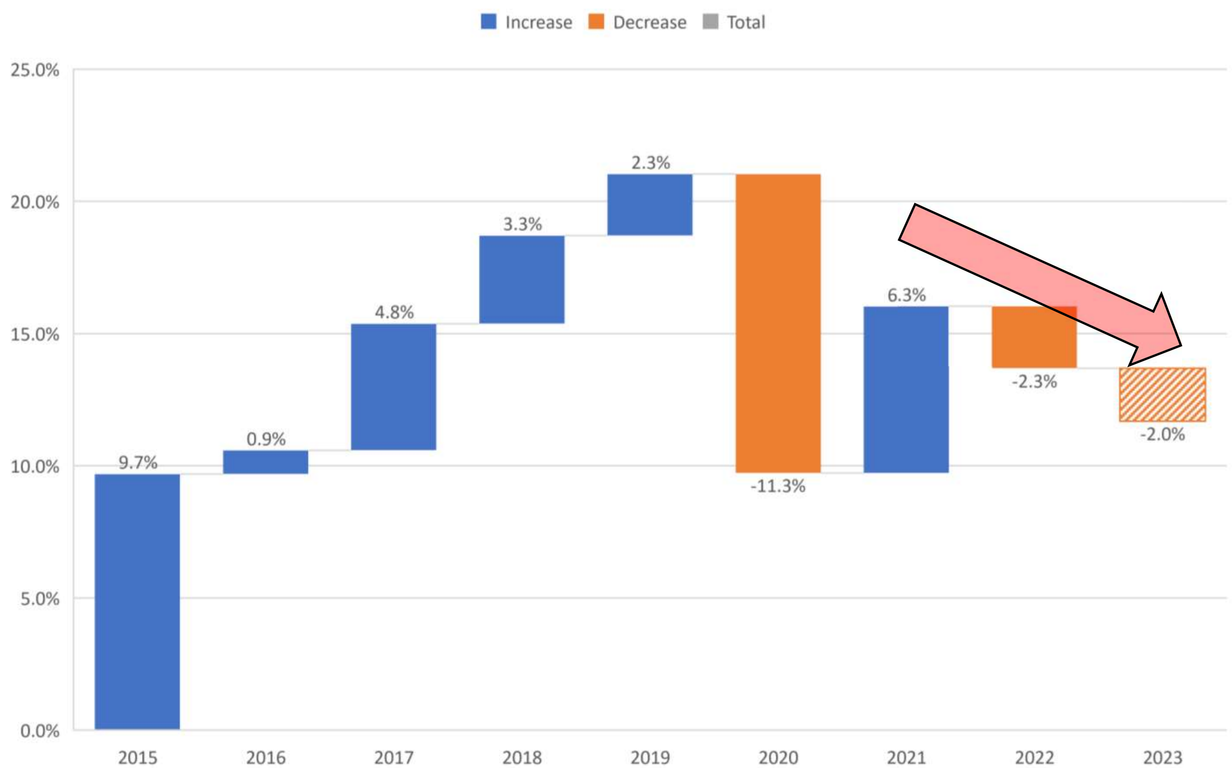
Annual Change in US Craft Beer Growth Rates



- US Craft volumes never recovered from pandemic
- For 2023, Craft will again post declines, est. at +/- 2%
- Consumption of all-important, high margin draft continues to be weak – vastly fewer tap handles now

Source: BA, incl. Macro craft

Annual Change in US Craft Beer Growth Rates



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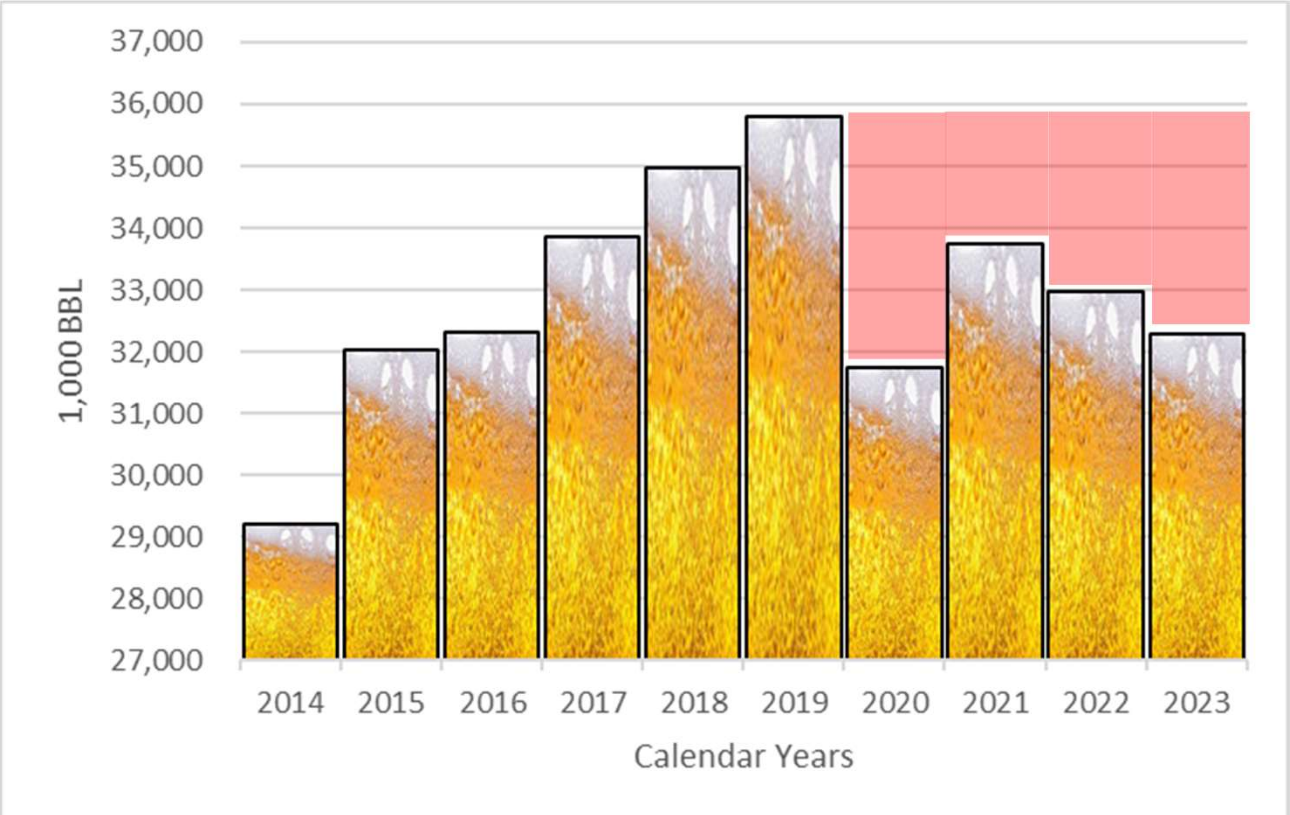
Source: BA, incl. Macro craft

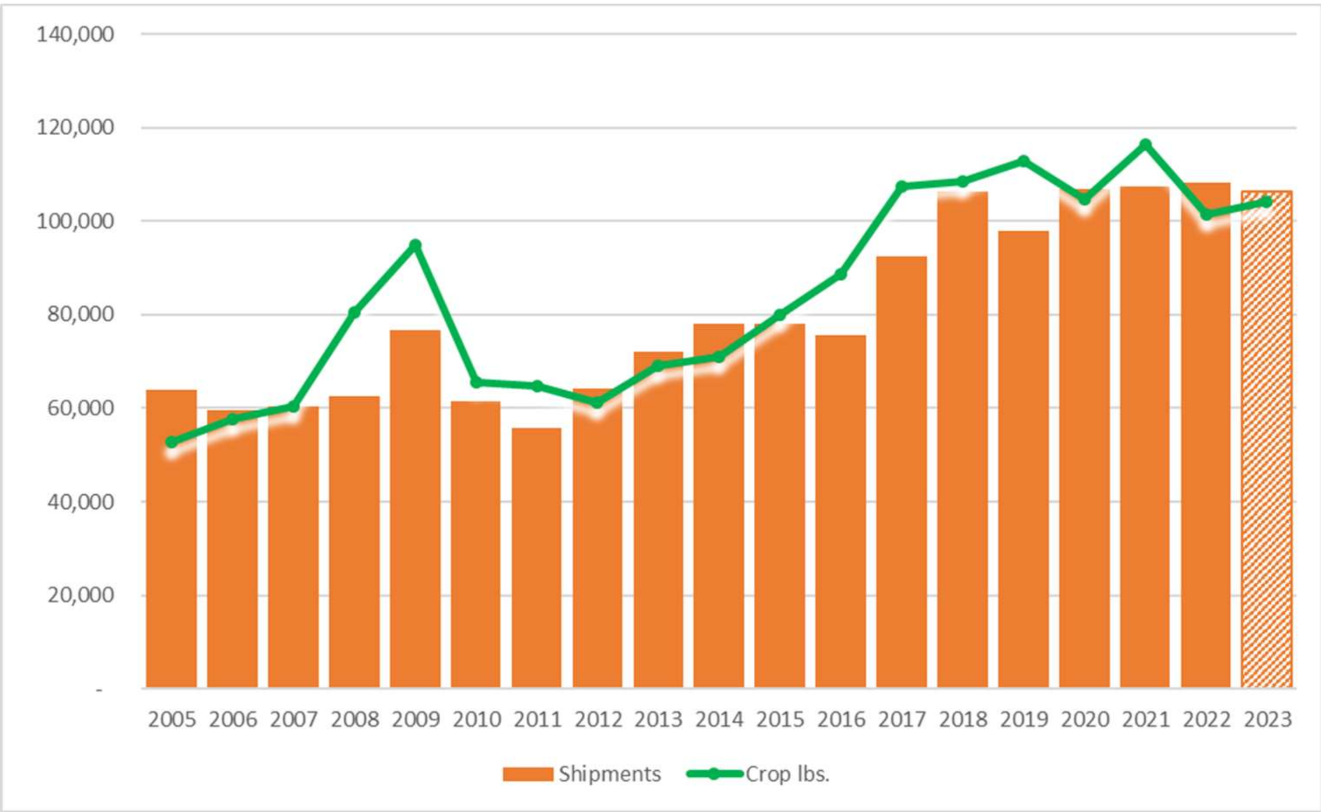
US Craft Beer Volume (bbl) Development



- Annual beer output dropped from 2019 to 2023 (est.) by 3.5 million bbls
- Compared to 2019, cumulative volume loss is nearly 12.5 million bbls
- At a theoretical 1.5 lb/bbl hopping rate, equates to ~20 million lbs of hops

Source: BA, incl. Macro craft

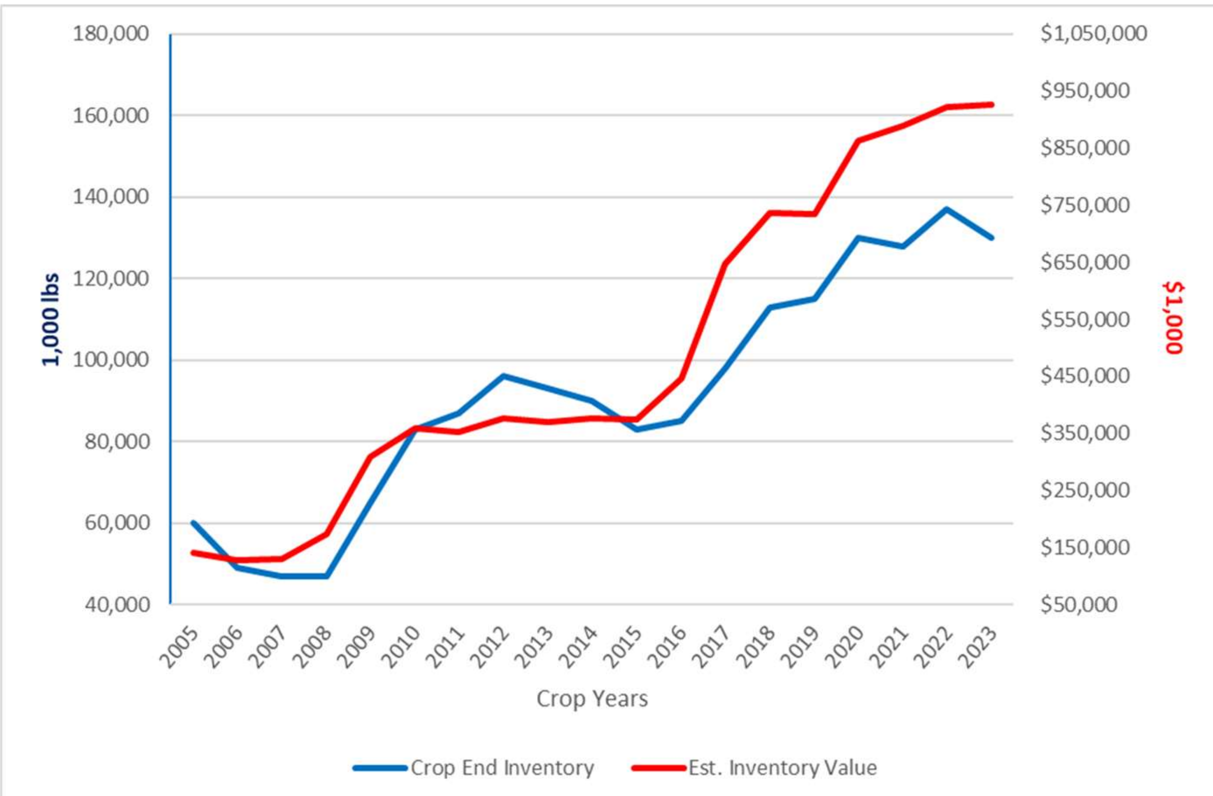
Crop Production vs. Shipments (in 1,000 lbs)



- Crop 2023 yields about equal to shipments (assumes 5-year avg. shipping rates)
- Crop 2023 made no meaningful impact on inventory reduction, despite *large* acreage cuts
- Estimated excess inventories of 35-40 million lbs. remain basically unchanged

Source: HGA Stat Pack

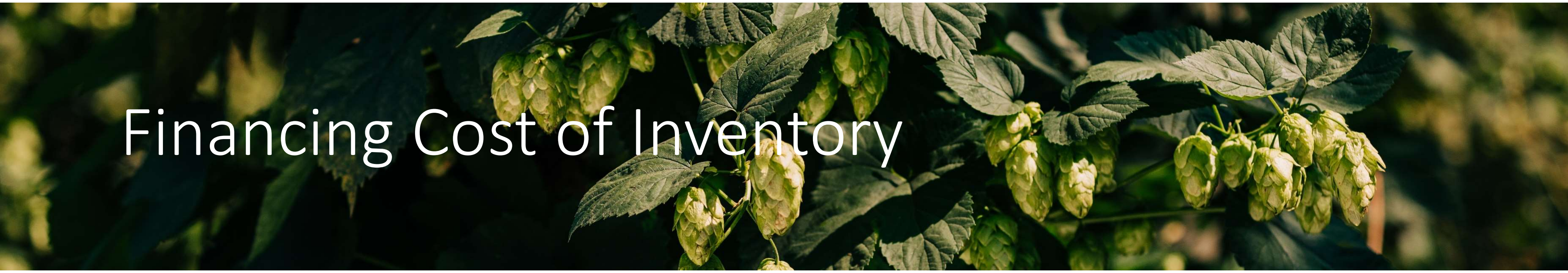
Cost of Accumulated Inventory

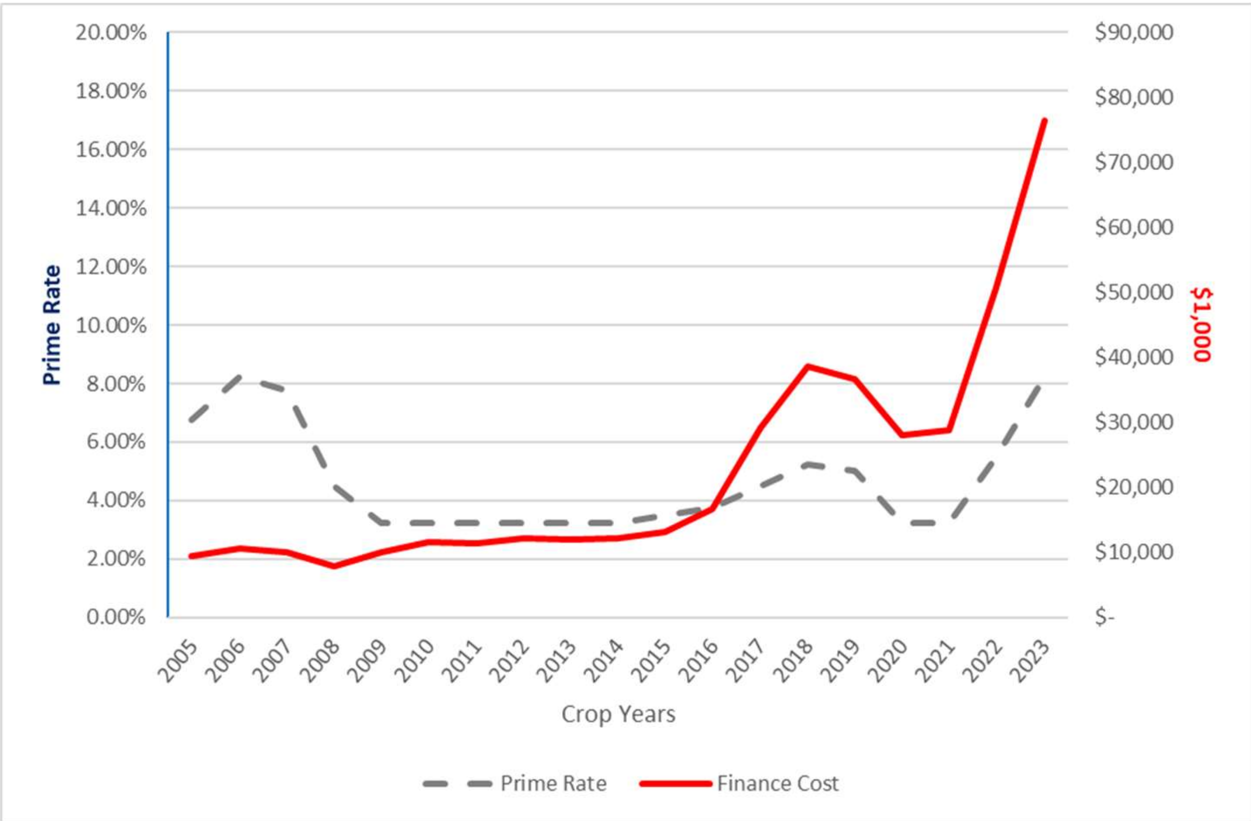


- Since 2015, cost of prior year inventory more than doubled, to almost $950 million
- ~16 months of shipments
- Just prior to new crop harvest ($562 million 2023 Farm Gate)
- Combination of increasing volumes + aroma/alpha shift

Source: NASS, HGA Stat Pack

Financing Cost of Inventory





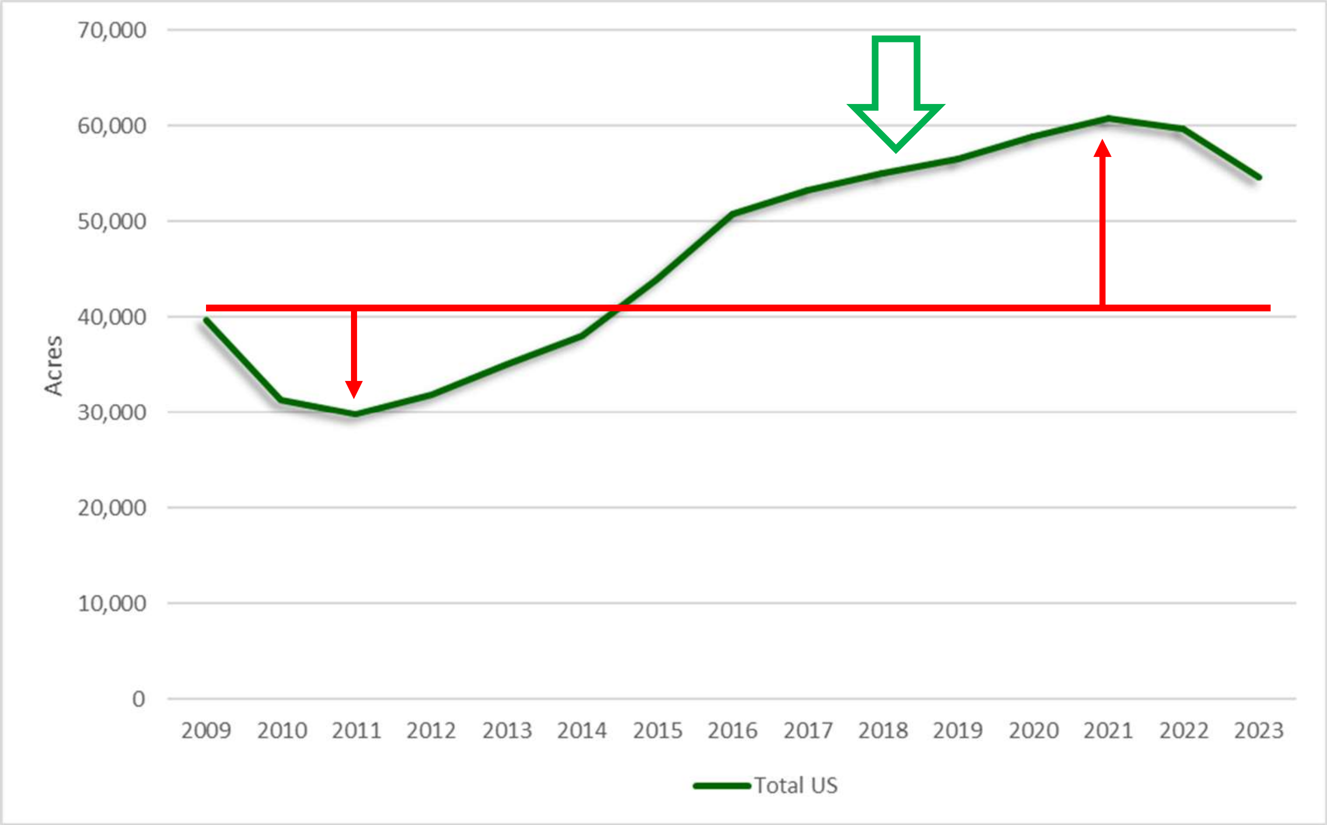
- Interest rates back to pre-financial crisis levels; will never be "free" again

- High crop cost +
  High inventory levels X
  High interest rates =
  Run-away financing costs

- $75 million annual interest on carryover stocks
  ➔ Unsustainable!

- In 2008, each lb. of hops carried just $0.10 of financing costs; in 2023, it's ~$0.75

Acreage Development (2009 – 2023)

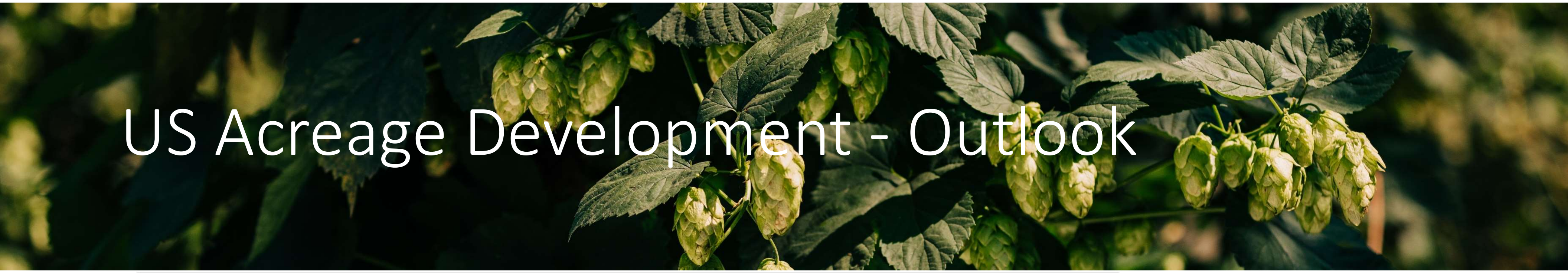


- After peaking at ~61,000 acres, total acreage is back to 2018 levels
- However, from prior peak in 2009, the industry added ~21,000 acres (+50%)
- Incl. supporting infrastructure (massive investments, $750M estim.)

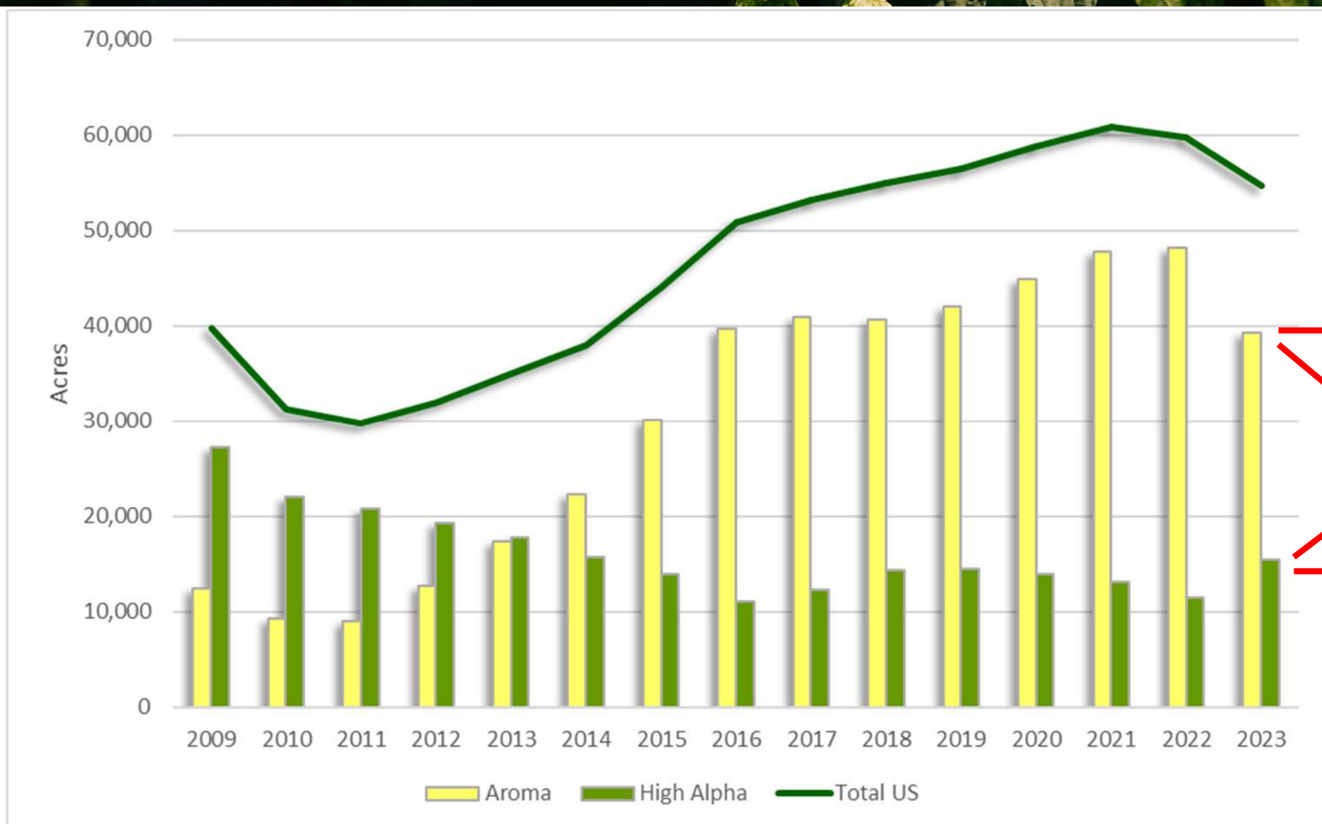
Source: HGA Stat Pack

Conclusion (Almost)

- Beer stagnant / down (global, US, craft)
- Hop stocks up (alpha/aroma, EU/US)
- Macro *headwinds* (climate, inflation, FX, regulations, politics, wars, etc.) and *tailwinds* (IPAs, N/A, innovations, winners, sustainability)



US Acreage Development - Outlook



- Where is (should) acreage go for 2024 and 2025+?

???

Answers to
these burning
questions
– and more –
in the upcoming
Q&A session!