



BarthHaas®

REPORT

2022/2023






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FOREWORD

The social and economic effects of the COVID-19 crisis are still with us. They have been joined by the consequences of Russia's war in Ukraine. Prices are soaring. We see all long-term measures – even the fight against climate change – being overshadowed by short-term crisis management. The world is politically divided. People have lost confidence in governments, in their neighbors, and in countries that were traditionally viewed as partners. It is a crisis of confidence that is paralyzing the world in many ways. We are living through a time in which tensions within countries, but also conflicts between countries, are increasing exponentially. Never since the Second World War have there been so many

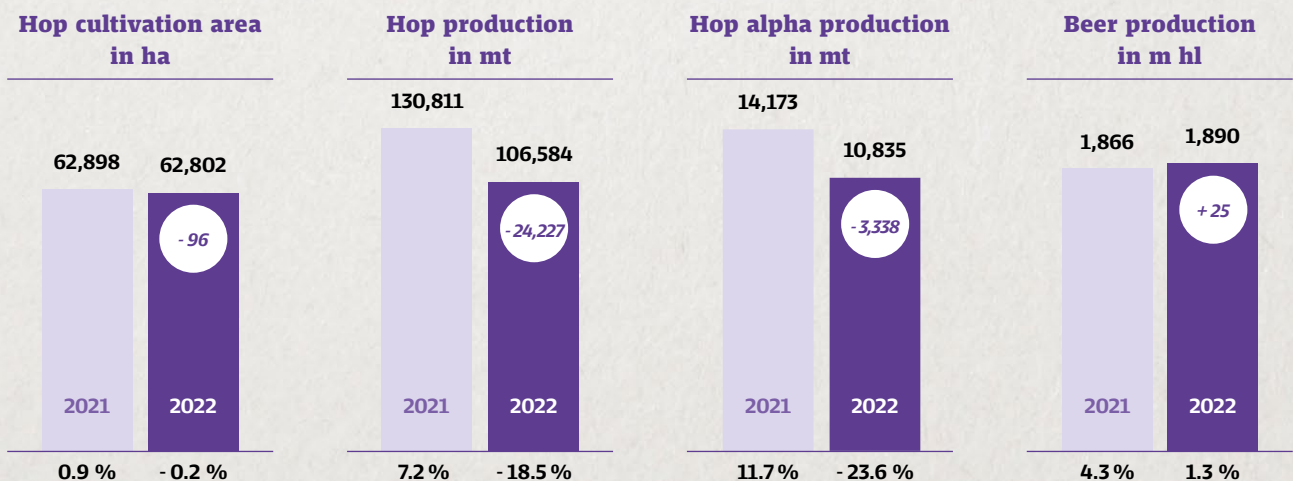
refugees and internally displaced people. All this contains a high potential for severe crises. However, that must not be allowed to rob us of hope or lead us to resignation.

BarthHaas has been an important partner in hop growing and hop supply for nearly 230 years. We are facing up to the challenges of the day and are proving that it pays to place your trust in us. With our innovations, our expertise, and our unique global position in the hop industry, we want and are able to support our growers and customers and provide specific solutions with which to accompany them on their respective journeys into a promising future.



Photo: Peter Hintermeier (left), Oliver Bergner (right)

WORLD MARKET DATA





WORLD POLITICS

Reporting period ending May 31, 2023

The global geopolitical situation was extremely tense, with multiple trouble spots.

The war in Ukraine, which began on February 24, 2022, accelerated a development that had already been becoming apparent for some time: a new world order. Asian and Eastern European countries with authoritarian regimes are lined up against Western countries with democratic, liberal political systems. Both sides are competing for greater influence over the Global South. The future of the geopolitical world order is therefore increasingly being co-determined by the group of countries made up of the developing and emerging economies.

War in Europe

Russia's war of aggression against Ukraine continues. Eastern Ukraine is being fiercely fought over.

On September 30, 2022, Russia's head of state Vladimir Putin proclaimed the annexation of the Ukrainian regions of Donetsk, Luhansk, Zaporizhia and Kherson. This action was strongly condemned internationally, as it is in breach of international law and therefore legally void.

Ukraine is receiving financial, humanitarian and military support, including the provision of weapons, from the EU, the G7 states and other democratically governed countries.

In February 2023, the UN General Assembly passed a resolution with the votes of 141 member states condemning the Russian war of aggression against Ukraine and demanding the withdrawal of the Russian troops.

In March 2023, the International Criminal Court (ICC) in The Hague issued an arrest warrant against Vladimir Putin. The court accuses him of "war crimes".

Other wars/conflicts

The death of a young Kurdish woman triggered off a nationwide uprising in **Iran**. She had died in police custody on September 16, 2022. In response, tens of thousands of Iranians demonstrated against the repressive course taken by the government and Islamic rule. The Iranian regime responded to the popular demonstrations with brute force, going as far as to impose death penalties. The Iranian leadership has also courted international controversy with its nuclear policy.

Since the radical Islamist Taliban seized power in August 2021, the humanitarian situation in **Afghanistan** has deteriorated. The supply crisis is dramatic. Women are being systematically excluded from all areas of public and political life. Supporters of the Islamic State (IS) are repeatedly carrying out terrorist attacks.

In **Sudan** two generals are fighting for power. The situation escalated in April 2023. Hundreds of civilians died and hundreds of thousands fled to escape war and starvation.

In **Ethiopia**, after two years of civil war the central government and the rebels of the People's Liberation

Front signed a peace treaty in the northern province of Tigray in November 2022. The entire country is a hotbed of conflicts among more than 90 different ethnic groups. The many refugees who have been arriving in Ethiopia from neighboring **Sudan** since May 2023 constitute an additional challenge.

A controversial judicial reform in **Israel** has triggered a deep domestic political and social crisis. There has been an unprecedented wave of protests against the government's plans since January 2023. The demonstrators accuse the government of attempting to weaken the country's independent judiciary and undermine democracy in Israel.

Elections/government coalitions

In **the UK**, the prime minister **Boris Johnson** stepped down as chairman of his party (Conservative Party) on July 7, 2022, but remained head of government for the time being. On September 5, 2022 he was succeeded in both roles by his foreign minister **Liz Truss**. After just over six weeks in office, she in turn resigned on October 20, 2022. She was succeeded as prime minister by **Rishi Sunak**.

After 70 years on the throne, the British monarch **Elizabeth II** died on September 8, 2022 at the age of 96. Her son **Charles III** was officially proclaimed king on September 10, 2022.

Following the resignation of the prime minister **Mario Draghi**, an early general election was held in **Italy**. The Italian parliament elected **Giorgia Meloni**, the leader of the post-fascist party Fratelli d'Italia (Fdl), as prime minister on October 22, 2022.

The presidential election in **Brazil** on October 30, 2022 was won by the left-wing politician and former president **Luiz Inácio Lula da Silva** who defeated his opponent, the far-right incumbent **Jair Bolsonaro**.

In the midterm elections in the **USA** on November 8, 2022, the Democrats under US President **Joe Biden** succeeded in defending their majority in the Senate, but lost the majority in the House of Representatives to the Republicans.

In December 2022 the Knesset in **Israel** elected **Benjamin Netanyahu**, the winner of the general election of November 1, 2022, as prime minister, thus confirming the coalition made up of the right-wing conservative Likud party, the extreme right-wing Religious Zionist Alliance, and two ultra-Orthodox parties. This is the most right-wing government that Israel has ever had and for the first time there are extreme right-wing politicians in its ranks. It was the fifth election within three and a half years.

In **China** the National People's Congress confirmed **Xi Jinping** as the country's president for a third period in office on March 10, 2023. Previously, the presidential term was limited to two periods.

In the presidential elections in **Turkey**, the opposition leader **Kemal Kılıçdaroğlu** was defeated by the incumbent president **Recep Tayyip Erdoğan** in the run-off on May 28, 2023.



WORLD POLITICS

NATO accession

Finland joined NATO on April 4, 2023 to become the 31st member state of the transatlantic Alliance. Sweden's admission is still awaiting ratification by Turkey and Hungary.

Following the disputed annexation of four Ukrainian regions by the Russian Federation on September 30, 2022, Ukraine applied for NATO membership on the same day.

COVID-19 pandemic

The continuing zero-COVID policy in China triggered the greatest wave of protest seen for decades in November

2022. Hundreds of people in the country's major cities demonstrated against the repeated lockdowns and compulsory quarantine. To everyone's surprise, the Chinese government lifted the COVID restrictions on December 7, 2022. From that moment, the coronavirus spread rapidly throughout the entire country. Experts assumed that this wave of COVID infections had passed its peak by the end of January 2023.

Since then, the number of infections with the SARS-CoV-2 virus that causes COVID-19 has decreased sharply worldwide.

GLOBAL ALCOHOL CONTROL POLICIES

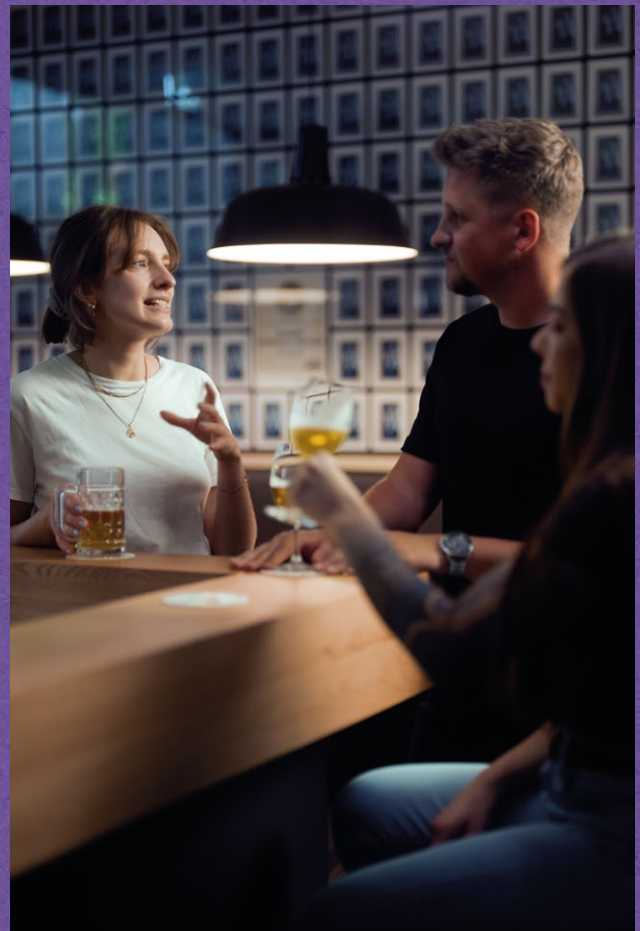
By invitation: Justin Kissinger, President & CEO of Worldwide Brewing Alliance

In recent years, an influential coalition of public health experts and temperance activists has been pushing a narrative that there is "no safe level" of alcohol consumption. This perspective on the harm from alcohol is resonating in the media, and alcohol is being framed as inherently harmful, with calls for new stringent regulations in many markets. This has already trickled down into alarmist national policies such as Ireland's new health warning labels on all alcoholic products and Canada's proposed guidelines that recommend no more than two alcoholic drinks per week.

Momentum for these policies is being driven by some in the World Health Organization and aligned experts and activists. Last year, the WHO completed its Global Alcohol Action Plan – an international plan for reducing harm from alcohol – that continues to focus on tackling the harmful use of alcohol despite earlier efforts to set a target for reducing per-capita consumption. It also recognizes the benefits of shifting consumers from higher-strength toward lower-strength products.

The trends around the science and health-impact of alcohol will continue to grow, increasing focus on alcohol control policies across the globe. As the lowest alcohol beverage category, the beer sector is well positioned to respond and be an ally to public health goals. Various industry organizations will therefore be focused on promoting differentiation, including citing research that shows that substituting high-alcohol beverages with low-alcohol ones, like beer, can reduce overall consumption and improve public health at the population level. Combined with continued promotion of responsible drinking and brewers' investment and innovation in lower- and no-alcohol options, the industry has an unprecedented opportunity to align its business with public health objectives.

The next review of these policies is coming up at the United Nations in 2025. Between now and then, it will be critical for brewers and industry stakeholders to make clear the role beer can play in reducing the harmful use of alcohol.





WORLD ECONOMY

Reporting period ending May 31, 2023

The after-effects of the coronavirus pandemic, disrupted supply chains, the war in Ukraine, high energy prices and unbridled inflation did not bode well for the development of the world economy.

In 2022, world **gross domestic product (GDP)** fell to 3.4%, down from 6.3% the previous year. In the **USA**, the economy grew by only 2.1%, following growth of 6.0% in 2021. **China's** economic performance of only 3.0% (2021: 8.5%) shows the effects of the country's restrictive anti-COVID measures. GDP in **Japan** fell by half to 1.1% (2021: 2.2%). In **Germany**, too, growth was also lower at 1.9% (2021: 2.6%). According to calculations by the International Monetary Fund (IMF), the world economy will continue to weaken in 2023, falling below 3%.



Interest rates

In July 2022, in response to high inflation rates the **European Central Bank (ECB)** ended years of loose monetary policy with a reversal in interest rates, raising its key lending rate in seven steps by a total of 3.75 percentage points. Due to the general rise in prices, the **US central bank (the Federal Reserve, or Fed)**, had already begun to gradually raise its benchmark rate in March 2022. By the end of the reporting period, it had lifted the rate to a target range of 5–5.25 percent. The interest rate increases for the euro zone were the fastest and sharpest in its history. In the USA, interest rates are at their highest level in 16 years.

Banking crisis

As a direct result of interest rate increases, several regional banks in the USA found themselves in difficulties. **Silicon Valley Bank (SVB)**, the house bank of the American start-up scene, collapsed, its business model being unable to withstand the rising interest rates. On March 10, 2023, the bank was placed under federal control. The collapse of SVB was the biggest bank failure since the global financial crisis of 2007/2008. Another US bank, **First Republic**, was caught up in the turbulence. After receiving billions of dollars in support from the largest US financial institutions, the bank was taken over by the financial holding company JPMorgan Chase & Co. in May 2023. Two other US banks went out of business. The situation remains tense.

Swiss bank **Credit Suisse AG**, a systemically important global financial institution, was also gripped by a major crisis. On March 19, 2023, it was announced that it had been taken over by its competitor UBS. The takeover was negotiated through the mediation of the Federal Council of the Swiss government.

Currencies

The US dollar profited from the tighter monetary policy of the Federal Reserve and was in increasing demand because of the untransparent geopolitical situation. The European Central Bank, on the other hand, was hesitant to take measures to combat inflation. On foreign exchange markets, the **euro** weakened further against the **US dollar** and reached a 20-year low of 0.960 USD on September 27, 2022. As the exchange rate began to recover, it reached its highest level during the reporting period of 1.113 USD on April 28, 2023.

Stock market

The **German share index (DAX)** fell to its lowest level within the reporting period of 11,975 points on September 29, 2022. It reached a new record high of 16,275 points on May 19, 2023. The **Dow Jones Industrial Average (DJIA)**, the US share index, fell to a low of 28,803 points on September 30, 2022. It reached its highest level of 34,254 points on February 9, 2023.

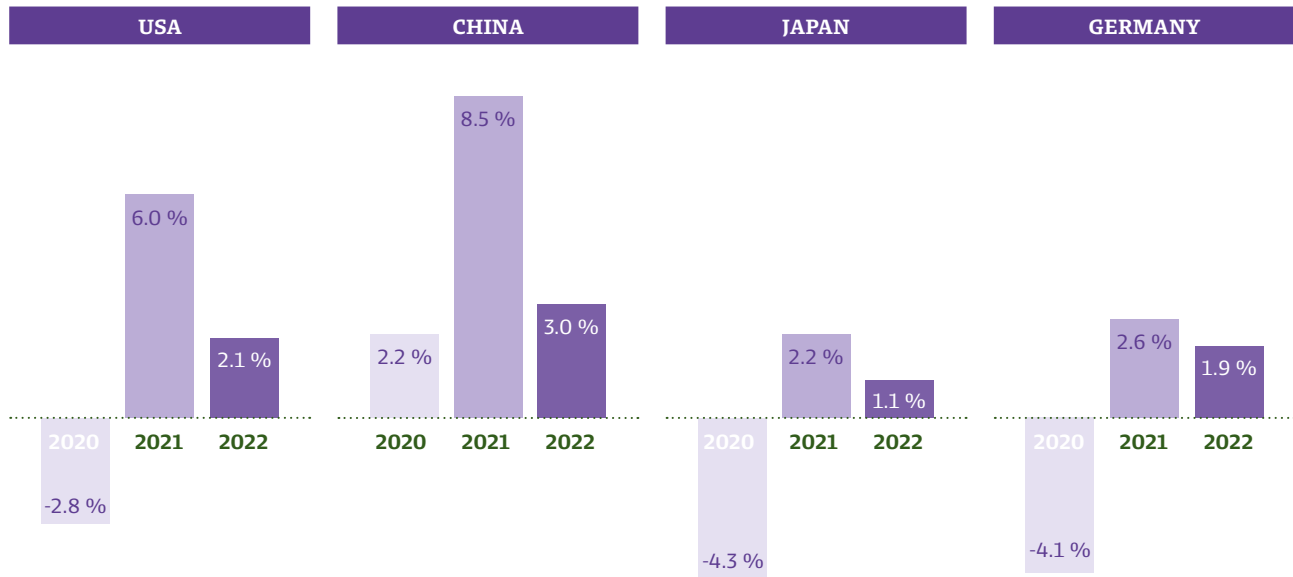
Commodities

Commodities in general rose in price. The **oil price**, on the other hand, was under pressure for some time due to concerns about economic growth. The price of Brent crude oil reached its highest level of 123.79 USD per barrel on June 8, 2022. Its lowest price during the reporting period was 71.93 USD recorded on May 3, 2023. The price of gas also fell.



KEY DATA

GDP growth (real)



		Balance of payments in USD bn	Balance of trade in USD bn	Inflation rate Ø*	Interest rate Ø*	Unemployment (as of 31.12.)
USA	2020	-619.7	-913.9	1.3 %	0.89 %	8.1 %
	2021	-846.4	-1,090.3	4.7 %	1.44 %	5.4 %
	2022	-951.4	-1,191.0	8.0 %	2.95 %	3.7 %
China	2020	248.8	511.1	2.5 %	2.92 %	4.2 %
	2021	317.3	562.7	0.9 %	3.01 %	4.3 %
	2022	417.5	685.6	2.0 %	2.76 %	4.0 %
Japan	2020	147.9	26.6	-0.0 %	-0.01 %	2.8 %
	2021	197.6	15.9	-0.3 %	0.07 %	2.8 %
	2022	90.4	-117.8	2.5 %	0.23 %	2.6 %
Germany	2020	274.2	218.0	0.4 %	-0.49 %	5.9 %
	2021	313.8	227.9	3.2 %	-0.34 %	5.7 %
	2022	150.7	121.2	8.7 %	1.17 %	5.3 %

The figures for 2020 and 2021 have been revised according to the latest statistics and subsequent recalculation.

* Interest rate for 10-year bonds.

CURRENCY EXCHANGE RATES

1 EUR EQUALS (REFERENCE BY ECB):

	on May 31, 2022	on May 31, 2023		on May 31, 2022	on May 31, 2023
Australia	1.4933 AUD	1.6497 AUD	Poland	4.5805 PLN	4.5368 PLN
China	7.1402 CNY	7.5926 CNY	Switzerland	1.0281 CHF	0.9724 CHF
United Kingdom	0.85138 GBP	0.86405 GBP	South Africa	16.7450 ZAR	21.1353 ZAR
Japan	137.36 JPY	149.13 JPY	Czech Republic	24.714 CZK	23.741 CZK
Canada	1.3573 CAD	1.4582 CAD	USA	1.0713 USD	1.0683 USD

These exchange rates can only serve as an indication. They vary from bank to bank and are not binding.



EUROPEAN UNION

Reporting period ending May 31, 2023

Accession to the European Union

Ukraine and the **Republic of Moldova** were officially admitted to the current group of EU candidate countries in June 2022, as was **Bosnia-Herzegovina** in December 2022. Negotiations with **North Macedonia** and **Moldova** on EU accession began in July 2022.

European Economic and Monetary Union (EMU)

Croatia introduced the euro as its currency and joined the border control-free Schengen area on January 1, 2023. The country has been a member of the European Union since 2013.

Asylum and Migration Policy

For years now, the EU states have been wrestling over the right course in asylum and migration policy. In 2022, the number of applications for asylum rose by nearly 50 percent year on year to stand at over 920,000. This was in addition to some four million Ukrainian refugees who are not required to apply for asylum. At a Brussels summit in February 2023, the heads of state and government agreed to toughen the policy by stepping up border protection, accelerating deportations, and preventing irregular migration.

Common Agricultural Policy (CAP)

January 1, 2022 marked the expiry of the deadline set by the European Commission for submission of CAP Strategic Plans by the member states. Having received the plans, the Commission sent notifications to all member states by May 25, 2022. In keeping with transparency principles, these were published along with the member states' responses on the europa.eu website. The structured dialogue between the Commission departments and the national authorities was then resumed in order to clarify any unresolved issues and finalize the revised CAP plans.

The Commission made sure that each plan was in keeping with the ten main goals of the CAP addressing the common ecological, social, and economic challenges. The plans must comply with EU legislation and should also contribute to meeting the EU's climate and environmental goals as specified in the Commission's "Farm to Fork" Strategy and its Biodiversity Strategy.

The Commission approved the first CAP Strategic Plans on August 31, 2022. With all 28 strategy plans (one for each EU country but two for Belgium) approved during the further course of the year, the new CAP 2023–2027 came into effect as planned on January 1, 2023. Implementation of the CAP Strategic Plans then began.

EU funds totaling 264 billion euros have been set aside for realization of the CAP goals. When co-financing and additional national funds are taken into account, the entire public budget for farmers and farming communities in the period 2023–2027 comes to 307 billion euros. A further 6 billion euros is available for other programs that are also within the responsibility of the CAP, but do not form part of the Strategic Plans. The beneficiaries include the POSEI program for the outermost regions, the EU schools program, and the sales promotion programs.

By the end of 2023, the European Commission will present a report in which the joint work of all the CAP Strategic Plans will be assessed, with the focus on common goals within the context of the Green Deal.

From 2024, each EU country will have to draw up an annual performance report showing their progress toward achieving the goals they have set themselves and organize an annual review meeting with the Commission.

Implications for hops as a specialty crop

On June 22, 2022, the EU Commission proposed new rules designed to reduce the use of and risks from pesticides in the EU in order to achieve the "Farm to Fork" Strategy's goal of creating a fair, healthy, and environment-friendly food system.

These proposals include:

- Legally binding EU-wide targets with the goal of reducing the use of and risk from pesticides in general and the use of dangerous pesticides by 50 % by 2030.
- Strict new rules designed to enforce environment-friendly pest control.
- A ban on the use of all pesticides in sensitive locations, such as public parks or gardens, playgrounds, recreational areas or sports grounds, and on public paths.
- Farmers will receive adjustment support through the EU's Common Agricultural Policy (CAP).

The new rules will be set out in an EU regulation that is binding for all member states. The corresponding measures will restrict the use of pesticides in hop growing and further reduce the number of pesticides available.

Once the 2023–2027 CAP had begun, the EU Commission started work reviewing and revising the relevant product-related regulations. For hops in particular, these are:

- Regulation (EC) No. 1850/2006 Hop and hop product certification
- Regulation (EC) No. 1295/2008 Importation of hops from third countries
- Regulation (EC) No. 1299/2007 Recognition of producer groups for hops



EUROPEAN UNION



With regard to the hop certification regulation, the individual member states' requests for adaptation were gathered and discussed. In addition, the member states were asked to assess the EU Commission's amendment proposals.

The only proposal received to date regarding the regulation on the importation of hops and hop products from third countries is from Germany's General Customs Directorate. The Directorate's proposal refers to the digitalization and simplification of the customs clearance process and the standardization of documentation within the authorities involved.

The regulation on producer group recognition defines the requirements that must be met in order to be recognized

as a producers' organization. The extent to which the German growers' associations meet these requirements is currently being examined. Recognition as a producer group is extremely important. The measures in the CAP Strategic Plan must be planned, submitted for approval, and once approved by the Federal Agency for Agriculture and Food, implemented by EU-approved producer groups within the framework of so-called "Operational Programs".

At the time of going to press, the consultations on these three regulations had not been concluded.



WORLD ACREAGE AND CROP 2021/2022

		2021				2022			
		Acreege ha	Production mt	Ø-Alpha %	Alpha mt	Acreege ha	Production mt	Ø-Alpha %	Alpha mt
Germany	Hallertau	17,122.0	41,093.0	12.5 %	5,122	17,111.3	29,152.3	10.3 %	3,011
	Elbe-Saale	1,581.8	3,223.3	10.9 %	350	1,575.5	2,528.6	10.0 %	253
	Tettmang	1,494.4	2,716.4	8.8 %	238	1,496.8	2,301.8	7.5 %	173
	Spalt	399.8	807.9	7.9 %	64	409.1	411.0	5.0 %	21
	Rhen.-P./Bitburg	22.3	21.7	10.8 %	2	12.0	12.2	7.2 %	1
	Total	20,620.3	47,862.2	12.1 %	5,776	20,604.6	34,405.8	10.1 %	3,459
Czech Republic	Saaz	3,833.7	6,358.4	4.6 %	290	3,800.7	3,176.2	3.7 %	119
	Tirschitz	620.6	997.8	4.3 %	43	621.5	733.4	3.5 %	26
	Auscha	516.9	949.6	5.0 %	47	520.5	542.8	4.6 %	25
	Total	4,971.2	8,305.7	4.6 %	380	4,942.6	4,452.3	3.8 %	169
Poland		1,758.5	3,107.9	8.1 %	251	1,728.1	3,424.6	9.1 %	312
Slovenia		1,534.5	2,185.8	5.0 %	110	1,625.7	2,283.0	5.0 %	114
France		584.6	957.2	5.8 %	56	672.5	769.3	3.8 %	29
Spain (incl. Galicia)		573.0	963.8	10.9 %	105	597.0	1,059.0	11.1 %	118
Romania		264.0	240.0	9.3 %	22	270.0	185.0	9.2 %	17
Austria		264.7	394.0	8.9 %	35	266.2	449.9	7.0 %	31
Belgium		181.3	291.7	8.0 %	23	185.3	241.6	6.7 %	16
Bulgaria		32.5	53.4	10.4 %	6	39.0	58.3	10.0 %	6
Slovakia		37.0	40.6	3.0 %	1	36.0	21.6	3.1 %	1
Portugal		12.0	20.8	9.4 %	2	12.0	7.9	10.0 %	1
Netherlands		4.8	0.9	14.5 %	0	4.8	1.6	9.2 %	0
	European Union	30,838.4	64,423.9	10.5 %	6,767	30,983.8	47,359.9	9.0 %	4,273
England		673.8	916.5	6.8 %	62	655.2	641.0	6.8 %	44
Russia*		366.0	590.0	4.7 %	28	400.0	600.0	4.5 %	27
Ukraine*		472.0	500.0	5.8 %	29	150.0	158.0	4.9 %	8
Turkey		179.0	222.0	10.0 %	22	138.0	114.2	10.3 %	12
Belarus/White Russia		60.0	82.5	8.4 %	7	62.0	91.7	8.7 %	8
Switzerland		18.0	31.0	10.7 %	3	18.0	20.3	8.1 %	2
Serbia		9.0	12.2	9.7 %	1	11.0	12.0	9.2 %	1
	Rest of Europe	1,777.8	2,354.2	6.5 %	152	1,434.2	1,637.2	6.2 %	101
	EUROPE	32,616.2	66,778.1	10.4 %	6,919	32,418.0	48,997.1	8.9 %	4,374
USA	Washington	17,718.7	38,377.9	12.0 %	4,590	17,305.5	32,573.2	12.1 %	3,953
	Idaho	3,923.1	8,352.7	11.8 %	985	3,750.3	7,290.4	10.8 %	789
	Oregon	2,992.8	5,718.9	10.6 %	604	3,138.8	6,079.0	10.6 %	643
	PNW-States	24,634.6	52,449.5	11.8 %	6,180	24,194.7	45,942.6	11.7 %	5,385
	Other States	561.3	408.2	7.7 %	32	563.3	420.4	8.6 %	36
	Total	25,195.9	52,857.7	11.8 %	6,211	24,758.0	46,363.0	11.7 %	5,421
Canada*		255.0	200.0	9.1 %	18	204.0	160.0	9.1 %	15
Argentina		178.4	267.8	9.5 %	25	194.2	314.2	9.1 %	29
	AMERICA	25,629.3	53,325.5	11.7 %	6,255	25,156.2	46,837.2	11.7 %	5,464
China	Xinjiang	1,356.1	3,742.0	7.2 %	269	1,349.4	3,399.0	7.2 %	245
	Gansu	1,013.4	2,551.0	7.5 %	192	1,074.5	2,614.9	7.1 %	185
	Total	2,369.5	6,293.0	7.3 %	461	2,423.9	6,013.9	7.2 %	430
Japan		85.7	171.2	5.2 %	9	79.8	166.2	5.2 %	9
	ASIA	2,455.2	6,464.2	7.3 %	470	2,503.8	6,180.0	7.1 %	439
South Africa		409.8	739.2	14.6 %	108	404.5	715.4	12.8 %	92
	AFRICA	409.8	739.2	14.6 %	108	404.5	715.4	12.8 %	92
New Zealand*		1,000.0	1,800.0	9.7 %	175	1,400.0	2,030.0	10.0 %	204
Australia		787.3	1,704.3	14.4 %	245	919.2	1,824.3	14.4 %	262
	AUSTRALIA/OCEANIA	1,787.3	3,504.3	12.0 %	421	2,319.2	3,854.3	12.1 %	466
	WORLD	62,897.8	130,811.2	10.8 %	14,173	62,801.7	106,584.1	10.2 %	10,835

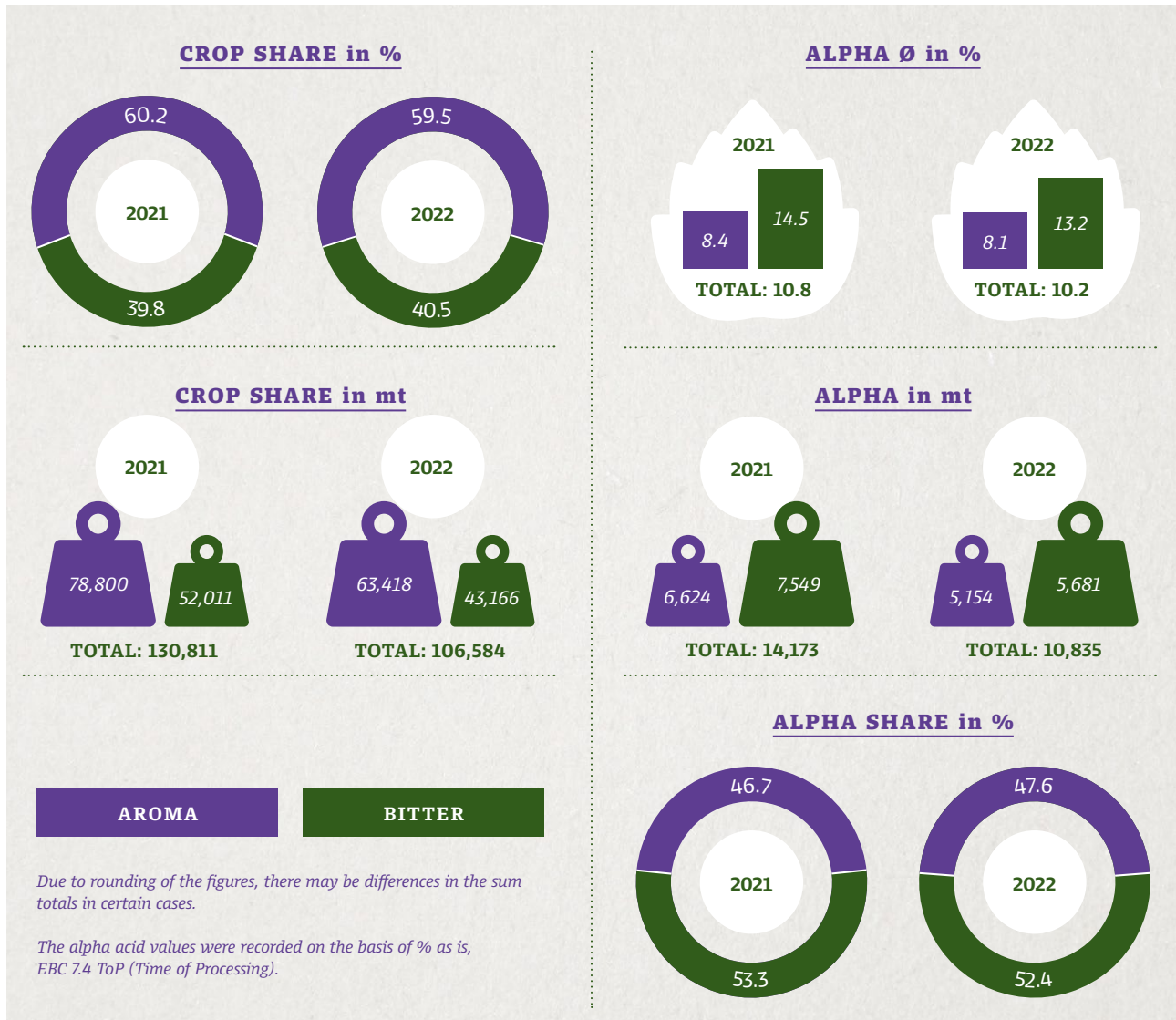
* Estimate

Italics: corrections of figures for 2021 as stated in last year's report



ALPHA ACID PRODUCTION

The world hop crop, divided into the groups below, produced the following alpha acid volume:



Although hop acreage was virtually unchanged, the volume of hops produced worldwide was 19% lower (-24,200 mt). Indeed, the alpha acid yield fell by 24% (-3,300 mt).

The share taken by aroma hops decreased in terms of crop yield in 2022 compared to 2021, but rose in terms of alpha yield. The exact opposite was the case for bitter hops.

The significantly below-average alpha content in Europe had a marked effect on the respective shares of the producer countries. The two leading hop-growing countries, the USA and Germany, together produced 82% (2021: 85%) of world alpha volume. The USA accounted for 50% (2021: 44%) and Germany for 32% (2021: 41%). In the aroma segment, the USA continued to dominate alpha production with 70% in 2022 (2021: 60%), while Germany accounted for 12% (2021: 22%). In the bitter segment, Germany accounted for 50% (2021: 57%) of alpha production and the USA for 32% (2021: 29%).

The working group "Arbeitsgruppe Hopfenanalyse" (AHA) publishes the average alpha acid values measured in freshly harvested hops. The members of AHA are the in-house laboratories of the German processing plants Hallertauer Hopfenveredelungsgesellschaft, Mainburg and Hopfenveredelung St. Johann, HVG Mainburg, LfL Hüll, BLQ Weihenstephan, VLB Berlin, Labor Veritas (Zurich), TU Berlin and IHPS Žalec. These values form the basis for any adjustments of supply contracts between the brewing industry and the hop industry containing an "alpha clause". The average values serve as the basis for parties concluding new supply contracts containing an "alpha clause". The table includes the designation of varieties as aroma hops (A) or bitter hops (B) in accordance with IHGC (International Hop Growers' Convention) classification.



ALPHA ACID PRODUCTION

Alpha acid values of the AHA as is, as per EBC 7.4, in freshly harvested hops

All other alpha acid values mentioned in the Barth Report were recorded on the basis of % as is, EBC 7.4 ToP (Time of Processing).

Area	Variety	Type	2021	2022	Ø 5 Years	Ø 10 Years
Hallertau	Hallertau Mittelfrueh	A	5.2	3.1	4.1	3.8
	Hersbruck Spaet	A	4.6	1.9	2.9	2.6
	Saphir	A	4.3	2.6	3.5	3.4
	Opal	A	8.7	6.1	7.4	7.1
	Smaragd	A	7.6	4.0	5.1	5.1
	Perle	A	9.0	4.9	6.7	6.7
	Spalt Select	A	6.4	3.3	4.6	4.4
	Hallertau Tradition	A	6.1	5.2	5.6	5.6
	Mandarina Bavaria	A	9.9	8.2	8.5	8.0
	Hallertau Blanc	A	9.9	8.1	9.3	9.0
	Huell Melon	A	8.4	6.3	6.9	6.4
	Northern Brewer	A	10.5	6.4	8.3	8.2
	Polaris	B	21.5	18.5	19.7	19.5
	Hallertau Magnum	B	16.0	12.2	13.3	13.1
	Nugget	B	11.1	9.9	10.7	10.6
	Hallertau Taurus	Hallertau Taurus	B	17.8	14.6	15.5
Herkules		B	18.5	15.4	16.3	16.3
Elbe-Saale	Hallertau Magnum	B	13.8	12.0	11.8	12.0
Tettnang	Tettnang	A	4.7	2.6	3.7	3.5
	Hallertau Mittelfrueh	A	5.0	3.2	4.2	4.1
Spalt	Spalt	A	5.2	2.8	4.0	3.6
	Spalt Select	A	6.4	2.8	4.2	4.2
Czech Rep.	Saaz	A	4.0	2.8	3.3	3.1
	Sládek	A	7.7	6.0	6.0	6.2
	Premiant	A	8.5	7.8	7.3	7.5
Poland	Lubelski	A	3.5	3.9	3.8	3.6
	Marynka	A	7.5	8.2	7.8	8.1
	Sybilla	A	6.5	6.3	5.8	5.7
Slovenia	Aurora	A	6.8	7.0	8.4	8.3
	Savinjski Golding	A	2.2	2.4	3.1	2.9
	Bobek	A	3.9	3.4	4.5	4.4
	Celeia	A	3.3	2.6	3.3	3.3

Alpha acid values as is, as per EBC 7.4, ToP (Time of Processing)

USA	Nugget	B	13.2	13.8	13.8	13.6
	CTZ	B	15.1	15.1	15.5	15.2
	HBC 682	B	18.6	18.0	18.1	17.6
	Eureka!™	B	18.0	17.0	18.1	-

Type A = Aroma Type B = Bitter





COUNTRY REPORT: GERMANY

Area	Variety	Development of acreage			Development of production				
		Acreage ha			Ø Yield mt/ha		Production mt		
		2021	+/-	2022	2021	2022	2021	2022	
Hallertau	Perle	2,886.0	9.5	2,895.5	2.13	1.17	6,134.44	3,395.87	
	Hallertau Tradition	2,661.0	-81.9	2,579.1	2.05	1.29	5,447.43	3,321.43	
	Hersbruck Spaet	815.0	-11.5	803.5	1.77	1.44	1,443.08	1,159.85	
	Hallertau Mittelfrueh	478.3	-19.1	459.2	1.59	0.90	762.60	414.54	
	Spalt Select	444.6	-18.4	426.2	2.10	1.40	935.83	594.82	
	Saphir	317.4	-18.3	299.1	2.17	1.44	689.98	429.61	
	Mandarina Bavaria	205.3	-34.5	170.8	2.32	2.03	476.59	347.54	
	Opal	135.0	-2.3	132.7	2.12	1.15	286.50	152.42	
	Amarillo	126.6	-4.6	122.0	2.66	2.09	337.33	255.56	
	Northern Brewer	127.2	-12.1	115.1	1.82	0.95	231.89	109.36	
	Hallertau Blanc	127.0	-18.5	108.5	2.38	1.84	302.46	199.48	
	Other Aroma	440.4	16.4	457.7	1.84	1.46	810.90	667.83	
	Total Aroma		8,763.9	-195.7	8,568.2	2.04	1.29	17,859.03	11,048.31
	Herkules	6,499.4	159.6	6,659.0	2.95	2.30	19,172.63	15,307.72	
	Hallertau Magnum	1,234.3	-37.7	1,196.6	2.36	1.48	2,909.79	1,764.99	
	Polaris	291.0	57.6	348.6	1.59	1.50	463.92	521.84	
	Hallertau Taurus	165.0	-8.3	156.7	2.16	1.38	356.12	215.50	
	Nugget	107.0	-1.3	105.7	2.42	1.99	258.49	210.56	
	Other Bitter	61.4	15.1	76.5	1.19	1.09	73.00	83.39	
	Total Bitter		8,358.1	184.9	8,543.0	2.78	2.12	23,233.95	18,104.00
Total Hallertau		17,122.0	-10.7	17,111.3	2.40	1.70	41,092.98	29,152.31	
Elbe-Saale	Perle	272.5	8.0	280.5	1.85	1.29	503.08	362.83	
	Saaz	155.1	-1.4	153.7	1.64	1.01	254.05	154.88	
	Northern Brewer	127.5	-12.9	114.6	1.96	1.21	250.53	138.63	
	Other Aroma	141.2	5.8	147.0	1.64	1.46	232.21	214.45	
	Total Aroma	696.1	-0.4	695.7	1.78	1.25	1,239.87	870.79	
	Hallertau Magnum	621.2	-7.1	614.1	2.11	1.67	1,309.22	1,024.88	
	Herkules	137.2	-0.4	136.8	3.13	2.69	429.86	368.43	
	Polaris	118.8	1.5	120.3	1.90	1.99	225.47	239.23	
	Other Bitter	8.6	0.0	8.6	2.19	2.94	18.87	25.29	
	Total Bitter	885.7	-5.9	879.8	2.24	1.88	1,983.42	1,657.83	
Total Elbe-Saale	1,581.8	-6.3	1,575.5	2.04	1.60	3,223.29	2,528.62		
Tettngang	Tettngang	681.5	-27.4	654.1	1.46	1.08	997.32	703.91	
	Hallertau Mittelfrueh	138.2	0.8	139.0	1.81	1.35	250.54	187.12	
	Perle	126.8	4.2	131.0	1.68	1.52	212.72	198.65	
	Other Aroma	224.4	21.3	245.7	1.83	1.57	410.65	386.37	
	Total Aroma	1,170.7	-0.9	1,169.8	1.60	1.26	1,871.23	1,476.05	
	Herkules	294.2	5.1	299.3	2.73	2.58	802.28	773.47	
	Other Bitter	29.5	-1.8	27.7	1.45	1.89	42.89	52.23	
	Total Bitter	323.7	3.2	326.9	2.61	2.53	845.17	825.70	
Total Tettngang	1,494.4	2.4	1,496.8	1.82	1.54	2,716.40	2,301.75		
Spalt	Spalt	107.0	-1.1	105.9	1.51	0.68	161.19	72.29	
	Other Aroma	246.2	5.8	252.0	2.13	1.09	525.47	274.38	
	Total Aroma	353.2	4.7	357.9	1.94	0.97	686.66	346.67	
	Total Bitter	46.6	4.6	51.2	2.60	1.26	121.19	64.29	
Total Spalt	399.8	9.3	409.1	2.02	1.00	807.85	410.96		
Rhen.-P./ Bitburg	Total Aroma	14.7	-5.7	9.0	0.86	0.90	12.71	8.06	
	Total Bitter	7.6	-4.6	3.0	1.18	1.38	8.96	4.14	
Total Rhen.-P./Bitburg	22.3	-10.3	12.0	0.97	1.02	21.67	12.20		
Total Aroma		10,998.6	-198.0	10,800.6	1.97	1.27	21,669.50	13,749.88	
Total Bitter		9,621.7	182.3	9,804.0	2.72	2.11	26,192.69	20,655.96	
GERMANY TOTAL		20,620.3	-15.7	20,604.6	2.32	1.67	47,862.19	34,405.84	

The rounding of acreage figures sometimes leads to differences in sum totals.



COUNTRY REPORT: GERMANY

Farm structure

The number of hop growers in Germany declined further, with the loss of 9 farms. This brings the total number of producers who have given up hop farming in the past five years to 79. While total acreage remained virtually unchanged, the average acreage per farm increased year on year to 19.6 ha (+0.2 ha).

Hops were produced by 854 growers (-6) on a planted area of 17,111 ha (-11 ha) in Hallertau, by 29 growers (+/-0) on 1,576 ha (-6 ha) in the Elbe Saale region, by 124 growers (-1) on 1,497 ha (+2 ha) in the Tettngang region, by 44 growers (-2) on 409 ha (+9 ha) in Spalt, and by 2 growers (+/-0) on 12 ha (-10 ha) in Rhenish Palatinate/Bitburg.

Acreage and variety development

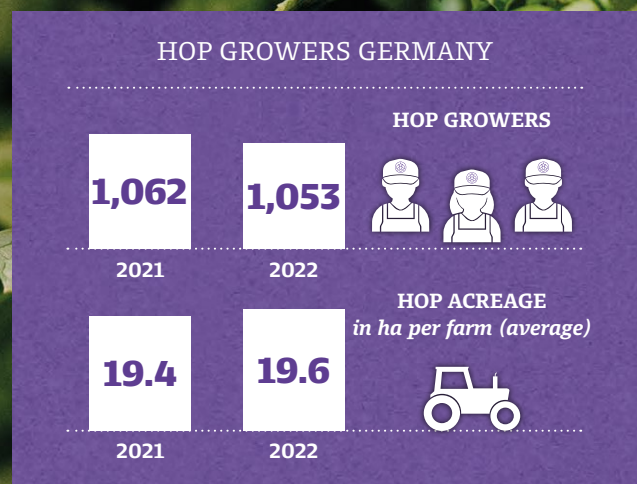
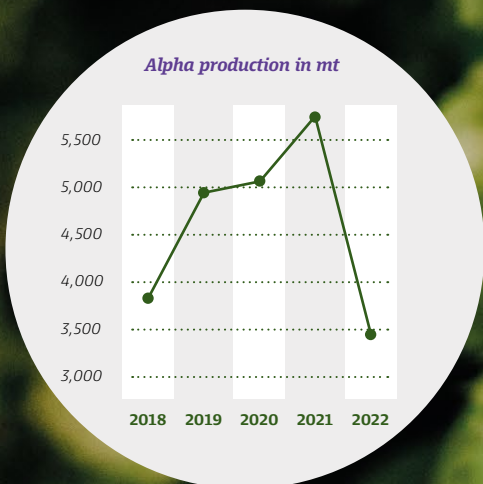
In relation to total acreage, the year-on-year decline of 16 ha is insignificant. Aroma hop acreage decreased by 198 ha (-2%), bringing its share of total acreage down to 52% (-1%). Bitter variety acreage on the other hand grew by 182 ha (+2%), raising its acreage share to 48%.

The only variety to see a noteworthy change in acreage was **Herkules**, with an increase of 168 ha (+2%). This consolidates its position as Germany's top-ranking hop variety with a share of 35% (+1%) of total acreage. It is

followed in the rankings by the aroma varieties **Perle** (+24 ha) in second place with 16% of acreage and **Hallertau Tradition** (-58 ha) in third with 14%, and the bitter variety **Hallertau Magnum** (-48 ha) in fourth with 9%, all with unchanged acreage shares. The aroma variety **Hersbruck Spaet** (-11 ha) is ranked fifth, with an acreage share of 4%.

Mandarina Bavaria, **Hallertau Blanc** and **Huell Melon**, which are also referred to in Germany as flavor varieties, saw their acreage decline (-70 ha). It will be interesting to see how the two new varieties from the Hüll hop research center, **Tango** and **Titan**, develop. These varieties combine climate stress tolerance and optimized cultivation and resistance characteristics with very good brewing quality. In brewing trials, the aroma variety **Tango** showed itself to be a good all-rounder. An area of 32 ha was planted with this variety in 2022. Brewing trials of the bitter variety **Titan** found it to have excellent bittering quality comparable to that of the market-leading hop variety **Herkules**. Planting of this variety is to begin from spring 2023.

The acreage shares of the production regions remained unchanged year on year: Hallertau 83%, Elbe-Saale 8%, Tettngang 7%, Spalt 2%.





COUNTRY REPORT: GERMANY

TOP 5 VARIETIES BY AREA SHARE 2022



Development of hop acreage in the last five years

Variety	2018 ha	2019 ha	2020 ha	2021 ha	2022 ha	Percentage of acreage 2022	Difference to previous year	Change in %
Perle	3,003	3,148	3,297	3,331	3,354	16.3 %	24	0.7 %
Hallertau Tradition	2,712	2,770	2,870	2,844	2,786	13.5 %	-58	-2.0 %
Hersbruck Spaet	924	918	904	821	810	3.9 %	-11	-1.3 %
Tettnang	750	732	718	682	654	3.2 %	-27	-4.0 %
Hallertau Mittelfruhe	687	678	671	650	636	3.1 %	-14	-2.1 %
Spalt Select	578	611	608	558	538	2.6 %	-19	-3.4 %
Saphir	515	492	449	395	374	1.8 %	-21	-5.3 %
Northern Brewer	293	279	266	255	230	1.1 %	-25	-9.8 %
Mandarina Bavaria	321	298	278	230	195	0.9 %	-35	-15.0 %
Saaz	156	156	157	162	160	0.8 %	-2	-1.1 %
Hallertau Blanc	168	167	167	149	127	0.6 %	-21	-14.4 %
Amarillo	300	206	178	144	138	0.7 %	-6	-4.3 %
Opal	141	146	144	138	135	0.7 %	-2	-1.6 %
Akoya	-	-	26	104	122	0.6 %	19	18.0 %
Spalt	120	118	113	107	106	0.5 %	-1	-1.2 %
Other Aroma	519	501	489	429	433	2.1 %	4	0.7 %
Total Aroma	11,185	11,221	11,335	10,999	10,801	52.4 %	-198	-1.8 %
Herkules	6,309	6,554	6,717	6,974	7,142	34.7 %	168	2.4 %
Hallertau Magnum	1,992	1,954	1,918	1,861	1,813	8.8 %	-48	-2.6 %
Polaris	225	275	340	437	494	2.4 %	57	13.1 %
Hallertau Taurus	258	228	211	169	161	0.8 %	-8	-4.9 %
Nugget	128	123	123	111	110	0.5 %	-1	-1.2 %
Other Bitter	47	61	61	70	85	0.4 %	15	21.4 %
Total Bitter	8,959	9,195	9,371	9,622	9,804	47.6 %	182	1.9 %
GERMANY TOTAL	20,144	20,417	20,706	20,620	20,605	100.0 %	-16	-0.1 %

The addition of rounded acreage figures may lead to differences in some cases.

Crop volume

Plant Development Report - Hallertau: In the winter months of December 2021, January and February 2022, the weather was much too warm, with excessive precipitation. Spring began with a very sunny, dry March and frequent night frosts. The spring work in the hop gardens was completed in ideal conditions. There followed a period of cool weather in early April which held back the development of the hop plants. As a result, bine training began approximately one week later than usual. Warmer temperatures in early May encouraged plant development, causing literally explosive growth of the hop shoots and requiring training to be done under considerable time pressure. Due to this rapid burst of growth by the beginning of June, plant development

was roughly one week ahead compared with the long-term average.

In the early evening of May 19, 2022, a thunderstorm accompanied by heavy rain and hail passed over the central Hallertau region. Another severe thunderstorm with hail and storm gusts on June 20, 2022 caused extensive damage in the southern Hallertau region. In total, the two thunderstorms caused damage of varying degrees to hop plants covering an area of about 2,000 ha.

The summer of 2022 was one of the hottest and driest on record. Hot, dry conditions were a constant feature of the months of June and July, with temperatures reaching 37 degrees. The soil became increasingly dry and the hop



COUNTRY REPORT: GERMANY

plants began to show drought stress symptoms. Consequently, the plants were underdeveloped in appearance. By August the drought was assuming dramatic proportions in many areas. There was no widespread precipitation in the Hallertau region until August 19, by which time it was too late for yields and alpha content to improve. On many farms, picking began in the last week of August, a little earlier than in previous years.

The red spider mite, which prefers warmth, thrived in the hot, dry conditions, causing major problems and requiring intensive control measures. In some cases, the severe infestation resulted in quality impairment. Hop aphid infestation also appeared earlier than usual, but was kept well under control. Although there were sporadic cases of powdery mildew among susceptible varieties such as Herkules, downy mildew was absent throughout the season.

The harvested volume of 34,406 mt for crop 2022 was 10 % below the figure estimated when picking began. The volume of hops harvested was down 28 % year on year. The aroma varieties in particular were far below average yield levels. This variety group had not seen such a low yield per hectare for 30 years (2022: 1.27 mt/ha / 1992: 1.24 mt/ha). Compared with the average of the last five crop years (2017 to 2022), the difference amounted to 33 % for aroma hops and 20 % for bitter varieties.

Alpha content

The poor crop yield was accompanied by low alpha acid content, evoking memories of the low-alpha crop year 2013. An alpha acid content overview for individual varieties can be found in the ALPHA ACID PRODUCTION section (page 12). Due to the below-average crop and alpha yields, there was a year-on-year decline in alpha acid production of 40 %.

Market situation

Contract market

The beginning of the Russian assault on Ukraine caused prices to explode overnight. Energy prices doubled; fertilizer prices quadrupled; and prices for hop string rose by 80 % within only a few weeks. Many growers realized that if production material prices remained high, they would no longer be able to cover their costs under the terms of their existing long-term hop supply contracts.

The first tentative contract market bids for **bitter hops** were submitted in early June. The prices offered were 35.00 EUR/kg alpha for early crop years and 37.00 EUR/kg alpha for later crop years (up to 2030). The growers were not prepared to sell at these prices, as uncertainty regarding inflation persistence and medium-term monetary stability was too great. Prices offered soon rose by 3.00 and 4.00 EUR/kg alpha, respectively. Few of these offers were accepted either, particularly due to the fact that the hot, dry weather conditions in the summer months of 2022 had already dashed any hopes of a good crop.

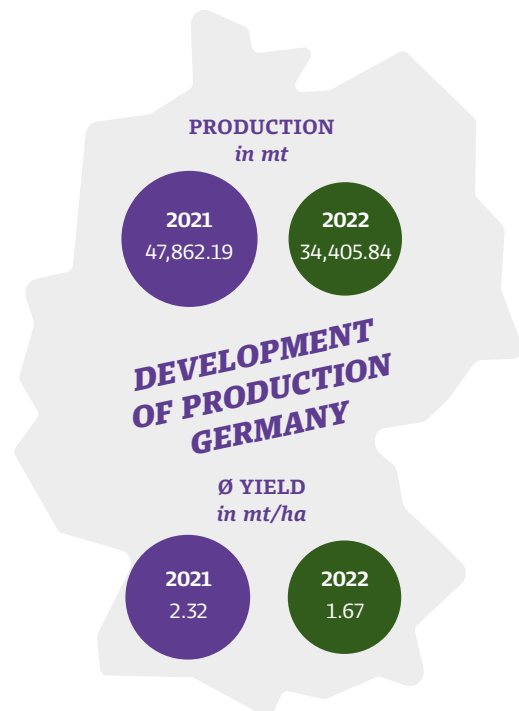
No further contract offers were made until early December 2022. The prices offered for **bitter hops** were 52.00 EUR/kg alpha for crop year 2023 and 50.00 EUR/kg for the subsequent crop years 2024 to 2027. Occasional offers were received for **Perle** and **Hallertau Tradition** at 10.00 EUR/kg for the entire contract term. Shortly before Christmas, some of these offers found takers among the growers, as the dramatic rise in production material prices had been priced in.

Occasional contract offers were also received from hop marketers in the first two months of 2023, but by the end of February all contract market activity had ceased. The highest prices for **bitter hops** were 52.00 EUR/kg alpha for crop years 2023 to 2025 and 50.00 EUR/kg alpha for crop years 2026 to 2030.

In the spring of 2023, 92 % of crop 2023 had been contracted on the basis of average yields. The forward-contracting rates for the key hop-producing countries for crop years 2023 to 2026 can be found in the FORWARD CONTRACTS section (page 28).

Spot market crop 2022

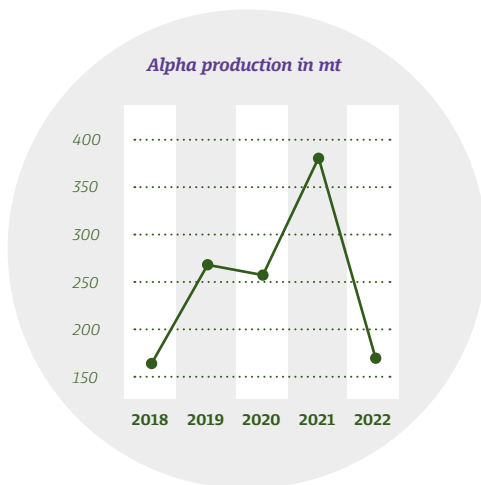
The spot market did not start up until mid-October, long after the harvest was over, with offers for pool hops and fixed-price offers. In the end, the prices offered were up to 70.00 EUR/kg alpha in the bitter hop segment and around 12.00 EUR/kg for **Hallertau Tradition** and **Perle** hops. Despite the poor harvest, there was still a surplus of marginal varieties of flavor and aroma hops which were bought at prices of up to 6.00 EUR/kg. Due to the low volumes available, spot market activity was extremely subdued.





COUNTRY REPORT: CZECH REPUBLIC

Variety	Development of acreage			Development of production			
	Acreage ha			Ø Yield mt/ha		Production mt	
	2021	+/-	2022	2021	2022	2021	2022
Saaz	4,183.6	-48.0	4,135.6	1.59	0.76	6,662.83	3,127.01
Sládek	373.8	23.7	397.4	2.41	1.82	901.92	724.10
Premiant	216.9	-4.1	212.8	1.84	1.44	398.81	307.12
Other Aroma	120.3	-10.9	109.4	1.80	1.56	216.24	170.26
Total Aroma	4,894.5	-39.3	4,855.2	1.67	0.89	8,179.80	4,328.49
Agnus	60.4	10.0	70.5	1.79	1.44	108.40	101.44
Other Bitter	16.3	0.6	16.9	1.08	1.33	17.54	22.41
Total Bitter	76.7	10.6	87.4	1.64	1.42	125.94	123.85
CZECH REPUBLIC TOTAL	4,971.2	-28.7	4,942.6	1.67	0.90	8,305.74	4,452.34



Farm structure

118 hop producers were registered in crop year 2022. This means that, as in the previous year, three producers stopped growing hops. The average planted area was 42 ha per farm, 1 ha more than in 2021.

Acreage/crop volume/alpha content

The acreage devoted to aroma varieties decreased by 39 ha, while bitter hop acreage increased by 11 ha, leaving the total planted area virtually unchanged year on year. The three varieties most affected by clearance measures were **Saaz** (-48 ha), **Saaz Late** (-12 ha), and **Premiant** (-4 ha). Conversely, there was an increase in the area planted with **Sládek** (+24 ha) and **Agnus** (+10 ha).

The weather in April was mostly rainy and very cold, while in May and June it was warm and very dry. By the end of June there was already a major water deficit in the soil in the **Žatec** and **Auscha** regions. The first days of July were rainy, with temperatures remaining summery. From July 8 to the middle of the month conditions were dry and cold. **Saaz** hops were about one week ahead in terms of vegetation, but below average in terms of development. The other varieties were in line with the long-term average, had reached trellis height and, depending on the variety, were between initial flowering and the early stages of cone

development. The second half of July featured hot summer temperatures and dry conditions, particularly in the **Žatec** and **Auscha** regions. The tropical temperatures persisted into August. Picking commenced comparatively early, between August 15 and 20, with the **Saaz** hops, which were better in appearance in the **Tirschitz** region than in **Auscha** and even more so than in **Žatec**. The **Saaz** hops produced a yield of only 0.76 mt/ha. As this variety dominates Czech hop growing with an acreage share of 84 %, the average yield for the entire crop did not come to more than 0.90 mt/ha.

While the alpha values for **Saaz** hops were significantly below average, those for **Sládek** equaled the long-term average, while those for **Premiant** and **Agnus** even exceeded it. An alpha acid content overview for individual varieties can be found in the ALPHA ACID PRODUCTION section (page 12). While the planted area was virtually unchanged, the alpha yield was down 56 % year on year, although it must be said that yields in crop year 2022 were historically low and the above-average alpha values in crop year 2021 had produced a record alpha yield.

Market situation

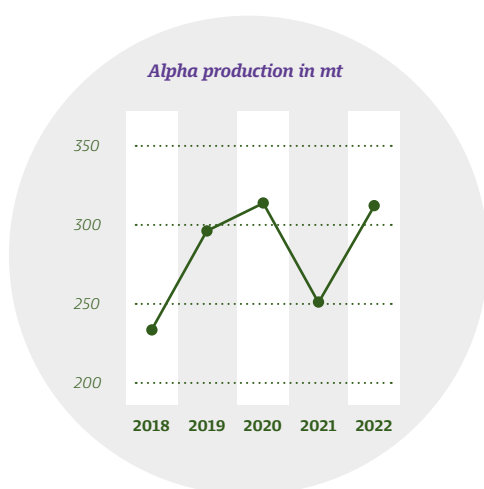
As a result of the low production volume, the quantities delivered by the growers fell substantially short of the originally contracted volumes. The producer prices for the contracted hops lay between 220 and 290 CZK/kg (9.00 and 11.85 EUR/kg). No prices can be quoted for non-contracted hops, as virtually none were available.

Crop year 2023 will see a net reduction in planted area of 69 ha (**Saaz** -73 ha, **Premiant** -16 ha, **Sládek** +11 ha., and **Agnus** +8 ha). The 2023 crop can already be considered to be sold out, as forward contracts account for almost 100 % of crop volume. The FORWARD CONTRACTS section (page 28) shows their development up to crop year 2026.



COUNTRY REPORT: POLAND

Variety	Development of acreage			Development of production			
	Acreage ha			Ø Yield mt/ha		Production mt	
	2021	+/-	2022	2021	2022	2021	2022
Marynka	331.8	-25.7	306.1	1.67	1.75	554.24	534.28
Lubelski	324.8	-25.2	299.6	1.43	1.53	466.00	459.38
Sybilla	90.3	2.5	92.9	1.44	1.74	130.40	161.46
Other Aroma	150.2	4.8	155.0	1.74	2.12	261.01	328.48
Total Aroma	897.1	-17.9	853.5	1.57	1.74	1,411.65	1,483.60
Hallertau Magnum	639.1	-8.1	631.0	1.89	2.20	1,206.21	1,385.81
Magnat	202.6	25.0	227.6	2.26	2.30	457.00	522.50
Other Bitter	19.8	-3.7	16.1	1.67	2.03	33.06	32.71
Total Bitter	861.4	13.2	874.6	1.97	2.22	1,696.27	1,941.02
POLAND TOTAL	1,758.5	-30.4	1,728.1	1.77	1.98	3,107.92	3,424.62



volume thereafter was rather low (max. 25 mm), but it rained regularly. Picking of the early varieties commenced at the beginning of September. Weather conditions during the harvest were cold and very rainy, which prolonged the harvesting period. The total crop yield of 1.98 mt/ha was in line with the average of the last five years.

The positive effects of the ideal growing conditions were particularly noticeable in the alpha yield which was up 24 % year on year. The alpha values for the aroma and the bitter varieties were above both those of the previous year and the long-term average. An alpha acid content overview for individual varieties can be found in the ALPHA ACID PRODUCTION section (page 12).

Farm structure

The number of hop producers fell for the third year in succession. Compared with the previous year, there were 12 growers fewer. As the drop in the number of hop producers was accompanied by a decline in acreage, the average planted area of the remaining 643 farms remained unchanged at 2.7 ha.

Acreage/crop volume/alpha content

The planted area of the three main hop varieties grown in Poland was reduced – **Marynka** and **Lubelski** by 8 % and **Hallertau Magnum** by 1 %. **Magnat** acreage, on the other hand, increased by 12 %. As a result of these measures, the area devoted to bitter varieties exceeded that of the aroma varieties.

Precipitation levels were low in the months of April and May, limiting vegetative plant growth during this period. Consequently, the bines were not as densely foliated as is usually the case in Poland. This allowed more sunlight to enter the hop gardens to the benefit of the hops. In mid-June there was a hailstorm to the east of the city of Lublin, a region in which there are many hop gardens. The storm struck at an early stage in the plants' development. Nevertheless, there were yield losses in the hop gardens affected. Precipitation

Market situation

When picking began, growers had already forward-contracted approximately 80 % of the 2022 crop volume. Prices ranged between 20 and 25 PLN/kg (4.30 / 5.35 EUR/kg) for **aroma varieties** and between 20 and 23 PLN/kg (4.30 / 4.90 EUR/kg) for **bitter varieties**.

The spot market did not start up until early November. An announcement that the Polish state was planning to purchase hops for 40 PLN/kg caused a sensation. This led hop growers to hold back on selling their non-contracted hops. As time passed and the government failed to intervene in the market, the growers sold their hops at the following prices: **Marynka** 24 – 26 PLN/kg (5.15 – 5.55 EUR/kg), **Lubelski** 25 – 28 PLN/kg (5.35 – 6.00 EUR/kg), **Hallertau Tradition** and **Perle** 30 – 35 PLN/kg (6.40 – 7.50 EUR/kg), and the bitter varieties **Hallertau Magnum** and **Magnat** 30 – 35 PLN/kg (6.40 – 7.50 EUR/kg). The crop is sold out.

Assuming an average yield, 85 % of the coming crop is estimated to have been sold during the spring 2023. An overview of the development of forward contracting up to crop year 2026 can be found in the FORWARD CONTRACTS section (page 28).

On the whole, acreage is expected to remain stable or decline slightly in crop year 2023, although there will be some switching from aroma to bitter varieties.



COUNTRY REPORT: SLOVENIA

Variety	Development of acreage			Development of production			
	Acreage ha			Ø Yield mt/ha		Production mt	
	2021	+/-	2022	2021	2022	2021	2022
Aurora	629.4	90.3	719.7	1.29	1.33	811.23	956.37
Celeia	446.8	-2.0	444.8	1.71	1.61	762.03	714.48
Bobek	142.2	10.4	152.6	1.48	1.55	210.93	236.91
Savinjski Golding	149.5	-5.1	144.4	0.96	0.90	143.88	129.61
Other Aroma	141.1	-0.7	140.5	1.53	1.48	215.28	208.48
Total Aroma	1,509.0	92.9	1,601.9	1.42	1.40	2,143.35	2,245.85
Total Bitter	25.5	-1.8	23.7	1.67	1.56	42.48	37.10
SLOVENIA TOTAL	1,534.50	91.2	1,625.65	1.42	1.40	2,185.82	2,282.95



Farm structure

The number of hop growers in Slovenia decreased by four, bringing the total number of active hop producers in crop year 2022 to 118 in addition to the eight craft brewers who grow hops on a very small scale for their own use. The average planted area per farm rose by one hectare to 14 ha.

Acreage/crop volume/alpha content

The 6% increase in planted area is mainly due to new planting of three varieties, **Aurora** (+14%), **Bobek** (+7%) and **Styrian Wolf** (+10%). In some cases, even new trellis systems were erected for the purpose. Slightly less than 99% of the planted area in Slovenia is devoted to aroma varieties, with **Aurora** hops accounting for 44%.

In the first three months of crop year 2022, there was only 35% of normal precipitation volume and it was mostly too warm. Bine training began in early May. May 11 marked the beginning of a period of rapid hop growth driven by temperatures of up to 30 °C. Rainfall remained too low, however, with the result that by the end of May the baby hops already required irrigation. Above-average high temperatures and a shortage of rainfall were persistent features as plant development progressed. Despite the unfavorable weather conditions, the hops grew unabated, with most of the hop gardens being irrigated, and by the end of July they were one week ahead in development. August

brought temperatures of 30 °C and over, with rainfall down to only half of the long-term average volume.

Several thunderstorms caused damage during the hops' growth phase. On June 2, a thunderstorm passed over the Koroška region, bringing torrential rain and hail. In the Savinja Valley, there were storms, in some cases with hail, on June 2, July 16, and August 18 and 27.

The harvest produced an average yield of 1.4 mt/ha which was unchanged year on year and thus below average. Crop year 2021 had also seen yield losses due to storm damage.

Alpha acid content was disappointing for all varieties with the exception of **Styrian Wolf**, and was below the long-term average, as in the previous year. An alpha acid content overview for individual varieties can be found in the ALPHA ACID PRODUCTION section (page 12). As a result of crop yield once again being poor and of the below-average alpha values, the alpha yield was only 3% higher year on year.

Market situation

Due to the below-average yields per hectare, almost 90% of the volume produced went to meet contract obligations. In view of the low quantities of non-contracted hops, the hop growers had high price expectations which were not met, however. In the summer, some market participants purchased the existing stocks of hops from the previous year's crop, in some cases bundled with spot hops from the current crop. On the whole, spot market activity was subdued. **Aurora** and **Celeia** hops were bought for 7.00 EUR/kg and **Bobek** for 6.50 EUR/kg. All available quantities were bought up.

Following the mandatory clearing of hop gardens affected by the citrus viroid CBCVd, some are still empty and are now being replanted with new rootstock. Growers are pressing ahead with the installation of irrigation systems. Planted area will increase by 2% to 1,660 ha in 2023. Assuming an average yield, approximately 80% of the coming crop has been forward-contracted. An overview of the development of forward contracting up to crop year 2026 can be found in the FORWARD CONTRACTS section (page 28).



COUNTRY REPORT: USA

Area	Variety	Development of acreage			Development of production			
		Acreage ha			Ø Yield mt/ha		Production mt	
		2021	+/-	2022	2021	2022	2021	2022
Washington	Citra®	3,547.6	-72.9	3,474.7	1.77	1.53	6,282.4	5,316.1
	Mosaic®	1,696.9	-13.4	1,683.5	2.39	2.20	4,049.2	3,704.1
	Cascade	1,288.1	170.4	1,458.5	1.78	1.66	2,288.4	2,414.5
	Simcoe®	1,283.7	130.3	1,414.0	1.84	1.55	2,368.3	2,187.1
	Centennial	800.5	26.7	827.2	1.78	1.64	1,422.1	1,357.3
	Chinook	475.1	108.9	584.0	2.07	1.50	985.7	873.8
	Amarillo®	539.9	-4.1	535.8	1.86	1.67	1,003.8	892.4
	Azacca®	295.4	57.1	352.5	2.14	1.75	632.1	615.9
	El Dorado®	450.4	-102.0	348.4	2.10	1.89	947.1	658.1
	Cashmere	279.2	11.0	290.2	1.56	1.70	436.6	494.7
	Sabro®	453.3	-231.5	221.8	2.47	2.30	1,121.2	510.1
	Tahoma	157.0	-2.0	155.0	1.18	1.47	185.7	227.6
	Talus™	222.6	-70.0	152.6	1.46	1.91	324.3	291.2
	Palisade®	134.8	17.8	152.6	2.09	2.06	281.9	315.0
	Ekuanot®	154.2	-5.7	148.5	2.92	2.41	450.7	358.4
	Comet	156.2	-23.9	132.3	1.83	1.46	285.7	192.7
	Strata™	121.4	10.1	131.5	2.24	2.02	272.2	265.4
	Bru-1™	119.8	0.0	119.8	1.59	1.57	190.0	188.0
	Cluster	157.8	-42.1	115.7	2.26	1.69	356.6	195.2
	Other Aroma	1,076.8	-40.1	1,036.7	2.19	1.67	2,362.9	1,731.9
	Total Aroma	13,410.7	-75.2	13,335.5	1.96	1.71	26,246.9	22,789.5
	CTZ	1,830.4	-212.4	1,618.0	2.98	2.53	5,449.1	4,091.2
	HBC 682	855.5	-163.9	691.6	2.76	2.39	2,361.8	1,652.7
	Pekko®	433.0	5.7	438.7	2.32	2.11	1,005.6	925.4
	Apollo™	303.5	0.0	303.5	3.00	2.91	910.0	884.5
	Eureka!™	188.6	42.1	230.7	3.39	2.47	638.8	570.1
	Summit™	176.9	-15.0	161.9	1.51	1.23	267.8	199.6
	Super Galena™	194.3	-51.0	143.3	3.19	3.18	620.3	455.7
	Other Bitter	325.8	56.8	382.6	2.69	2.63	877.6	1,004.5
	Total Bitter	4,308.0	-337.9	3,970.1	2.82	2.46	12,131.0	9,783.7
Total Washington	17,718.7	-413.2	17,305.5	2.17	1.88	38,377.9	32,573.2	
Idaho	Citra®	705.4	9.7	715.1	1.58	1.70	1,117.2	1,214.3
	Mosaic®	558.5	24.3	582.8	2.40	2.36	1,340.2	1,373.6
	Cascade	193.8	148.2	342.0	1.75	1.67	338.7	572.6
	Chinook	210.8	8.5	219.3	2.36	1.64	497.2	360.7
	Willamette	157.4	28.4	185.8	1.47	1.56	231.3	290.0
	Simcoe®	157.0	21.5	178.5	1.26	1.56	197.3	278.6
	Idaho7®	239.6	-85.0	154.6	3.18	2.90	761.8	448.4
	Amarillo®	153.8	-0.4	153.4	2.03	1.63	312.5	250.7
	El Dorado®	251.3	-128.3	123.0	1.99	1.98	500.8	243.5
	Other Aroma	621.2	-4.4	616.8	1.47	1.49	912.8	916.2
	Total Aroma	3,248.9	22.4	3,271.3	1.91	1.82	6,209.8	5,948.6
	CTZ	423.3	-212.9	210.4	3.55	3.39	1,503.6	714.0
	Eureka!™	134.4	35.2	169.6	2.86	2.47	384.3	418.1
	Other Bitter	116.5	-17.4	99.1	2.19	0.00	255.0	209.7
	Total Bitter	674.2	-195.0	479.2	3.18	2.80	2,142.9	1,341.8
Total Idaho	3,923.1	-172.8	3,750.3	2.13	1.94	8,352.7	7,290.4	
Oregon	Citra®	595.7	88.6	684.3	1.58	1.75	944.1	1,198.1
	Strata™	337.1	125.5	462.6	2.12	2.24	713.7	1,036.9
	Mosaic®	341.6	23.0	364.6	2.33	2.31	795.1	841.5
	Cascade	269.5	-3.2	266.3	1.79	1.77	481.9	471.0
	Simcoe®	201.9	11.4	213.3	1.84	1.84	371.9	393.4
	Willamette	180.5	10.1	190.6	1.64	1.67	295.6	318.1
	Centennial	147.3	6.5	153.8	1.55	1.77	228.5	271.5
	Other Aroma	601.1	-12.5	588.6	1.88	1.80	1,129.1	1,060.7
	Total Aroma	2,674.7	249.2	2,923.9	1.85	1.91	4,959.9	5,591.2
	Nugget	231.5	-53.0	178.5	2.42	2.34	561.0	417.1
	Other Bitter	86.6	-50.2	36.4	2.29	1.94	198.0	70.7
	Total Bitter	318.1	-103.2	214.9	2.39	2.27	759.0	487.8
Total Oregon	2,992.8	146.0	3,138.8	1.91	1.94	5,718.9	6,079.0	
Total Aroma	19,334.3	196.3	19,530.6	1.94	1.76	37,416.6	34,329.3	
Total Bitter	5,300.3	-636.2	4,664.1	2.84	2.49	15,032.9	11,613.3	
USA Pacific Northwest	24,634.6	-439.9	24,194.7	2.13	1.90	52,449.5	45,942.6	
Other States	561.3	2.0	563.3	0.73	0.75	408.2	420.4	
USA TOTAL	25,195.9	-437.9	24,758.0	2.10	1.87	52,857.7	46,363.0	

Due to the conversion of acres into ha and from lbs into mt, there may be minor statistical deviations and differences in the sum totals caused by figures being rounded up or down.



COUNTRY REPORT: USA

The summary below pertains to the traditional growing regions of Washington, Oregon, and Idaho which are also referred to as the Pacific Northwest (PNW) states. Developments outside the PNW states are reported in a separate section.

Farm structure

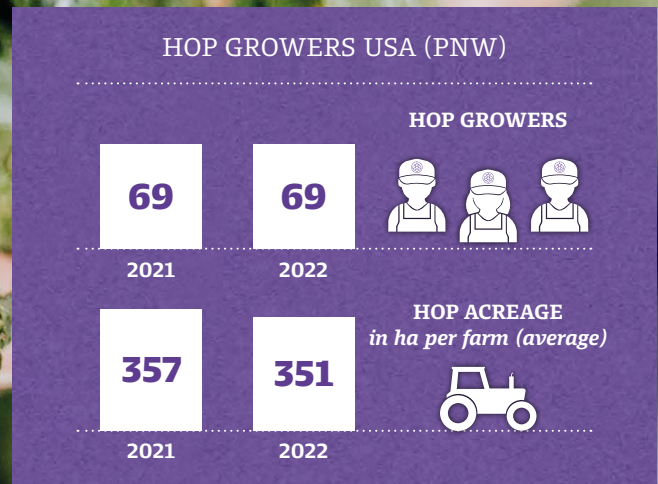
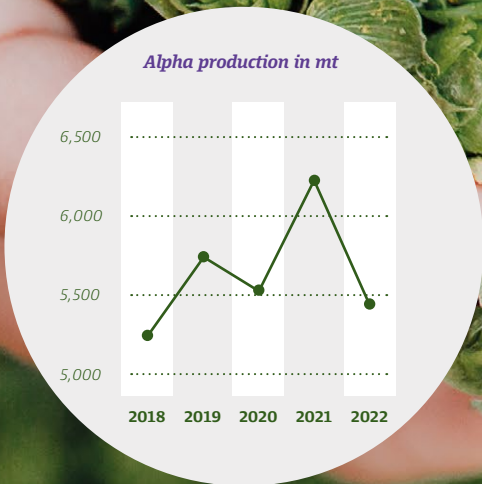
For crop 2022 the number of hop farms in the Pacific Northwest (PNW) remained unchanged year on year with a total of 69 growers. Larger farms that have multiple corporate entities are counted as one farming unit. The total acreage grown for crop 2022 in the PNW region declined by 2%, slightly reducing the average farm size to 351 ha. Average farm size fell to 468 ha in Washington and 375 ha in Idaho, while in Oregon it increased to 143 ha due to acreage coming into production from new plantings made the prior year. With the reduction in total acreage grown, most PNW farms were slightly below their existing harvesting and land infrastructure. Open trellis (fields not strung for harvest) appeared on several farms this season.

According to Hop Growers of America (HGA), the estimated number of additional US states growing hops remains unchanged at 26, led by Michigan, New York, and Montana. With a few exceptions, most farms outside the PNW region are of much smaller scale compared with the large established farms in the PNW.

Acreage/variety development

Crop 2022 acreage dropped 2%, marking the end of an unprecedented 10-year expansion that climaxed with the all-time US acreage record set in 2021, double the acreage from a decade ago. Total acreage strung for the crop 2022 harvest was 24,195 ha, a slight drop of 440 ha from the previous year. Aroma varieties, which make up nearly 81% of US acreage, remained essentially flat with only a 2% increase, while the bitter category unexpectedly decreased by 12%. Bitter acreage totaled 4,664 ha, roughly half of the area grown in the US a decade ago. The expansion of proprietary varieties developed by private breeding programs has leveled off at approximately 65% of total US acreage.

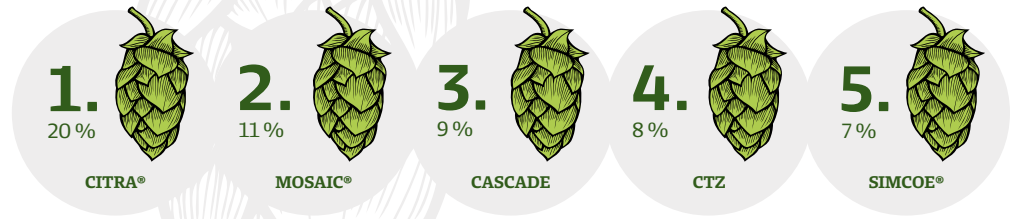
Washington and Idaho acreage saw similar reductions of 2% and 4%, respectively, while Oregon increased by 5%. Washington remains the dominant hop-producing state in the PNW region with 17,305 ha (71%), followed by Idaho with 3,750 ha (16%) and Oregon with 3,139 ha (13%).





COUNTRY REPORT: USA

TOP 5 VARIETIES BY AREA SHARE 2022



Development of hop acreage for the main varieties in the last five years

Variety	2018 ha	2019 ha	2020 ha	2021 ha	2022 ha	Percentage of acreage 2022	Difference to previous year	Percentage change
Citra®	2,583	3,517	4,450	4,849	4,874	20.1 %	25	0.5 %
Mosaic®	1,113	1,662	2,224	2,597	2,631	10.9 %	34	1.3 %
Cascade	2,499	2,212	1,634	1,752	2,067	8.5 %	315	18.0 %
Simcoe®	1,614	1,730	1,665	1,643	1,806	7.5 %	163	9.9 %
Centennial	1,954	1,545	1,222	968	1,001	4.1 %	33	3.4 %
Chinook	1,143	946	766	718	840	3.5 %	122	17.0 %
Amarillo®	1,166	959	870	772	774	3.2 %	2	0.3 %
Strata™	-	-	216	491	635	2.6 %	144	29.4 %
El Dorado®	218	402	641	702	471	1.9 %	-231	-32.9 %
Willamette	590	429	380	391	427	1.8 %	36	9.1 %
Cashmere	-	125	232	338	355	1.5 %	17	5.2 %
Azacca®	221	238	292	295	352	1.5 %	57	19.1 %
Sabro®	-	299	498	575	279	1.2 %	-296	-51.5 %
Idaho7®	-	-	366	397	219	0.9 %	-178	-44.8 %
Tahoma	99	93	72	193	195	0.8 %	2	1.2 %
Comet	132	130	171	215	191	0.8 %	-24	-11.3 %
Mt. Rainer	174	153	146	170	173	0.7 %	3	2.0 %
Talus™	-	-	62	223	171	0.7 %	-52	-23.5 %
Ekuanot®	354	270	274	168	163	0.7 %	-5	-3.2 %
Palisade	212	196	103	138	156	0.6 %	18	13.0 %
Crystal	250	180	121	123	144	0.6 %	21	17.0 %
Cluster	272	216	175	166	123	0.5 %	-43	-25.7 %
Bru-1™	-	-	116	120	120	0.5 %	0	0.2 %
Other Aroma	1,863	1,704	1,406	1,332	1,365	5.6 %	33	2.5 %
Total Aroma	16,458	17,008	18,102	19,334	19,531	80.7 %	196	1.0 %
CTZ	2,478	2,645	2,544	2,254	1,828	7.6 %	-426	-18.9 %
HBC 682	716	885	917	863	692	2.9 %	-171	-19.8 %
Pekko®	-	126	324	433	439	1.8 %	6	1.4 %
Eureka!™	219	247	263	323	400	1.7 %	77	23.9 %
Apollo™	416	429	388	374	374	1.5 %	0	-0.1 %
Nugget	580	471	356	253	200	0.8 %	-53	-21.1 %
Summit™	637	434	259	177	162	0.7 %	-15	-8.4 %
Super Galena™	270	223	227	229	159	0.7 %	-70	-30.7 %
Bravo™	149	122	100	115	100	0.4 %	-15	-12.7 %
Other Bitter	351	295	251	279	309	1.3 %	30	10.8 %
Total Bitter	5,815	5,875	5,629	5,300	4,664	19.3 %	-636	-12.0 %
PNW TOTAL	22,272	22,883	23,732	24,635	24,195	100.0 %	-440	-1.8 %

The rounding of acreage figures sometimes leads to differences in sum totals.



COUNTRY REPORT: USA

The top five varieties in the US accounted for over half of US acreage at 13,206 ha collectively, representing 55 % of total US acreage. In the prior year, this group's share amounted to 53%. **Citra**® quickly rose to the top of the US acreage chart in recent years and remained the most widely grown US variety for a fifth consecutive year with an acreage share of 20%. Its acreage alone is larger than the entire bitter category in the US. However, with crop 2022 its expansion leveled off with only a minor increase of 25 ha. The expansion of **Mosaic**® also slowed with only a slight increase of 34 ha, but with a share of 11% it remained in second place. **Cascade** saw the largest increase of all varieties, adding 315 ha (18%) to overtake **CTZ** as the third-most widely grown variety in 2022. Following several years of acreage cuts, the supply of formerly market-leading **Cascade** had become tight, hence the acreage expansion in crop years 2021 and 2022. In contrast, **CTZ** experienced the largest decline of all varieties, shedding 426 ha (19%) and dropping into fourth position on the US acreage list. **Simcoe**® rounds off the top five with an increase of 163 ha (10%).

Outside the top five, **Centennial** ended a four-year slide with a slight increase of 33 ha (3%), as supply has also tightened for this variety. Other aroma varieties with notable acreage adjustments include **Strata**™ and **Chinook** with increases of 144 ha (+29%) and 122 ha (+17%), respectively, while **Sabro**® (-296 ha / 52%), **El Dorado**® (-231 ha / 33%), and **Idaho7**® (-178 ha / 45%) saw their acreage decrease. In the bitter category, in addition to the significant drop of **CTZ** acreage, **HBC 682** also declined by 171 ha (20%). Most of the other US varieties, both aroma and bitter, saw only minor acreage changes or remained flat.

Crop volume

The PNW region received an above-average snowpack over the winter, which led to a strong water supply for crop 2022. However, the La Niña weather pattern lingered well into spring, manifesting into one of the coldest and wettest spring seasons in recent history for the PNW region, breaking many rainfall records along the way. The adverse conditions delayed early-season fieldwork with twining being carried out one to two weeks later than normal. As a result, early-season plant growth got off to a very slow start, particularly with baby (first-year) fields. Entering the months of May and June, plant development in many fields remained significantly behind normal growth. Downy mildew, typically more prevalent in Oregon, appeared in Washington as well this season, with a strong and unusual outbreak due to the wet spring conditions, in addition to

powdery mildew pressure. A more normal weather pattern returned to the PNW region by mid-June. However, the crop did not have enough time to fully recover from the setbacks experienced in the spring. Despite normal warm summer temperatures throughout the remainder of the summer, the crop continued to lag in growth, leading to a slightly underdeveloped crop with small cone sizes for several varieties at harvest time.

The Oregon crop rebounded reasonably well with normal timing for the start of harvest. Yields were something of a mixed bag, but were near long-term averages overall and even above average for several varieties. In particular, **Citra**® and **Centennial** turned in strong performances in Oregon, while **Mosaic**®, **Cascade** and **Willamette** produced yields similar to those of the prior season. Crop development did not fully recover in Washington and Idaho, with harvest starting about five to seven days later than normal. Throughout the harvest, growers were forced to adjust normal picking schedules based on the variable maturity of individual varieties, and in some cases shutting down harvest temporarily to wait for cones to ripen further. A late mite outbreak further challenged picking schedules particularly in Idaho, but also in Washington to a lesser extent. Yields steadily declined throughout the harvest. Nearly all the top 10 aroma varieties came in well short of long-term averages.

Yields for the PNW region collectively were down about 11% from crop 2021 which had seen average yields. Many of the top aroma varieties were down 5-10% from last season, including **Citra**®, **Mosaic**®, **Simcoe**®, **Amarillo**®, **Cascade**, and **Centennial**, with **Chinook** down nearly 30%. Bitter varieties, including **CTZ** and **HBC 682**, were down about 15%, although alpha content was normal. An alpha acid content overview for individual varieties can be found in the ALPHA ACID PRODUCTION section (page 12).

Despite the disappointing yields, the quality and aroma of crop 2022 was the strongest seen in recent years, scoring high marks in brewer hop selections. Furthermore, unlike the previous two crops, the PNW region had no smoke issues from wildfires this season.

Upon completion of the harvest, the USDA reported that the PNW states had produced a total crop of 45,942.6 mt, down 6,506.9 mt (12%) from last season's all-time record crop volume. Production from **aroma** varieties decreased by 3,087.3 mt (-8%), while volume from the **bitter** category was down 3,419.6 mt, a significant drop of 23%. The US production ratio of aroma/bitter varieties stands at 75/25 for crop 2022.



COUNTRY REPORT: USA

The high-inflation environment has significantly increased the cost of hop production, with growers absorbing large cost increases for fertilizers, pesticides, fuel, labor, and many other growing supplies. In Washington, state-mandated overtime pay for agricultural labor was instituted for the first time in state history. Overtime pay will be phased in over a three-year period which started with crop 2022, with growers having to pay overtime wages for any time worked over 55 hours per week. This scales down to 48 and 40 hours for crops 2023 and 2024, respectively. Oregon will institute a similar phased-in program starting with crop 2023. Industry-wide, labor costs are nearing 50 % of the overall cost of growing hops.

Market situation Contract market

In contrast to recent years, in the months immediately following completion of the harvest the forward contract market never gained any meaningful momentum while the general industry view of a growing aroma oversupply strengthened. Market activity focused more on restructuring and reducing aroma acreage for crop 2022 rather than further expansion, a situation that applied to nearly all the aroma varieties, with just a few exceptions. Contracting activity remained quiet for **Citra**® and **Mosaic**®, the two varieties leading much of the forward contracting in recent years. Activity for many other proprietary aroma varieties also fell silent over the winter months. Only **Simcoe**® and **Strata**™ saw some slight forward movement. **Cascade**, the leading public aroma variety, saw moderate activity as the 2022 growing season commenced, including some speculative acres grown open for the spot market. Such activity led to **Cascade** being the only variety seeing any material expansion for crop 2022. Open acreage of crop 2022 bitter varieties, mainly **CTZ**, also was not contracted over the winter months of 2021/2022 due to soft market conditions in the global alpha market, leading the US to shed another 12 % of its bitter acreage.

An overview of the development of forward contracting up to crop 2026 can be found in the FORWARD CONTRACTS section on page 28.

Spot market crop 2022

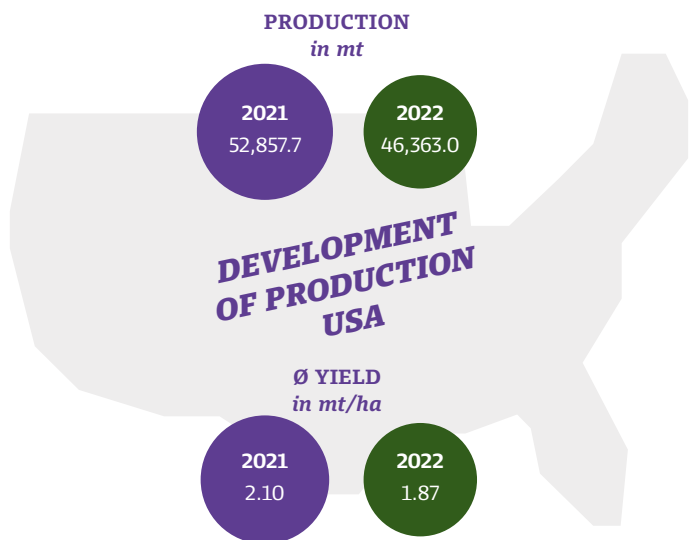
Nearly 65 % of total US crop 2022 production came from proprietary varieties which are sold on a full-production basis to the respective variety owners, thus eliminating any potential spot availability for such varieties. Furthermore, there are several large, established corporate farms in the

US that market 100 % of their self-grown production, which further reduces annual spot hop volumes in the US. The only possible spot volumes each season come from public aroma and bitter varieties.

With crop 2022 yields down roughly 11 % from long-term averages, few spot hops existed other than acreages of public varieties grown open. Spot volumes of **Cascade** and **Cashmere** were available, and to a much lesser extent **Centennial**, **Chinook**, **Willamette**, and **Nugget**. The spots were generally sold at craft-market prices, with a few varieties being sold for generic alpha value. A moderate amount of **CTZ** spots were also available, with all being sold during or shortly after harvest. The poor alpha crop in Germany did not manifest into strong pricing for the US spot market.

Outside the Pacific Northwest

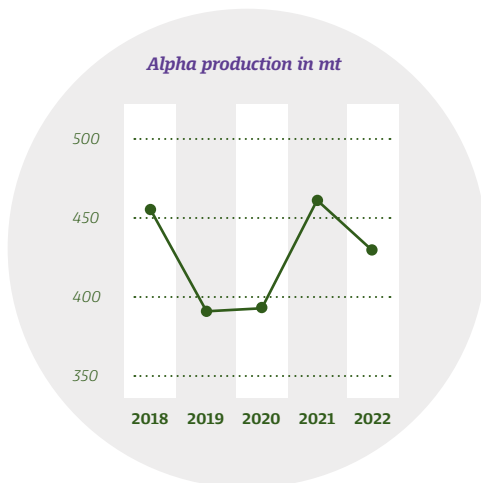
As reported by the Hop Growers of America, beyond the traditional PNW hop-growing region, another 26 states grew hops for crop 2022. Collectively, the 26 states grew a total of 563.3 ha, or about 2.3 % of total US acreage, led by **Michigan** (154 ha), **New York** (121 ha) and **Montana** (80 ha). These three states combined accounted for 63 % of non-PNW acreage. Total production for the non-PNW region is estimated to have risen slightly year on year to approximately 420.4 mt (+3 %) given the more favorable growing conditions seen this season. Total hop production from the non-PNW region accounted for about 1 % of the US crop, similar to the prior season. Hops from this region are generally sold into smaller, local craft brewers with on-premise distribution models.





COUNTRY REPORT: CHINA

Area	Variety	Development of acreage			Development of production			
		Acreage ha			Ø Yield mt/ha		Production mt	
		2021	+/-	2022	2021	2022	2021	2022
Xinjiang	Tsingtao Flower	662.7	0.0	662.7	2.72	2.40	1,802.00	1,589.00
	Marco Polo	408.0	-11.3	396.7	2.85	2.82	1,162.00	1,120.00
	SA-1	166.7	0.0	166.7	2.54	2.22	424.00	370.00
	Kirin Flower	38.0	0.0	38.0	4.50	3.89	171.00	148.00
	Aroma	80.7	4.6	85.3	2.27	2.02	183.00	172.00
	Total Xinjiang	1,356.1	-6.7	1,349.4	2.76	2.52	3,742.00	3,399.00
Gansu	Tsingtao Flower	802.7	40.0	842.7	2.53	2.52	2,032.00	2,123.00
	Bitter	174.3	26.4	200.7	2.63	2.18	459.00	438.30
	Aroma	36.4	-5.3	31.1	1.65	1.72	60.00	53.60
	Total Gansu	1,013.4	61.1	1,074.5	2.52	2.43	2,551.00	2,614.90
Total Aroma		283.8	-0.7	283.1	2.35	2.10	667.00	595.60
Total Bitter		2,085.7	55.1	2,140.8	2.70	2.53	5,626.00	5,418.30
CHINA TOTAL		2,369.5	54.4	2,423.9	2.66	2.48	6,293.00	6,013.90



There are no reliable statistics on acreage and production volume in China. The figures shown here, which, due to the extent of the acreage in China, are often based on estimates, have been gathered from our own sources.

Farm structure

The number of hop farms remained unchanged year on year. As a result of the increase in hop acreage compared with crop year 2021, the average cultivated acreage of the 31 farms rose from 76 ha to 78 ha per farm. In the **Xinjiang** production region, the average cultivated acreage of the 23 farms there remained unchanged at 59 ha. In the **Gansu** production region, the average area farmed by the eight producers there rose from 127 ha to 134 ha.

A correction to the 2021/2022 BarthHaas Report was called for in connection with the number of hop farms in Xinjiang and the size of farms in Gansu following an acreage adjustment.

Acreage/crop volume/alpha content

The total planted acreage increased by 2%. The share of total Chinese hop acreage in the **Xinjiang** production region fell to 56% (-2%), reflecting a shift in favor of the **Gansu** region. This can be seen in a decline in acreage of 7 ha in **Xinjiang**, accompanied by an increase in acreage of 61 ha in **Gansu**. The relative shares of aroma and bitter hops in China remained unchanged at 12:88.

In the **Xinjiang** production region, the weather throughout the season was warm, with too little rainfall. Average precipitation was at its lowest level since 1986. In many places there were significant regional differences in rainfall and dramatic periods of drought. In general, the average summer temperature in Xinjiang was nearly 1 °C above normal. The north of Xinjiang, the Tianshan mountain range and the south of Xinjiang were 0.7 °C, 1.3 °C and 0.9 °C, respectively, above the average. Precipitation in the summer was 34% below average, with the north of the region receiving four times as much rainfall as the south. The below-average yield of 2.52 mt/ha was primarily due to the low levels of rainfall in both the spring and the summer.

In the **Gansu** production region, temperatures were normal during the spring work phase and the initial growing period. The hop plants grew very quickly from May to June. Temperatures were already as high as 32 °C on some days in May, rising to as much as 35 °C in June and July. The bitter varieties were more severely affected by the high temperatures, which was reflected in the yield. The yield of 2.43 mt/ha for the crop as a whole was within the multi-year average.



COUNTRY REPORT: CHINA

The alpha acid content was slightly above the long-term average. While the average alpha content of **Tsingtao Flower** hops equaled that of the last five crop years at 5.7%, the values were considerably higher in **Gansu** than in **Xinjiang**. The lower production volume and somewhat lower alpha values produced a year-on-year drop in alpha yield of 7%.

Market situation

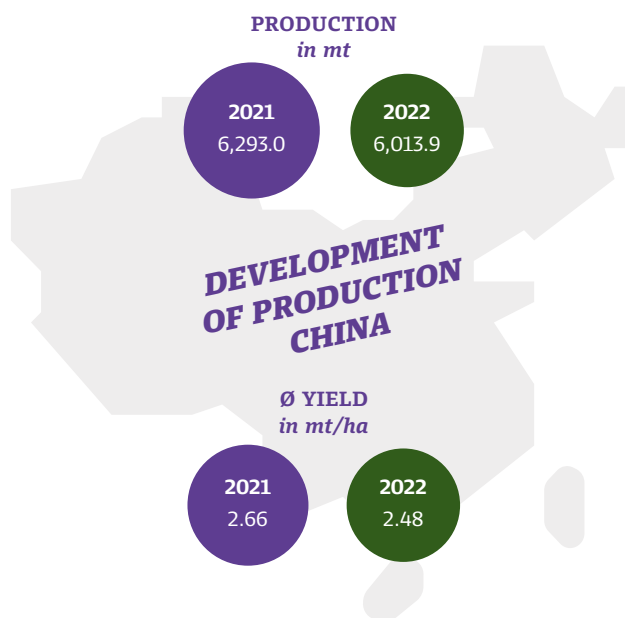
In China there is no forward contract market comparable to that in Europe or the USA. Instead, it is customary for farmers and buyers to conclude purchase agreements. These agreements only contain a definition of quantity and quality. The actual price is settled at a later date.

Producers in the **Xinjiang** production region sold approximately half of the harvested volume through purchase agreements without specific fixed prices. The settlement price for **Tsingtao Flower** lay between 27.50 and 28.50 CNY/kg (3.80/3.95 EUR/kg). For **Marco Polo**, growers were paid between 33.00 and 34.50 CNY/kg (4.55/4.75 EUR/kg). The crop is sold out, with no stocks remaining.

In the **Gansu** production region, the volume specified in purchase agreements exceeded the volume harvested.

The prices paid here were 28.00 CNY/kg (3.87 EUR/kg) for **Tsingtao Flower**, 34.00 CNY/kg (4.70 EUR/kg) for bitter hops, and 38.00 CNY/kg (5.25 EUR/kg) for aroma hops.

Aside from some changes in the varietal mix, hop acreage will remain unchanged in both **Xinjiang** and **Gansu** in 2023.



COUNTRY REPORT: AUSTRALIA - CROP YEAR 2023

Area	Variety	Development of acreage			Development of production			
		Acreage ha			Ø Yield mt/ha		Production mt	
		2022	+/-	2023	2022	2023	2022	2023
Victoria	Galaxy®	353.4	0.0	353.4	2.12	2.32	750.8	818.5
	Vic Secret™	117.9	4.7	122.6	2.47	2.61	290.6	320.5
	Eclipse®	50.1	15.6	65.7	1.89	2.45	94.6	160.8
	Pride of Ringwood	47.0	0.0	47.0	1.06	1.06	50.0	50.0
	Super Pride	33.0	0.0	33.0	0.91	0.91	30.0	30.0
	Topaz™	22.6	0.0	22.6	2.43	2.66	54.9	60.0
	Ella™	12.9	0.0	12.9	2.40	2.03	31.0	26.2
	Cluster	3.0	0.0	3.0	0.67	0.67	2.0	2.0
	Total Victoria	639.9	20.3	660.2	2.04	2.22	1,303.9	1,468.0
Tasmania	Galaxy®	139.6	3.9	143.5	1.84	1.93	257.0	277.4
	Enigma®	57.6	0.0	57.6	1.51	1.36	86.8	78.48
	Ella™	36.7	7.3	44.0	1.79	1.38	65.8	60.82
	Cascade	16.3	0.0	16.3	1.58	1.11	25.8	18.1
	Super Pride	16.2	0.0	16.2	2.47	1.45	40.0	23.5
	Pride of Ringwood	12.9	0.0	12.9	3.48	2.98	45.0	38.5
	Total Tasmania	279.3	11.2	290.5	1.86	1.71	520.4	496.8
AUSTRALIA TOTAL		919.2	31.5	950.7	1.98	2.07	1,824.3	1,964.8



COUNTRY REPORT: AUSTRALIA – CROP YEAR 2023

Farm structure

Hop Products Australia (HPA) farms a total planted area of 847 ha (2022: 810 ha). The company grows hops on three farms: Buffalo River Valley and Rostrevor Hop Gardens, both in Victoria, and Bushy Park Estates in Tasmania. There are four other hop producers in Australia with an average planted area of 26 ha (2022:27 ha) per farm.

Acreage/crop volume/alpha content

Hop acreage in Australia increased for the ninth year in succession. In the Victorian production region, acreage grew by 3% as a result of expansion of the area devoted to the **Eclipse**® and **Vic Secret** varieties. In Tasmania, there was a 4% increase in planted area, with expansion focusing on **Ella**™ and **Galaxy**® hops.

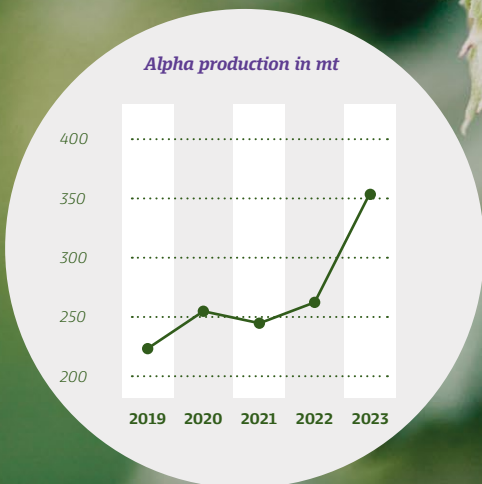
For the third year running, the La Niña weather phenomenon had a significant effect on hop-growing conditions. Low temperatures and heavy rainfall at the start of the vegetation period initially slowed plant growth and caused local flooding in Victoria in the late spring. In the summer, above-average temperatures and below-average rainfall stimulated cone maturation. Both Victoria and

Tasmania recorded an unusually low number of sunshine hours for the fourth year in succession, particularly in October and November. This year, the oil content of all the proprietary varieties was equal to or above the 5-year average, with **Eclipse**® and **Galaxy**® performing particularly well. While crop yield in Victoria was in line with the long-term average, results in Tasmania were below average.

Alpha acid content was above average among the aroma varieties, but below average among the bitter varieties. Thanks to the higher crop volume and above-average alpha content in the main varieties **Galaxy**® and **Vic Secret**™, the alpha yield was up 36% year on year.

Market situation

A high proportion of the 2023 crop was forward-contracted. Only very limited quantities are available for sale on the open market. Forward contracting for crop year 2024 is estimated to account for 85% of the harvest, assuming average yields. The forward-contracting rates for the key producer countries for crop years 2023 to 2026 can be found in the FORWARD CONTRACTS section (page 28).



HOP GROWERS IN AUSTRALIA

HPA


+4

2022

HPA

+4

2023



810

+27*


2022

847

+26*

2023

HOP ACREAGE
in ha per entity



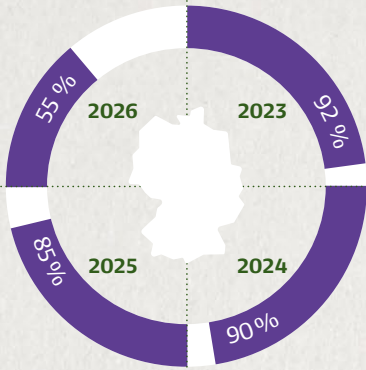
(* average)



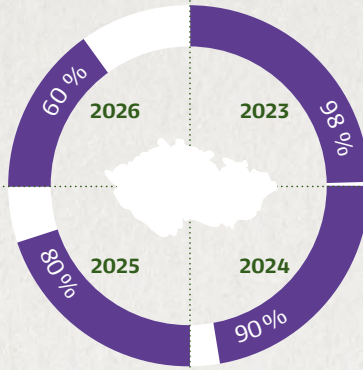
HOP FORWARD CONTRACT RATES



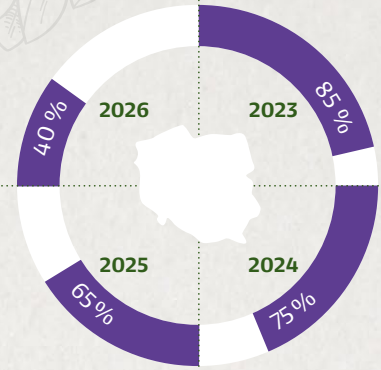
GERMANY



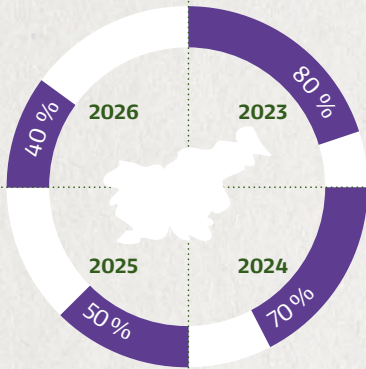
CZECH REPUBLIC



POLAND



SLOVENIA

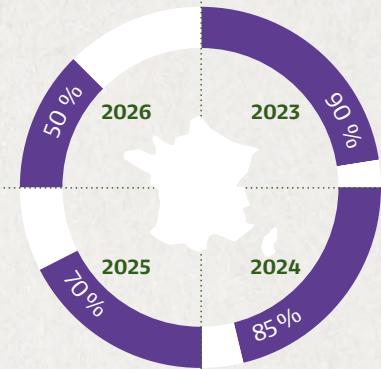


FORWARD CONTRACT RATES (AS PER SPRING 2023)

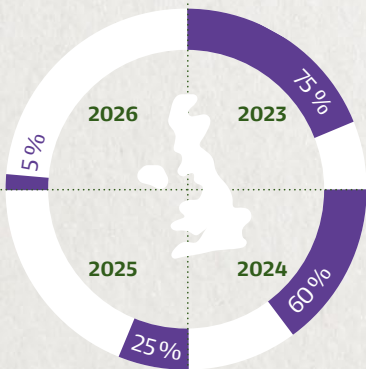


Due to insufficient availability of official data, the forward contracting rates are based on estimates and have been calculated on the long-term average yield.

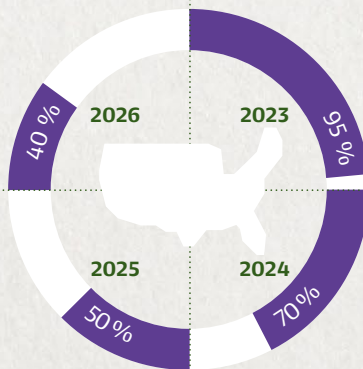
FRANCE



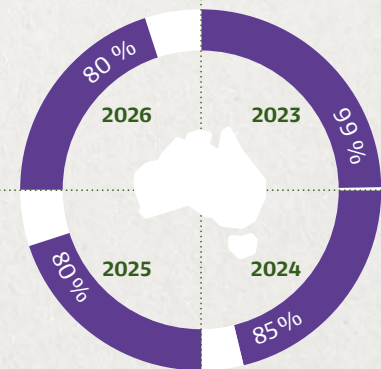
ENGLAND



USA



AUSTRALIA



CONVERSION TABLE WEIGHTS AND MEASURES

Area:

1 hectare (ha) = 10,000 m² = 2,471 acres
1 acre = 0.4047 ha

Volume:

1 hl = 100 l = 26.42 gall = 0.8523 bbl (US)
1 hl = 100 l = 22.01 gall = 0.6114 bbl (Brit.)
1 barrel (bbl/USA) = 31 gall = 1.1734 hl
1 barrel (bbl/GB) = 36 gall = 1.6365 hl

Weight:

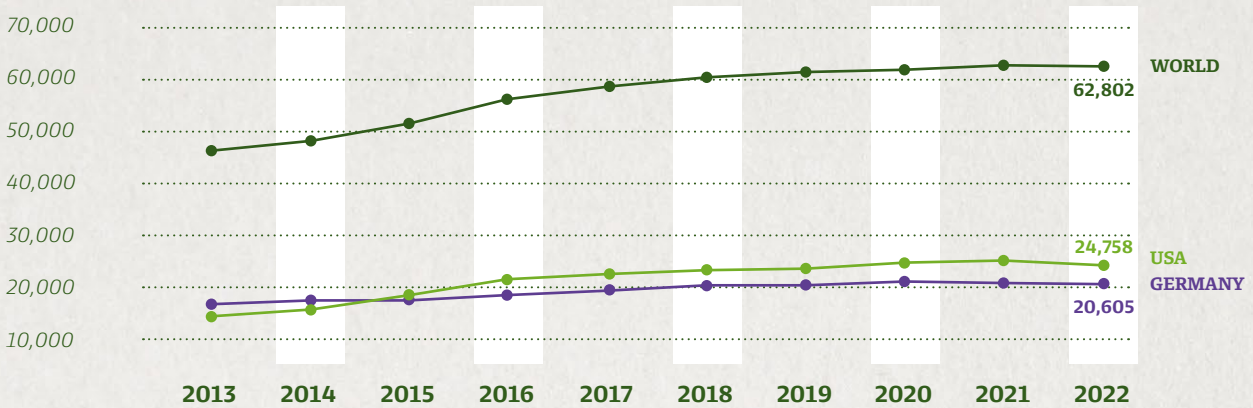
1 metr. ton (t) = 1,000 kg = 20 Ztr. (DE) = 2,204.6 lbs
1 Zentner Ztr. (DE) = 50 kg = 110.23 lbs = 1.102 cwt (US)
= 110.23 lbs = 0.984 cwt (GB)
1 hundredweight (cwt/US) = 100 lbs = 45.36 kg = 0.9072 Ztr.
1 hundredweight (cwt/GB) = 112 lbs = 50.800 kg = 1.0160 Ztr.
1 centner (GB) = 100 lbs = 45.36 kg = 0.9072 Ztr.
1 kg = 2.20462 lbs
1 lb = 0.45359 kg





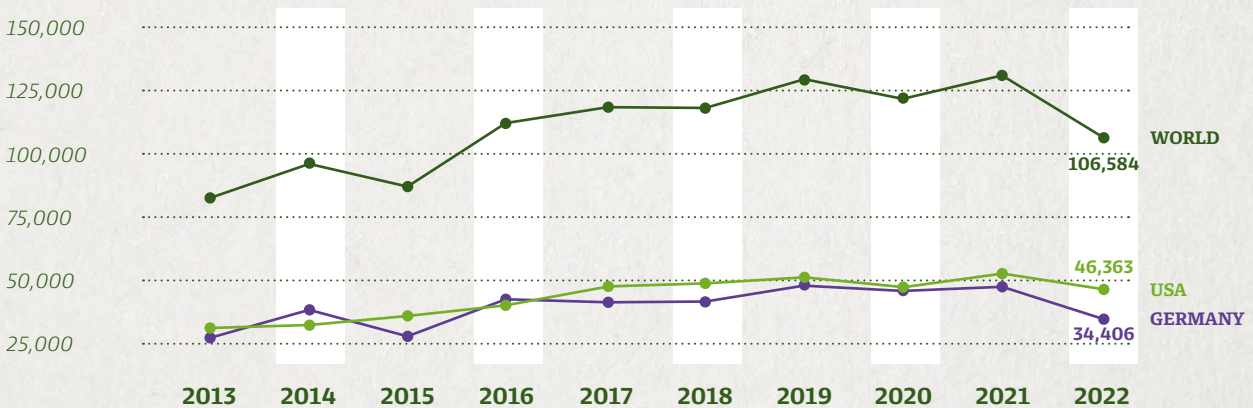
DEVELOPMENT OF ACREAGE

HOP AREA UNDER CULTIVATION IN HA



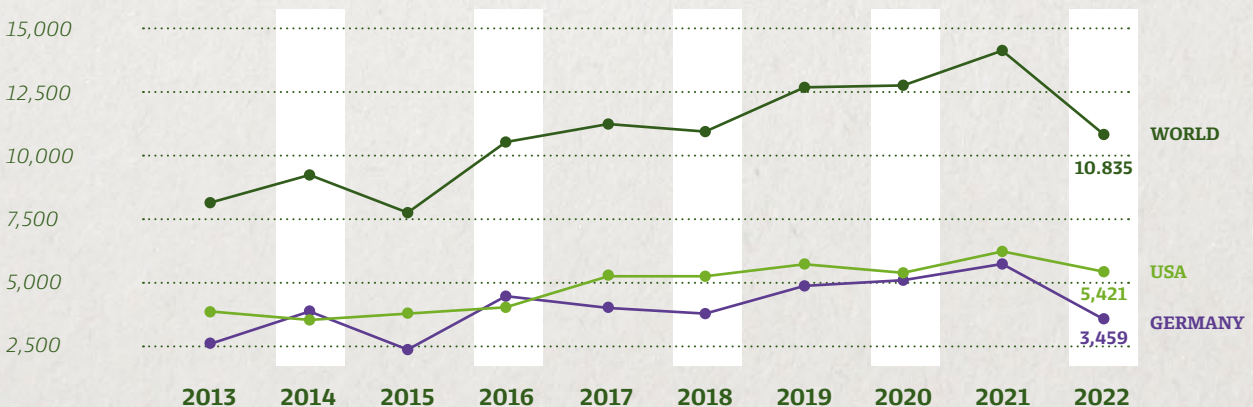
DEVELOPMENT OF CROP

HOP PRODUCTION IN MT



DEVELOPMENT OF ALPHA VOLUME

HOP ALPHA PRODUCTION IN MT







OUTLOOK 2023

Reporting period early June 2023

Germany

According to figures provided by the German hop growers' association (Verband Deutscher Hopfenpflanzer e.V.), total hop acreage in Germany for crop 2023 is 20,629 ha. It is therefore roughly the same as in crop years 2021 and 2022. Compared with crop year 2022, however, the area planted with aroma varieties has fallen by 427 ha (-4%), while bitter hop acreage has risen by 451 ha (+5%). The ratio of aroma to bitter varieties has shifted from 52:48 in crop year 2022 to 50:50 in 2023.

Several varieties have seen their acreage cut, including the aroma varieties **Perle** -119 ha (4%), **Hallertau Tradition** -84 ha (3%) and **Amarillo** -48 ha (35%), and the bitter variety **Hallertau Magnum** -43 ha (2%). The most significant expansion in acreage was seen by **Herkules** +356 ha (5%), the new variety **Titan** +94 ha (100%) and **Polaris** +67 ha (14%), all of them bitter varieties, and the aroma variety **Tango** +30 ha (94%).

In the variety rankings, **Herkules** continues to lead the field with an acreage share of 36% (7,498 ha), followed by **Perle** with 16% (3,235 ha), **Hallertau Tradition** with 13% (2,702 ha), **Hallertau Magnum** with 9% (1,770 ha) and **Hersbruck Spaet** with 4% (785 ha).

The 2022/2023 winter season was very mild, with the exception of a brief cold spell in mid-December. Precipitation levels in January and February were also significantly below the long-term average. As a result of the dry weather conditions, the ground was suitable for vehicles when spring work was due to begin. This work was repeatedly interrupted, however, due to the onset of changeable weather. Cool temperatures held back plant growth and training began one week later than usual. Here, too, work was frequently interrupted because of the wet weather. The weather conditions changed in late May/early June, with warm weather stimulating plant growth. This enabled the hop plants to make up for the slow start, and by the end of the reporting period they had reached a stage of development only a few days behind the long-term average.

USA (PNW)

For the 2023 harvest season, the US Department of Agriculture reported hop acreage in the PNW region of 22,144 ha. This represents a year-on-year decline of 2,051 ha (-8%), making crop year 2023 the second year in succession to see a reduction in hop acreage. What is more, while aroma hop acreage has fallen significantly by 3,629 ha (-19%), bitter hop acreage has expanded by 1,578 ha (+34%). The ratio of aroma to bitter varieties has thus changed from 81:19 in crop year 2022 to 72:28 in 2023.

The varieties that had seen the greatest acreage expansion in recent years were the ones to be cut back most in crop year 2023. By far the most of the cutbacks are to be seen among the proprietary aroma varieties **Citra**® and **Mosaic**®. In spite of shedding 1,252 ha (-26%), **Citra**® remains the most widely grown variety (3,622 ha). Its share of total acreage is down from 20% to 16%, however. **Mosaic**®, too, has been cut back considerably by 544 ha (-21%), reducing its acreage share to 9% (2,087 ha) and causing it to slip from second to third place in the US acreage rankings. The aroma varieties seeing the most significant contraction are **Azacca**® (-171 ha), **Sabro**® (-168 ha), **Strata**® (-168 ha) and **El Dorado**® (-150 ha). **Amarillo**® was an exception, expanding instead by 114 ha. The public aroma varieties have not escaped the acreage cuts either: **Cascade** (-319 ha), **Cashmere** (-164 ha) and **Chinook** (-118 ha).

The expansion of bitter hop acreage is attributable primarily to the area devoted to **CTZ** being increased by 43% (+794 ha), as a result of which this variety replaces **Mosaic**® as the second-most widely grown hop variety in the USA with 2,622 ha and an acreage share of 12%. Other bitter varieties to see moderate expansion are **HBC 682** and **Helios**™, while acreage of most of the other varieties remains unchanged. Bitter hop acreage expansion was simplified by the fact that acreage was vacant where aroma hop plants had been grubbed up, which can be seen as a realignment of the varietal mix in the hop industry as a consequence of the weakening craft beer market.

The winter of 2022/2023 left an above-average snowpack in the mountains and brought above-average rainfall elsewhere, providing the basis for sufficient water supply for the PNW region. The weather conditions were dictated by the La Niña weather pattern for the third time in succession. As in the previous year, plant growth initially lagged behind by one to two weeks. As temperatures rose and normal growing conditions returned, the plants quickly made up for the retarded growth. However, warm temperatures in late spring brought on early bloom in some aroma varieties, which may possibly lead to lower yields.

World

Hop acreage worldwide in crop year 2023 will total approximately 60,940 ha, which is about 1,860 ha less than the year before. Despite this decline in acreage of 3%, the structural hop surplus remains.



WORLD BEER OUTPUT 2021/2022

It is becoming increasingly difficult to obtain figures for beer output volume for individual countries. Also, there are often significant discrepancies in the production figures based on data provided by different sources. The output volumes here, which in some cases are estimates, are based on close scrutiny of all available data and on our own judgement.

Europe			
Ranking	Country	2021	2022
5	Germany	85,443	87,832
6	Russia	82,124	81,700
8	Spain	38,109	41,100
10	Poland	38,277	37,800 *
11	United Kingdom	38,382	37,409
15	Belgium	24,043	25,000 *
16	France	21,800	22,500 *
17	Netherlands	22,086	22,500 *
20	Czech Republic	19,559	20,550
23	Italy	17,643	18,000 *
26	Romania	16,600	15,800
31	Ukraine	17,071	12,280
34	Austria	9,851	10,288
35	Turkey	9,330	9,500 *
37	Portugal	6,711	7,787
40	Denmark	6,240	6,400 *
41	Hungary	5,568	5,640
48	Bulgaria	4,460	4,500 *
52	Sweden	4,154	4,200 *
53	Belarus/White Russia	4,344	4,127
54	Greece	4,019	4,100 *
55	Ireland	3,828	4,000 *
57	Switzerland	3,382	3,678
60	Finland	3,699	3,550 *
61	Lithuania	3,337	3,504
64	Croatia	3,267	3,343
66	Serbia	3,780	3,300
69	Slovakia	3,140	3,100 *
70	Norway	3,300	3,045
78	Slovenia	2,231	2,200 *
98	Estonia	1,366	1,196
100	Georgia	875	1,125
106	Bosnia-Herzegovina	950 *	900 *
108	Latvia	743	873
110	Moldova	905 *	780 *
111	Albania	758	708
116	North Macedonia	554	493
120	Cyprus	357	415
128	Armenia	281	303
129	Montenegro	310 *	300 *
132	Luxembourg	225	279
139	Iceland	183	188
140	Malta	155	181
TOTAL		513,440	516,474

America			
Ranking	Country	2021	2022
2	USA **	204,200	194,100
3	Brazil	143,000	147,433
4	Mexico	134,700	141,000
13	Colombia	26,093	27,671
19	Canada	21,205	20,613
21	Argentina	19,087	20,435
29	Peru	14,010	14,996
33	Chile	10,350	11,822
39	Ecuador	6,113	6,791
44	Guatemala	5,400	5,150
47	Venezuela	3,149	4,656
49	Dominican Republic	5,900	4,380
59	Bolivia	3,530	3,555
68	Panama	3,262	3,295
73	Paraguay	2,650	2,740
76	Cuba	2,300 *	2,300 *
87	Uruguay	1,600	1,670
88	Costa Rica	1,590	1,560
89	Honduras	1,556	1,554
96	El Salvador	1,285	1,286
99	Nicaragua	1,150	1,190
102	Puerto Rico	1,117	1,082
113	Trinidad	580	600 *
118	Guyana	380	480
122	Jamaica	415	405
137	Haiti	195 *	195
143	St. Lucia	175 *	175 *
147	Bahamas	148 *	148 *
149	Dutch Antilles	140 *	140 *
150	Suriname	100 *	100 *
152	Barbados	80 *	80 *
156	Martinique	60 *	60 *
157	Aruba	55 *	55 *
159	St. Vincent	45 *	46 *
161	Belize	40 *	40 *
163	Grenada	30 *	32
164	St. Kitts	25 *	26
165	Antigua	20 *	20 *
166	Cayman Islands	25	20
167	Dominica	11 *	11 *
TOTAL		615,771	621,912

Italics: Corrections of figures for 2021 stated in last year's report. These figures only became known after going to press or were subsequently corrected.

All figures in 1,000 hl Ordered according to output volume in 2022

* Estimate ** US volume includes hard seltzers and flavored malt beverages



WORLD BEER OUTPUT 2021/2022

Africa			
Ranking	Country	2021	2022
12	South Africa	31,000 *	33,750
22	Nigeria	17,998	18,184
28	Ethiopia	13,500 *	15,000
32	Angola	11,000 *	12,000
36	Cameroon	7,200	8,000
45	Tanzania	4,970	5,005
46	Dem. Rep. of the Congo (Zaire)	4,700 *	4,900 *
50	Kenya	4,300 *	4,350 *
56	Mozambique	3,859	3,948
58	Uganda	3,600 *	3,650 *
62	Congo (Brazzaville)	3,350 *	3,500 *
63	Burkina Faso	3,400	3,450 *
67	Ghana	3,300	3,300 *
71	Ivory Coast	3,600	3,000
74	Burundi	2,400 *	2,500
77	Sambia	2,200	2,225
79	Zimbabwe	2,200 *	2,180 *
80	Tunisia	1,980	2,045
81	Botswana	2,050	2,020
84	Namibia	1,800	1,810
85	Gabun	1,780	1,800
86	Algeria	1,800	1,800
91	Rwanda	1,460 *	1,500 *
92	Madagascar	1,450	1,460
94	Benin	1,310	1,310 *
97	Togo	1,200 *	1,200
101	Malawi	1,050 *	1,100 *
103	Chad	973	981
107	Egypt	900 *	900
109	Morocco	780 *	830 *
119	Lesotho	420	425
121	Mauritius	413	413
124	Guinea Conakry	430 *	370 *
127	Equatorial Guinea	310 *	320
131	Eritrea	280	280
133	Central African Republic	250 *	260 *
135	Réunion	220 *	225 *
136	Kingdom Eswatini	220 *	225 *
138	Mali	190 *	190 *
142	Sierra Leone	175	177
144	Senegal	150 *	160
145	Liberia	150	155
151	Seychelles	104	100
160	Guinea Bissau	45 *	45 *
162	Niger	0	35
169	Cape Verde	8 *	9 *
	TOTAL	144,475	151,087

Australia/Oceania			
Ranking	Country	2021	2022
24	Australia	16,830 *	17,445 *
72	New Zealand	2,925	2,940
112	Papua New Guinea	627	698
141	Tahiti	180 *	180 *
146	New Caledonia	150 *	150 *
148	Fiji Islands	147	145
154	Solomon Islands	65 *	65 *
155	Samoa	62 *	62 *
168	Vanuatu	9 *	9 *
	TOTAL	20,995	21,694

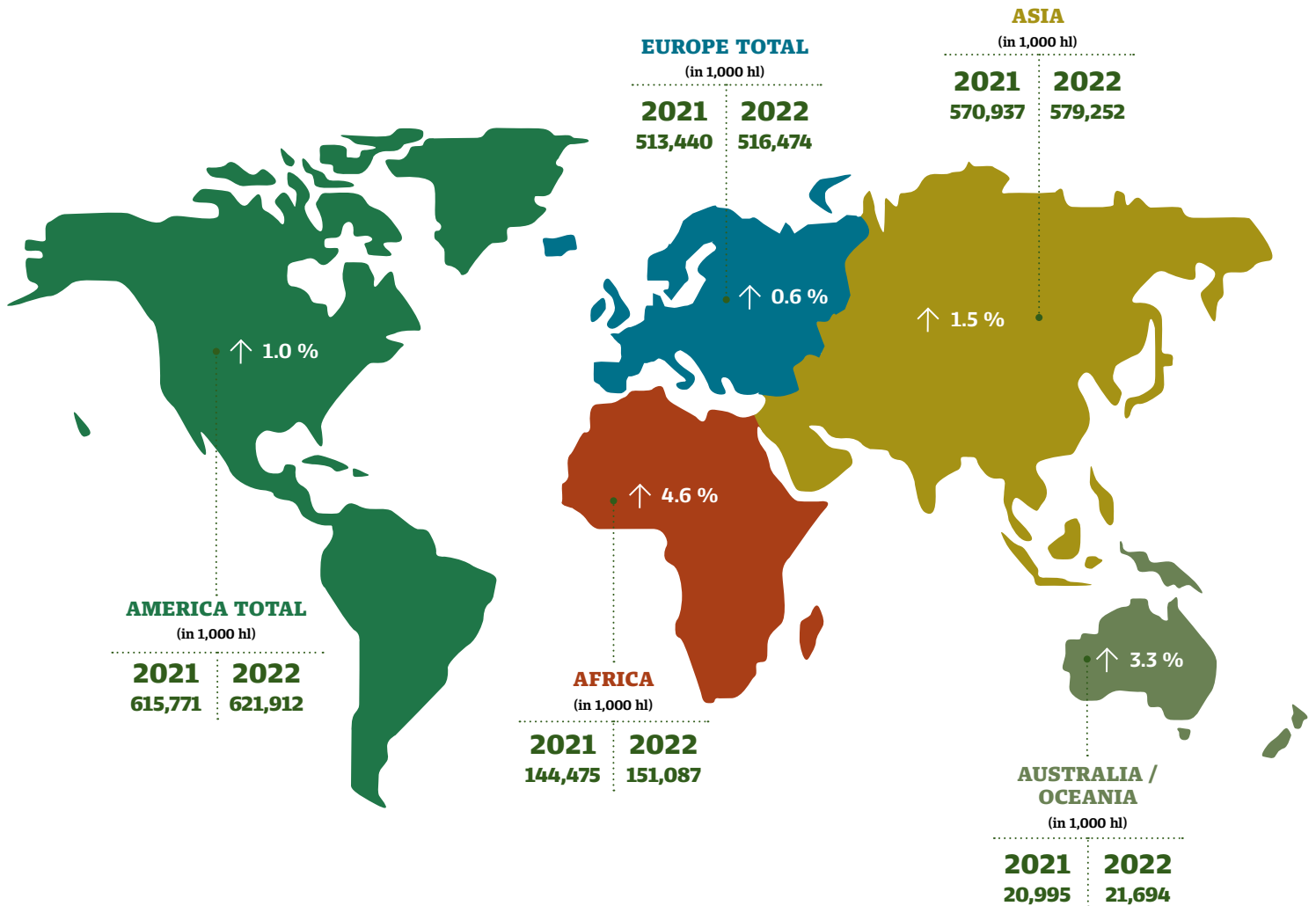
Asia			
Ranking	Country	2021	2022
1	China	359,740	360,405
7	Japan	44,561	45,882
9	Vietnam	42,000	39,000
14	India	22,044	25,517
18	Thailand	19,806	22,434
25	Philippines	14,765	16,245
27	South Korea	13,380	15,697
30	Cambodia	16,000 *	13,000 *
38	Kazakhstan	7,017	7,177
42	Laos	5,000	5,500 *
43	Taiwan	5,462	5,370
51	Myanmar	3,500	4,260
65	Indonesia	2,770	3,310
75	Usbekistan	2,645	2,330
82	Nepal	1,900	1,900 *
83	Israel	1,690	1,860
90	Malaysia	1,289	1,542
93	Sri Lanka	1,260	1,320
95	Singapore	1,210	1,300
104	Mongolia	650 *	950 *
105	Iran	1,000 *	900 *
114	Azerbaijan	585 *	595 *
115	Hong Kong	510	525
117	Turkmenistan	485 *	480 *
123	Kyrgyzstan	360	380 *
125	Lebanon	365	354
126	Tajikistan	345 *	350 *
130	Bhutan	246	289
134	Jordan	229	240
153	Pakistan	76	80
158	Bangladesch	42	55
170	Palestine	5 *	5 *
	TOTAL	570,937	579,252

WORLD		
	2021	2022
TOTAL	1,865,618	1,890,419



BEER OUTPUT DEVELOPMENT 2021/22

Development by continent



	2021 1,000 hl	2022 1,000 hl	2021 +/- % rel.	2022 +/- % rel.
European Union	343,644	353,295	-8.0 %	2.8 %
Rest of Europe	169,796	163,179	30.8 %	-3.9 %
EUROPE TOTAL	513,440	516,474	2.0 %	0.6 %
North America	360,105	355,713	1.9 %	-1.2 %
Central America/Caribbean	25,604	23,850	20.6 %	-6.9 %
South America	230,062	242,349	7.4 %	5.3 %
AMERICA TOTAL	615,771	621,912	4.6 %	1.0 %

Following corrections to beer output volumes in various countries, the revised volume of beer brewed worldwide in 2021 was 1.87m hl which is 0.3% or 6m hl more than originally reported.

In 2022, world beer production rose by 25m hl to 1.89bn hl, representing growth of 1.3%.

The five leading beer-producing countries, **China, the USA, Brazil, Mexico, and Germany**, saw their share of world beer production fall slightly to 49%.

In the European Union, **Spain** (+3m hl) and **Germany** (+2.4m hl) in particular achieved significant growth. The sharp drop in production reported for the remainder of the



BEER OUTPUT DEVELOPMENT 2021/22

countries in Europe is primarily due to the fall in output in **Ukraine** (-4.8m hl). In Europe as a whole, beer production increased by 3m hl.

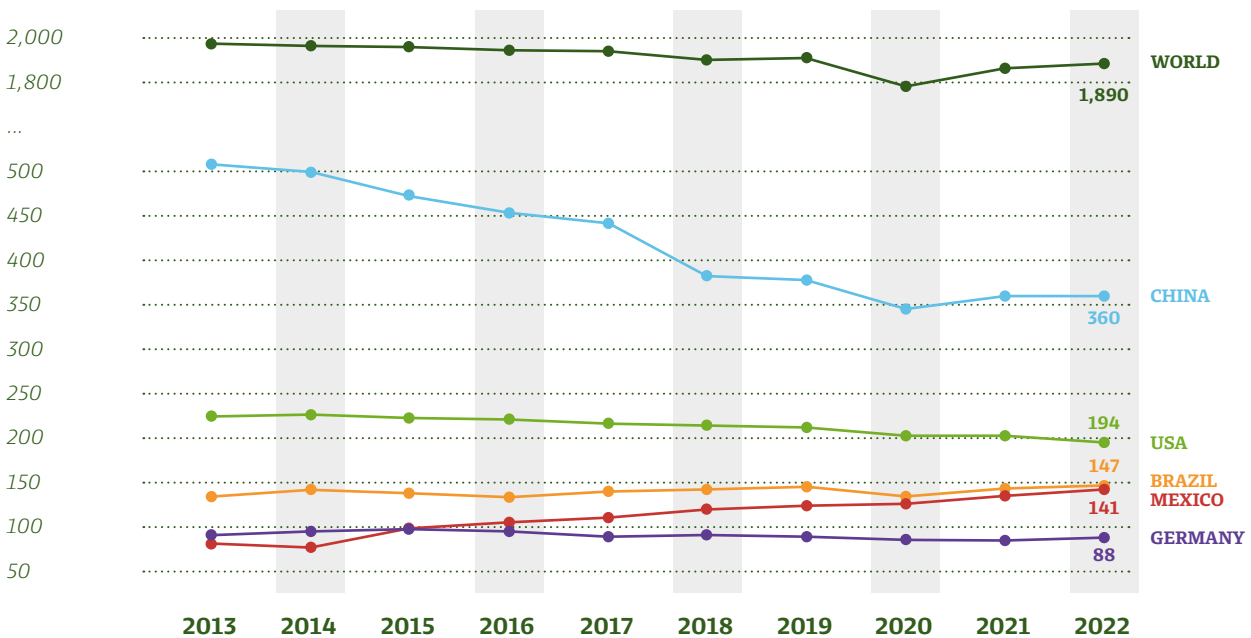
In the Americas, output rose by 6.1m hl. There was strong growth in South America. The country with the highest growth in volume terms was **Brazil** (+4.4m hl). In North America, growth in **Mexico** (+6.3m hl) was insufficient to compensate for falling output in the **USA** (-10.1m hl). The Central America/Caribbean region also registered falling output.

India (+3.5m hl), **Thailand** (+2.6m hl), **South Korea** (+2.3m hl), the **Philippines** (+1.5m hl) and **Japan** (+1.3m hl) were the countries with the highest growth in Asia and produced a positive result, which, despite the falling output in **Vietnam** and **Cambodia** (each -3m hl) 8.3m hl was higher than in the previous year.

The African continent saw its output increase by 6.6m hl, thus achieving the highest proportion increase of all continents. The main contributors to this growth were **South Africa** (+2.8m hl), **Ethiopia** (+1.5m hl) and **Angola** (+1m hl).

DEVELOPMENT IN THE YEARS 2013 - 2022

BEER PRODUCTION IN MILLION HL



TOP 40 BREWERS

2022 was characterized by rising output at the big breweries, while regional brewers found it more difficult to make up for the volume losses sustained during the pandemic.

In the craft beer segment, the consolidation process continued. Japan's **Sapporo Breweries** acquired **Stone Brewing Company** in the USA in order to consolidate its presence on the American continent. The American **Canarchy Group** was taken over by the beverage maker **Monster**.

Heineken now holds majority shares in **United Breweries Group**, India (which consequently drops out of the Top 40 rankings, as its output volume is consolidated in Heineken's), as well as in **Grupa Zywiec**, Poland, and **Namibia Breweries**. **Diageo** sold the Ethiopian **Meta Abo Brewery** to **BGI/Groupe Castel**. The Danish company

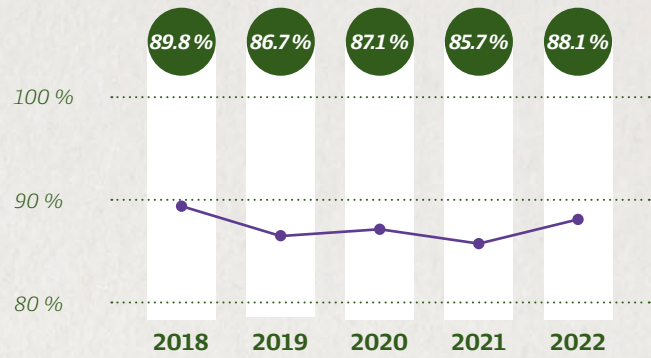
Royal Unibrew acquired a majority shareholding in Norway's **Hansa Borg**.

Contrary to what they announced in the spring of 2022, none of the major groups have succeeded in divesting themselves of their Russian businesses. **Kirin's** efforts to dispose of its shareholding in **Myanmar Breweries Ltd.**, on the other hand, were successful - although with a considerable write-down on its balance sheet.

The above-mentioned integration of **UB** into the **Heineken** empire paved the way for Venezuela's **Polar** to enter the Top 40, as its output had again exceeded the four-million-hectoliter mark. In addition, the Belgian brewer **Martens** replaced **Veltins** in the rankings.



TOP 40 BREWERS

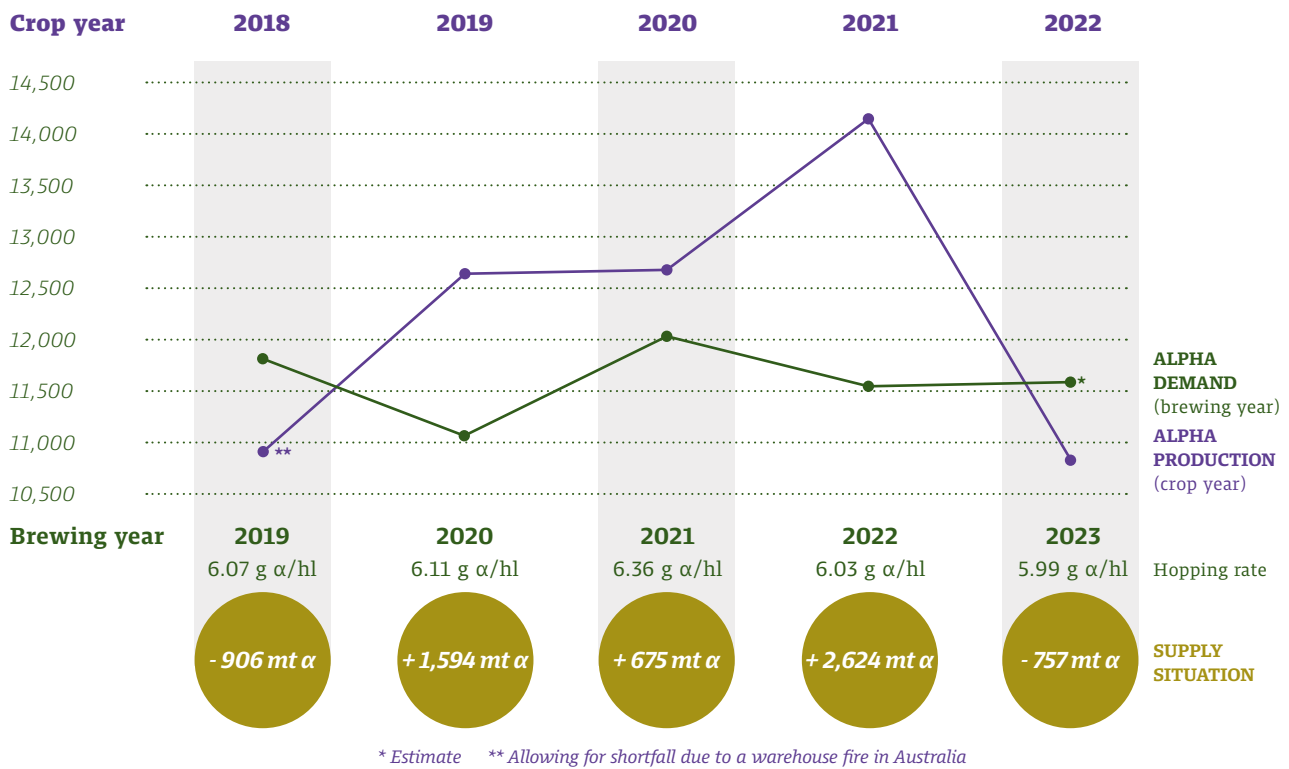


Ranking	Brewery	Country	Beer output 2022 in mill. hl	Share of world beer production
1	AB InBev	Belgium	518.0	27.4 %
2	Heineken	Netherlands	256.9	13.6 %
3	China Res. Snow Breweries	China	122.2	6.5 %
4	Carlsberg	Denmark	102.4	5.4 %
5	Molson Coors	USA/Canada	82.3	4.4 %
6	Tsingtao Brewery Group	China	79.6	4.2 %
7	Asahi Group	Japan	59.3	3.1 %
8	BGI / Groupe Castel	France	43.7	2.3 %
9	Yanjing	China	37.7	2.0 %
10	Efes Group	Turkey	34.0	1.8 %
11	Constellation Brands	USA	33.2	1.8 %
12	Grupo Petrópolis	Brazil	26.0	1.4 %
13	Kirin	Japan	24.4	1.3 %
14	Diageo (Guinness)	Ireland	23.9	1.3 %
15	CCU	Chile	17.6	0.9 %
16	San Miguel Corporation	Philippines	17.4	0.9 %
17	Saigon Beverage Corp. (SABECO)	Vietnam	15.3	0.8 %
18	Grupo Mahou - San Miguel	Spain	15.3	0.8 %
19	Singha Corporation	Thailand	14.6	0.8 %
20	Pearl River	China	13.4	0.7 %
21	Damm	Spain	12.7	0.7 %
22	Radeberger Gruppe	Germany	11.0	0.6 %
23	Beer Thai (Chang)	Thailand	8.7	0.5 %
24	Suntory	Japan	8.1	0.4 %
25	Oettinger Gruppe	Germany	8.0	0.4 %
26	Sapporo	Japan	7.8	0.4 %
27	Swinkels Family Brewers	Netherlands	7.3	0.4 %
28	TCB Beteiligungsgesellschaft mbH	Germany	7.1	0.4 %
29	Krombacher Gruppe	Germany	6.0	0.3 %
30	Paulaner Gruppe	Germany	6.0	0.3 %
31	Bitburger Braugruppe	Germany	5.8	0.3 %
32	Hitejinro	South Korea	5.5	0.3 %
33	Olvi Group	Finland	5.2	0.3 %
34	Hanoi Beverage Corp. (HABECO)	Vietnam	5.0	0.3 %
35	Royal Unibrew	Denmark	4.8	0.3 %
36	Estrella de Galicia	Spain	4.8	0.3 %
37	Polar	Venezuela	4.1	0.2 %
38	Obolon	Ukraine	4.0	0.2 %
39	Moscow Brewing Company	Russia	3.9	0.2 %
40	Martens	Belgium	3.5	0.2 %
TOTAL			1,666.3	88.1 %
WORLD BEER PRODUCTION 2022			1,890.4	100.0 %

The data were taken from the brewers' own annual reports. In other cases, after different sources had reported differing figures, or where no figures were available, the production volume had to be estimated.



ALPHA ACID BALANCE



Taking into account the somewhat higher volume of beer output than that quoted in the last report for 2021, alpha demand was slightly higher and reduces the alpha surplus.

However, as a result of lower hopping rates, the alpha surplus originally calculated for the 2022 brewing year has grown considerably (by 277 mt to 2,624 mt). Beer output remained below that of the year prior to the COVID-19 outbreak, but we expect output in the 2023 brewing year to return to the level last seen in 2019. Alpha demand, on the other hand, will probably remain lower.

Crop year 2022, which corresponds to the 2023 brewing year, produced below-average results. This left the market facing an arithmetical supply deficit (-757 mt). Due to the surpluses produced in the three previous crop years, however, there will not be a supply shortfall.

The volume required for uses beyond brewing has been taken into consideration in our calculation of the alpha supply situation.





MARKET SITUATION

After eight years of continuous expansion, hop acreage declined in crop year 2022 for the first time since 2014. The decline was very minor, however, amounting to only 96 ha, or 0.2% of total acreage. The total planted hop acreage worldwide was 62,802 ha. The crop volume harvested on that acreage was 106,584 mt. This was 19% down year on year. There has never been a greater percentage decrease in the entire post-war period. At 10.2% (ToP), the average alpha acid content of all the varieties harvested was significantly below the previous year's record. The combination of very low crop volume and at best average alpha content resulted in an alpha volume that was far below any seen in previous years. The volume of alpha acid harvested was 10,835 mt, a year-on-year drop of approx. 3,300 mt.

Hop acreage in Germany decreased by slightly less than 16 ha in crop year 2022 and thus remained virtually unchanged. In the USA, the continuous expansion of the past 10 years went into reverse, leaving total planted area at 24,750 ha in crop year 2022. US hop acreage exceeds Germany's by nearly 4,200 ha. Unfavorable weather conditions affected both of the world's two biggest hop producers equally. Average yield was 1.87 mt/ha in the USA, but only 1.67 mt/ha in Germany. The effects of climate change are becoming apparent. The fluctuations in yield observed in the USA are historically unprecedented.

2022 was a year characterized by geopolitical influences affecting the global economy and presenting the brewing and hop industries with corresponding challenges. Whereas at the beginning of the Russian war of aggression against Ukraine it was expected that world beer output might decline, in the 2022 brewing year it went against all the trends to increase slightly by 1.3% to 1.890m hl. Nevertheless, alpha demand from the brewing industry fell due to the trend toward less hopped beers.

Despite the substantially below-average harvest in crop year 2022 and an arithmetical undersupply for the 2023 brewing year, the alpha balance accumulated in recent years still clearly shows the market to be oversupplied. The brewing industry still has a fair to large surplus of some varieties, as stocks from previous crop years remain widely available. In addition, with the costs of energy, raw materials and labor soaring, brewers' profit margins are shrinking. In order to counter this, appropriate action is being taken, including the introduction of cost-saving measures. No exceptions are being made for hop addition either. This can be seen particularly with regard to aroma hop addition in the clear trend toward greater use of high alpha varieties at the expense of aroma varieties and the growing demand for more efficient hop products. Uncertainty on the economic front due to high inflation and rising interest rates is making the brewing industry more cautious in its hop purchasing policy. From the hop industry's point of view, the development of both the spot and contract markets was and is disappointing and, considering the poor harvest in 2022, unexpected. Call-offs of contracted products are being significantly delayed, which is a further indication that the breweries still hold more than enough inventory.

In Germany's hop-growing regions there has been no let-up in the trend toward replacing aroma and flavor varieties that are surplus to market demand and low-yielding older plantings of widely grown aroma varieties with reliably-yielding and climate-resistant high alpha varieties. In Germany and the other European hop-producing countries, acreage in crop year 2023 remains stable at approx. 32,500 ha.

In the American hop-growing regions in the Pacific Northwest (PNW), much more significant acreage movements are taking place. As a result of the high surplus of flavor and aroma varieties on the market, neither merchants nor producers can afford to continue as before. Hop marketers and growers are making a concerted effort to rebalance the market. In crop year 2023, the area planted with aroma varieties in the USA is being massively reduced by approx. 3,600 ha. Part of the newly vacant area, some 1,600 ha, has been replanted either with well-known high alpha varieties or with new, higher-yielding, and licensed ones such as Helios™ or HBC 682. The dimension of this change marks a return of American hop producers as competitors to their European counterparts in alpha production. Yield potential and reliability, production costs per hectare, and the euro-dollar exchange rate will once again influence the competitiveness of the two major hop-producing nations more strongly.





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THRIVING TOGETHER IN AN EVER-CHANGING WORLD

We are all likely to need to make some changes in the future. In fact, most of us are already doing so. Increasing costs, supply fluctuations and changing customer demands are challenges to our businesses that cannot be ignored. At BarthHaas, however, we see opportunities in these challenges, as we, as a fully integrated global hop supplier, are in a unique position to help solve them. We have nearly 230 years of experience and world-leading product innovations and expertise, and we share this to create solutions that help us all thrive in the face of the challenges we meet.

Efficiency is going to be ever more important as we all step into the future. Increasing costs have hit businesses around the world, making it more challenging for them to operate profitably. We have developed – and continue to improve and refine – products that enable brewers to create amazing beers more efficiently. Our liquid hops range of products is part of the future of hop products that revolutionize how bitterness, hop flavor and even natural hop haze can be created quickly, efficiently and with less loss. By using these products, brewers can make efficiency savings at almost every stage of the brewing process, helping them to achieve the competitive advantage they need to grow in the future.

As well as efficiency, we have been looking at how we, together with our growers and customers, can identify and mitigate future risks. The 2022 harvest in Europe made us brutally aware of the magnitude of the challenges presented by the increasingly frequent occurrence of extreme weather conditions. As we will very probably be confronted with such challenges more and more often in the future, our aim is to counter them worldwide. Variety selection is a starting point in this respect. Many of the older regional varieties that are well established and loved by brewers around the world are unable to realize their full potential in these changing climatic conditions. New, sustainable cultivars that are better able to tolerate drought stress, for example, or are more resistant to disease and thus require less use of pesticides, will serve the entire industry with regard to safeguarding raw materials.

At BarthHaas, we have set ourselves a mission to facilitate change on all sides of the industry. We want to work alongside brewers, advising them on how they can brew with varieties that are more resilient and achieve the same flavors. In doing so, we can help our growers to make the changes needed to make the future of hop supply as stable and reliable as possible.

Finally, we at BarthHaas have been looking at the changing demands of consumers around the world. In Europe, as well as many other areas of the world, we are seeing consumers becoming more health-conscious and discerning. The rise of non-alcoholic beers continues, and interest in other non-beer options is also growing. As experts in natural flavor, we can see that we have a role to play in helping brewers to make the most of these opportunities. Wherever we can help a business diversify their offering to provide their customers with what they need, we know that we can help that business to generate revenue. Our Brewing Solutions Team and our unique range of hop products are ideally suited to this task and can help beverage makers of all types create exciting new ranges that drive new business, and ultimately help them to thrive.

SO HERE IS OUR PROMISE TO THE BREWING INDUSTRY AND BEYOND:

As the world's largest hop supplier and as leading experts in hop flavor, we are going to meet the inevitable change to our industry head-on. We are going to do all we can to be more efficient, to mitigate risk and to diversify the solutions we offer, and we want you all to join us. Collaboration, innovation, and adaptation will be required of us all, and if we get it right, we will all thrive together.



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Our thanks go to all those bodies and individuals who provide us with information and thus contribute to the success of the BarthHaas Report.