

# **Survey of Phosphorus Industry in China 2023**

**The Eighth Edition**

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**Researched & Prepared by:**

**Kcomber Inc.**

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## Contents

<b>Executive summary</b> .....	<b>1</b>
<b>Methodology</b> .....	<b>2</b>
<b>1 Phosphate rock</b> .....	<b>4</b>
1.1 Overview of global phosphate rock.....	4
1.2 Phosphate rock in China.....	6
1.2.1 Distribution of phosphate rock reserves, 2022 .....	6
1.2.2 Output of phosphate rock, 2018–2022 .....	6
1.2.3 Price of phosphate rock, 2018–2022.....	7
1.2.4 Export analysis of phosphate rock, 2018–2022 .....	9
<b>2 Phosphate fertilizers in China</b> .....	<b>10</b>
2.1 Output of phosphate fertilizers, 2014–2021 .....	10
2.2 MAP in China, 2018–2022 .....	11
2.2.1 Production .....	11
2.2.2 Price .....	12
2.2.3 Import and export .....	13
2.3 DAP in China, 2018–2022 .....	18
2.3.1 Production .....	18
2.3.2 Price .....	19
2.3.3 Import and export .....	20
<b>3 Yellow phosphorus in China</b> .....	<b>25</b>
3.1 Capacity and output of yellow phosphorus, 2018–2022 .....	25
3.2 Price of yellow phosphorus, 2018–2022 .....	26
3.3 Export analysis of yellow phosphorus, 2018–2022.....	28
<b>4 Key phosphorus producers in China, 2022</b> .....	<b>31</b>

### LIST OF TABLES

Table 1.1-1 Global phosphate rock output and economic reserves, 2018–2022E, '000 tonne
Table 1.2.2-1 Output of phosphate rock in China by region, 2022
Table 1.2.3-1 Ex-works price of 29% phosphate rock in China, 2018–2022
Table 2.2.1-1 Capacity and output of MAP producers in China, 2020–2022
Table 2.2.3-1 Imports and exports of MAP in China, 2018–2022
Table 2.2.3-2 Top ten export destinations of MAP in China, 2020–2022
Table 2.2.3-3 China's export volume of MAP by province/region/municipality, 2020–2022
Table 2.3.1-1 Production situation of DAP producers in China, 2020–2022
Table 2.3.3-1 Imports and exports of DAP in China, 2018–2022
Table 2.3.3-2 Top ten export destination of DAP in China, 2020–2022
Table 2.3.3-3 China's DAP export volume by province/region/municipality, 2020–2022
Table 3.3-1 China's exports of yellow phosphorus by destination, 2022
Table 4-1 List of major phosphate rock producers in China, 2022

Table 4-2 List of major yellow phosphorus producers in China, 2019–2022

### LIST OF FIGURES

- Figure 1.1-1 Global phosphate rock output, 2018–2022E  
Figure 1.1-2 Distribution of global phosphate rock marketable reserves by region, 2022  
Figure 1.2.1-1 Distribution of phosphate rock reserves in China by region, 2022  
Figure 1.2.2-1 Output of phosphate rock in China, 2018–2022  
Figure 1.2.3-1 Monthly ex-works price of 29% phosphate rock in China, 2021–2022  
Figure 1.2.3-2 Monthly ex-works price of phosphate rock in China by region, 2021–2022  
Figure 1.2.4-1 China's export volume of phosphate rock, 2018–2022  
Figure 1.2.4-2 Annual average export prices of phosphate rock from China, 2018–2022  
Figure 2.1-1 Output of phosphate fertilizers (converted to 100% P<sub>2</sub>O<sub>5</sub>) in China, 2014–2021  
Figure 2.2.1-1 Capacity and output of MAP in China, 2018–2022  
Figure 2.2.2-1 Ex-works price of MAP (55% powder) in China, Jan. 2018–Dec. 2022  
Figure 2.2.3-1 Monthly exports of MAP from China, Jan. 2018–Dec. 2022  
Figure 2.2.3-2 Share of top ten export destinations of MAP in China, 2022  
Figure 2.3.1-1 Capacity and output of DAP in China, 2018–2022  
Figure 2.3.2-1 Ex-works price of DAP (64%) in China, Jan. 2018–Dec. 2022  
Figure 2.3.3-1 Monthly exports of DAP in China, Jan. 2018–Dec. 2022  
Figure 2.3.3-2 Share of top ten export destinations of DAP in China, 2022  
Figure 3.1-1 Capacity and output of yellow phosphorus in China, 2018–2022  
Figure 3.1-2 Capacity distribution of yellow phosphorus in China, 2022  
Figure 3.1-3 Output distribution of yellow phosphorus in China, 2022  
Figure 3.2-1 Annual average ex-works price of yellow phosphorus in China, 2018–2022  
Figure 3.2-2 Monthly ex-works price of yellow phosphorus in China, Jan. 2018–Dec. 2022  
Figure 3.2-3 Monthly ex-works price of yellow phosphorus in China by region, Jan. 2018–Dec. 2022  
Figure 3.3-1 China's export volume of yellow phosphorus, 2018–2022  
Figure 3.3-2 Monthly exports of yellow phosphorus from China, Jan. 2018–Dec. 2022

## **Executive summary**

Phosphate rock is an upstream source of phosphorus element. The distribution of world phosphate rock reserves is uneven, mainly in Morocco and Western Sahara. China's phosphate rock reserves rank second in the world. According to data from the National Bureau of Statistics of China, the reserves of phosphate rock in China are 3.69 billion tonnes. Most phosphate mines are distributed in provinces such as Hubei, Yunnan, Guizhou, and Sichuan. Affected by environmental policies, China's annual production output of phosphate rock showed a downward trend from 2018 to 2020. However, in 2021 and 2022, driven by strong market demand, the production output of phosphate rock increased for two consecutive years.

In terms of its application, phosphate rock is mainly used for the production of phosphate fertilizers. However, in recent years, due to increasingly strict environmental regulations and fluctuations in downstream demand in China, the production output of phosphorus fertilizers has been declining. Since 2018, the production outputs of DAP and MAP have generally shown a downward trend. In 2022, China produced 14,902,000 tonnes of MAP and 13,300,000 tonnes of DAP, which sank by 3.69% YoY and 1.80% YoY respectively.

China's yellow phosphorus production accounts for a large proportion in the world. From 2019 to 2021, China's yellow phosphorus capacity remained relatively stable. In 2022, due to the increase in downstream demand and the rise in yellow phosphorus prices, the production enthusiasm of producers increased, which resulted in a significant increase in capacity and output. In 2022, China's yellow phosphorus output reached 840,000 tonnes, an increase of 32.86% YoY. In 2022, the yellow phosphorus capacity was 1,448,500 t/a, an increase of 15.05% YoY.

## **Methodology**

### **Research scope and targets**

This research aims to study China's phosphorous industry by product categories, which include phosphate rock, phosphate fertilizer and yellow phosphorus.

Region scope: China

Time scope: primarily 2018 to 2022 unless otherwise stated

### **Methodology and sources**

This report is based on data collected with diverse methods, which are listed as follows:

#### **Desk research**

This includes access to published magazines, journals, government, industry and Customs statistics, association seminars as well as information from the Internet. A lot of work has gone into the compilation and analysis of the obtained information. Data collected and compiled are variously sourced from:

- CCM's database
- Published articles from periodicals, magazines, journals, and third-party database
- Statistics from governments and international institutes
- Customs statistics
- Comments from industrial experts on various platforms
- Information from the Internet

#### **Telephone interview targets**

- Key producers
- Key traders
- Industrial associations
- Industrial experts

#### **Data compilation and crosscheck**

Data obtained from various sources have been combined and cross-checked to ensure that this report is as accurate and methodologically sound as possible.

## **Units and abbreviations**

### **Units**

tonne: equals to metric ton in this report

t/a: tonne per annum

CNY: currency code, China Yuan

RMB: Ren Min Bi, name of Chinese currency

USD: currency code, United States Dollar

### **Abbreviations**

CAGR: compound annual growth rate

CCMA: China Chemical Mining Association

DAP: Diammonium phosphate

MAP: Monoammonium phosphate

MLR: Ministry of Land and Resources of the People's Republic of China

P<sub>2</sub>O<sub>5</sub>: Phosphorus pentoxide

The EU: the European Union

The US: the United States of America

USGS: the United States Geological Survey

NBS: National Bureau of Statistics of the People's Republic of China

Table 1 Exchange rate USD/CNY, 2018–2022

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
2018	6.5079	6.3045	6.3352	6.2764	6.3670	6.4078	6.6157	6.8293	6.8347	6.8957	6.9670	6.9431	6.6070
2019	6.8482	6.7081	6.6957	6.7193	6.7344	6.8896	6.8716	6.8938	7.0883	7.0726	7.0437	7.0262	6.8826
2020	6.9614	6.9249	6.9811	7.0771	7.0690	7.1315	7.0710	6.9980	6.8498	6.7796	6.7050	6.5921	6.9284
2021	6.5408	6.4623	6.4754	6.5584	6.4895	6.3572	6.4709	6.4660	6.4680	6.4604	6.4192	6.3693	6.4615
2022	6.3794	6.3580	6.3014	6.3509	6.5672	6.6651	6.6863	6.7467	6.8821	7.0992	7.2081	7.1225	6.6972

Source: The People's Bank of China

# 1 Phosphate rock

## 1.1 Overview of global phosphate rock

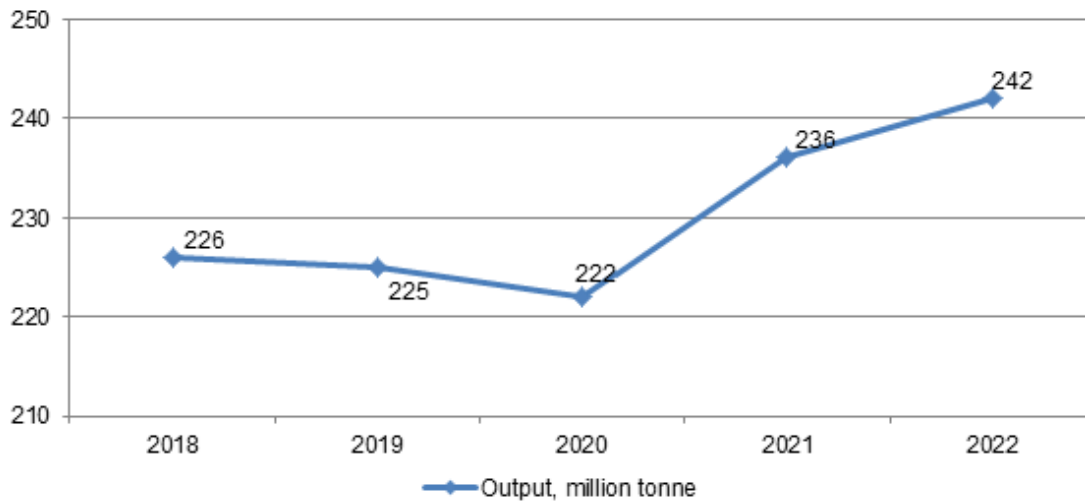
The estimated global output of phosphate rock in 2022 climbed up by 2.58% compared to the output in 2021, and went up by 6.99% compared to the output in 2018.

From 2018 to 2020, the global output of phosphate rock declined year by year, mainly because some countries, out of concerns for environmental protection and conservation of non-renewable phosphate rock resources, scaled down the size of their phosphate rock mining.

In 2021 and 2022, the global output of phosphate rock increased for two consecutive years. The output growth could be attributed to two factors:

- As the uplifts in global food prices prompted governments to place weight on food supply, demand for phosphate fertilizers grew, which ramped up demand for phosphate rock.
- In the wake of new energy vehicle industry's rapid development, usage of lithium iron phosphate (LFP) batteries has been swelling. Because phosphate rock plays an important role in the industry chain of LFP batteries, demand for phosphate rock rose.

Figure 1.1-1 Global phosphate rock output, 2018–2022E



Source: United States Geological Survey (USGS), National Bureau of Statistics (NBS), CCM

Table 1.1-1 Global phosphate rock output and economic reserves, 2018–2022E, '000 tonne

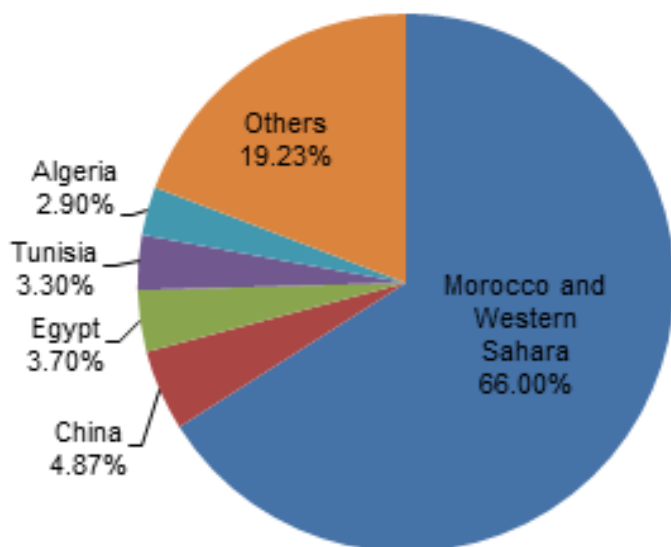
Region	Output					Reserves 2022
	2018	2019	2020	2021	2022E	
China	96,326	93,324	88,933	102,899	104,745	3,690,000
Morocco and Western Sahara	34,800	35,500	37,000	38,000	40,000	50,000,000
The US	25,800	23,300	24,000	22,000	21,000	1,000,000
Russia	14,000	13,100	13,000	14,000	13,000	600,000
Jordan	8,020	9,220	9,200	9,200	10,000	1,000,000
Saudi Arabia	6,090	6,500	6,500	8,500	9,000	1,400,000
Brazil	5,740	4,700	5,500	5,500	5,500	1,600,000
Egypt	5,000	5,000	5,000	5,000	5,000	2,800,000
Vietnam	3,300	4,650	4,700	4,700	4,500	30,000
Peru	3,900	4,000	4,000	3,800	4,200	210,000
Tunisia	3,340	4,110	4,000	3,200	4,000	2,500,000
Israel	3,550	2,810	2,800	3,000	3,000	60,000
Senegal	1,650	3,420	3,500	2,200	2,600	50,000
Australia	2,800	2,700	2,700	2,200	2,500	1,100,000
Algeria	1,200	1,300	1,300	1,200	1,800	2,200,000
South Africa	2,100	2,100	2,100	2,000	1,600	1,600,000
Kazakhstan	1,300	1,500	1,500	1,500	1,500	260,000
Togo	800	800	800	1,200	1,500	30,000
India	1,600	1,480	1,500	1,400	1,400	46,000
Mexico	1,540	558	600	530	450	30,000
Syria	100	2,000	360	N/A	N/A	1,800,000
Others	2,859	3,035	3,000	3,500	4,300	3,750,000
<b>World total</b>	<b>225,815</b>	<b>225,107</b>	<b>221,993</b>	<b>235,529</b>	<b>241,595</b>	<b>75,756,000</b>

Note: Data of output for 2022 are estimated, except that for China.

Source: USGS, NBS, CCM



Figure 1.1-2 Distribution of global phosphate rock marketable reserves by region, 2022



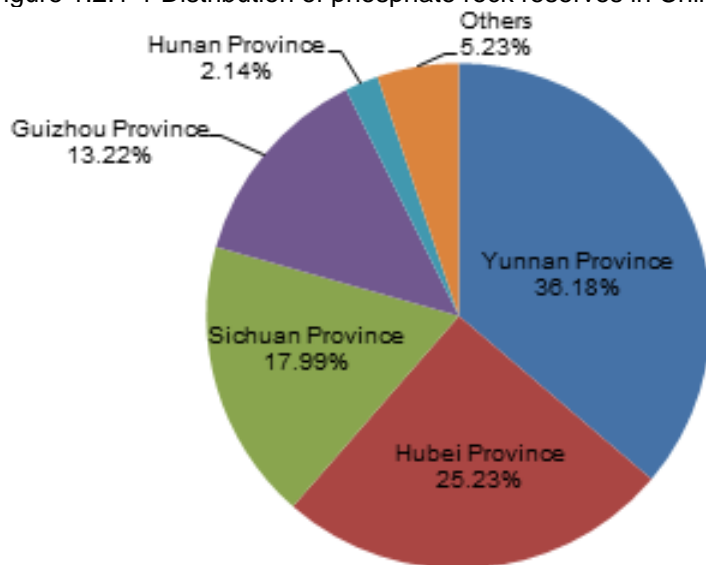
Source: USGS, CCM

## 1.2 Phosphate rock in China

### 1.2.1 Distribution of phosphate rock reserves, 2022

In 2022, the proven phosphate rock reserves in China were about 3,690 million tonnes, up 15.31% compared with that in 2021. Most of the phosphate rock reserves in China are distributed in provinces including Yunnan, Hubei, Sichuan, and Guizhou.

Figure 1.2.1-1 Distribution of phosphate rock reserves in China by region, 2022



Source: CCM

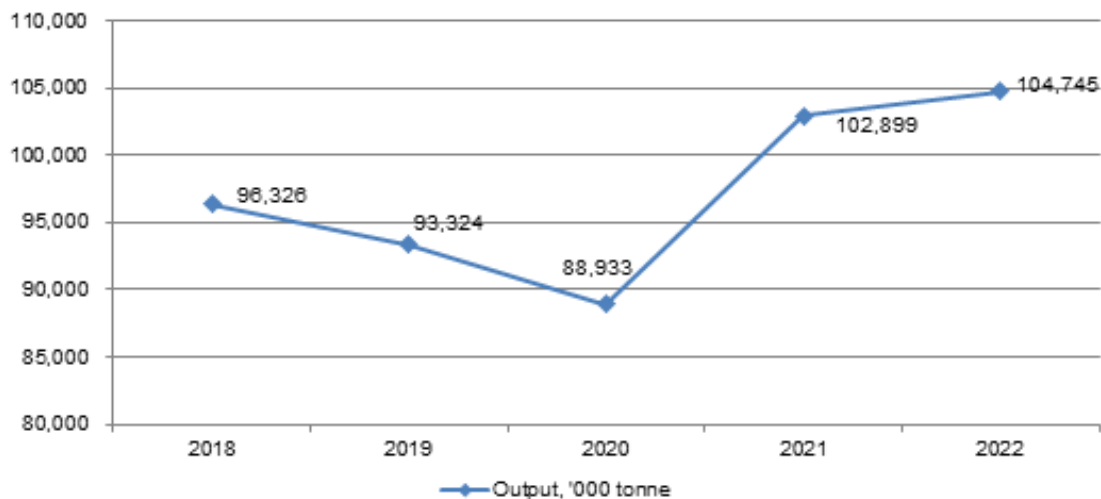
### 1.2.2 Output of phosphate rock, 2018–2022

From 2018 to 2020, output of phosphate rock in China showed a downward trend. In 2021 and 2022, the output rose for two consecutive years, which was basically consistent with the trend of global phosphate rock production in this two-year period.

Affected by policies on protecting the ecological environment and restricting phosphate rock mining, output of phosphate rock in China dropped by 7.67% in 2020 compared with that in 2018. Subsequently in 2021 and 2022, the output went up by 15.7% YoY and 1.8% YoY respectively, exhibiting recovery growths. The main reason for output growth was the rise in downstream demand—partially from LFP battery industry. Also, price of phosphate rock increased in this period, which boosted relevant producers' enthusiasm for phosphate rock mining.

Notably, 98.9% of China's 2022 phosphate rock output were contributed by top five provinces. Hubei Province was still the country's largest phosphate rock production province in 2022, with output gaining 4.10% YoY. Among the top five provinces, the fastest growth was witnessed in Yunnan Province's output, a YoY uplift of 23.19%. Outputs of Sichuan Province and Henan Province increased 1.15% YoY and 9.22% YoY respectively. Only Guizhou Province saw a decline in phosphate rock output—a YoY decrease of 21.25%.

Figure 1.2.2-1 Output of phosphate rock in China, 2018–2022



Source: CCM

Table 1.2.2-1 Output of phosphate rock in China by region, 2022

Region	Output, '000 tonne	Proportion
Hubei Province	50,338	48.1%
Yunnan Province	24,930	23.8%
Guizhou Province	19,022	18.2%
Sichuan Province	7,937	7.6%
Henan Province	1,327	1.3%
Others	1,192	1.1%
<b>Total</b>	<b>104,745</b>	<b>100.0%</b>

Source: CCM

### 1.2.3 Price of phosphate rock, 2018–2022

In 2018–2019, price of phosphate rock in China did not fluctuate much. However, the price started to increase rapidly from Aug. 2021, and such uptrend in price persisted until April 2022. The annual average price of phosphate rock in 2022 sharply rose by 105.54%. Monthly price in 2022 peaked at USD156.0/t in June and then held firm in July, but it went downwards in remaining months of the year.

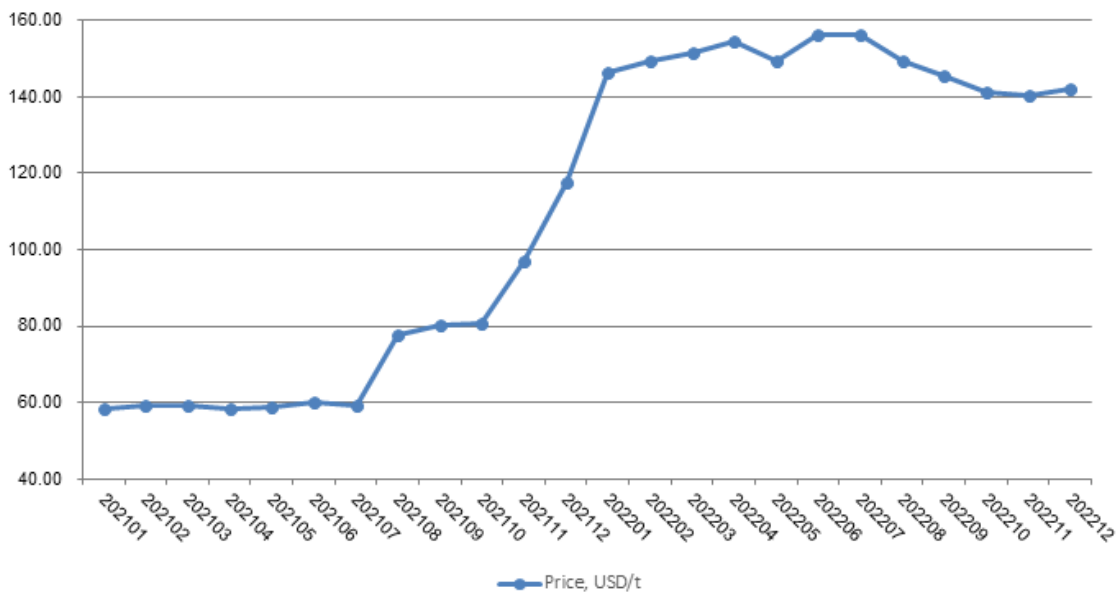
The price rise of phosphate rock in 2022 was primarily owing to the insufficient supply. Since environmental protection policies restricted mining, the phosphate rock output in 2022 only saw a limited growth, and failed to fully satisfy downstream demand. Meanwhile, new production capacities for lithium iron phosphate, a raw material for LFP batteries, were put into operation in the year. The market players were optimistic about the future development of phosphate rock, and therefore propped up the prices. The price rise was also attributed to the increase in production costs of phosphate rock, which arose from energy price hike, a result of Russia-Ukraine conflict.

Table 1.2.3-1 Ex-works price of 29% phosphate rock in China, 2018–2022

Year	Ex-works price, USD/t												
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual average
2018	60.1	61.7	61.5	61.9	61.3	64.8	62.7	60.8	61.8	61.6	61.0	61.2	61.7
2019	62.1	63.4	63.5	63.7	63.5	62.1	62.9	62.7	61.0	61.2	61.4	61.6	62.4
2020	62.1	62.5	62.0	61.1	61.2	60.6	61.2	61.8	63.1	62.0	62.6	64.1	62.0
2021	58.5	59.2	59.1	58.3	58.9	60.2	59.1	77.7	80.4	80.5	97.0	117.4	72.2
2022	146.3	149.4	151.3	154.3	149.2	156.0	156.0	149.2	145.3	141.3	140.1	141.8	148.4

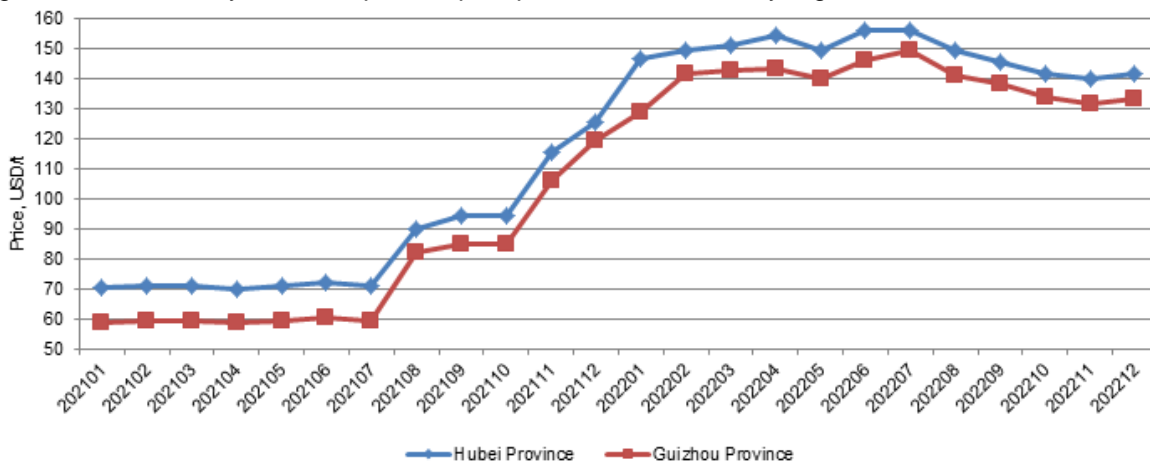
Source: CCM

Figure 1.2.3-1 Monthly ex-works price of 29% phosphate rock in China, 2021–2022



Source: CCM

Figure 1.2.3-2 Monthly ex-works price of phosphate rock in China by region, 2021–2022



Source: CCM

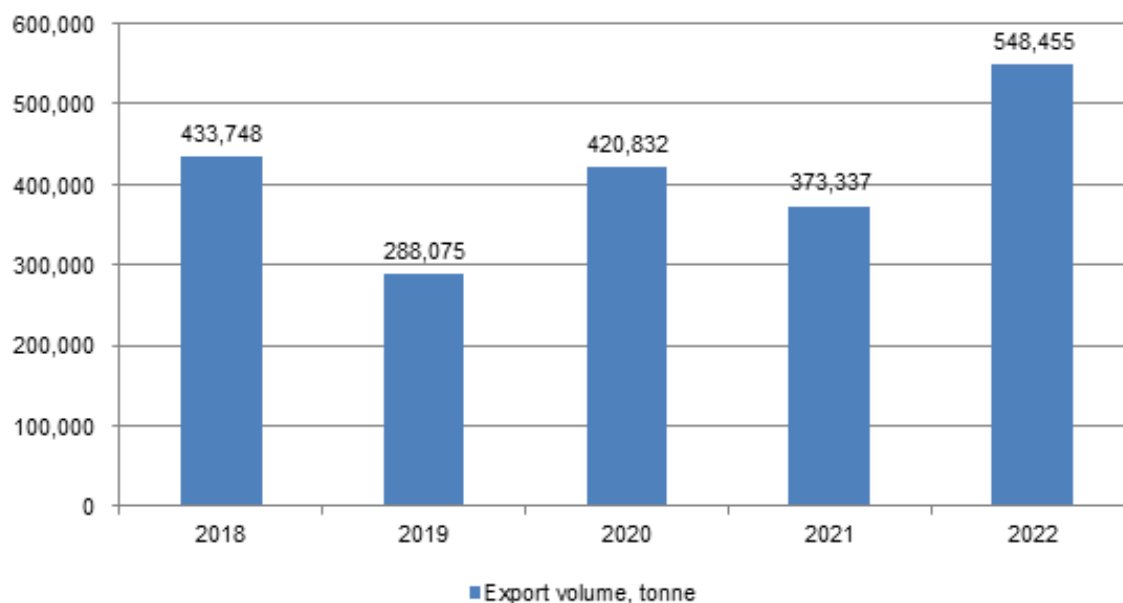
### 1.2.4 Export analysis of phosphate rock, 2018–2022

China's annual export volume of phosphate rock in 2018–2022 showed oscillations. As most of the phosphate rock output were consumed domestically, only a small proportion of output was exported; for example, that proportion in 2022 was roughly 0.52%.

China's export volume of phosphate rock in 2022 increased by 46.91% YoY, and major export destinations in the year include New Zealand, South Korea, Malaysia and Japan.

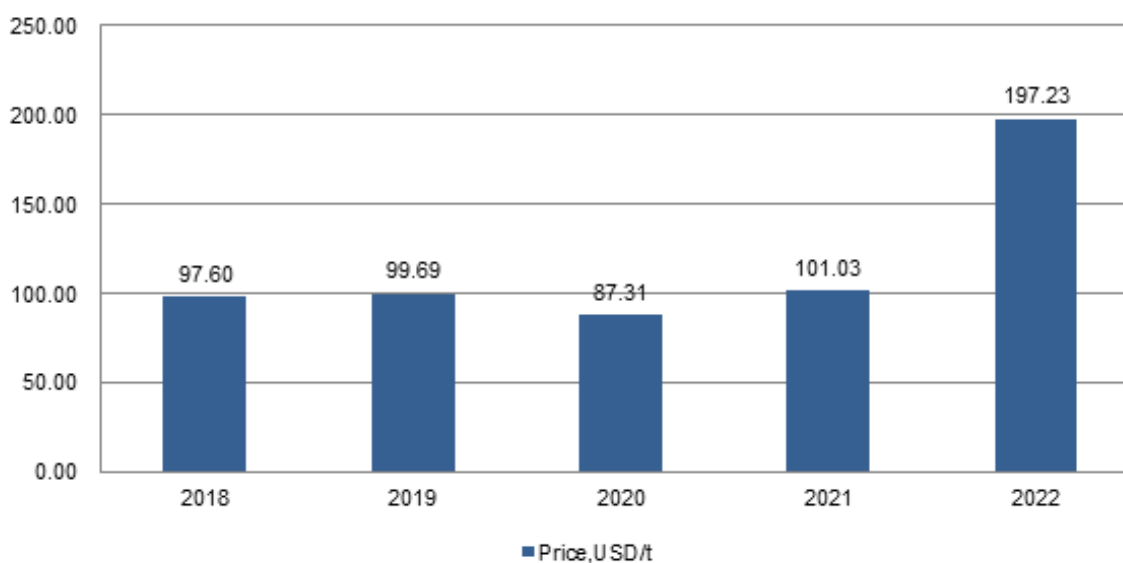
As for export prices, the yearly average export price of phosphate rock had little fluctuation in general during 2018–2021; in 2020, it only fell by 12.42% YoY. Export prices rose by 95.22% in 2022. The yearly average export price in 2022 soared by 95.22% YoY, mainly bolstered by increase in ex-works price.

Figure 1.2.4-1 China's export volume of phosphate rock, 2018–2022



Source: CCM

Figure 1.2.4-2 Annual average export prices of phosphate rock from China, 2018–2022



Source: CCM

## 2 Phosphate fertilizers in China

Phosphate fertilizers are chemical fertilizers containing phosphorus and can be categorized into water-soluble phosphate fertilizers, citrate-soluble phosphate fertilizers and insoluble phosphate fertilizers, in terms of solubility and availability to plants.

- **Water-soluble phosphate fertilizers** are the most widely used phosphate fertilizers with a wide application scope, which can easily be absorbed into the soil. The main products include monoammonium phosphate (MAP), diammonium phosphate (DAP), single super phosphate (SSP), triple super phosphate (TSP), etc.
- **Citrate-soluble phosphate fertilizers** come with good physical properties, which are insoluble in water, but soluble in weak acids, such as 2% citric acid. The main products include fused calcium-magnesium phosphate (FMP), thomas phosphatic fertilizer and precipitated phosphate.
- **Insoluble phosphate fertilizers** are highly efficient phosphate fertilizers, which are insoluble in water, and poorly soluble in weak acids but soluble in strong acids, with slow and long-lasting fertilizer effects. The main products include phosphate powder and bone meal.

Among them, MAP and DAP are the most widely used phosphate fertilizers in China, which together account for more than 85% of the total consumption. MAP is usually made into a compound fertilizer by being compounded with potassium nitrogen fertilizer, whereas DAP is applied directly. Other phosphate fertilizers less used in China are mainly exported.

### 2.1 Output of phosphate fertilizers, 2014–2021

China's phosphate fertilizer industry started in the 1880s. Since 1994, preferential policies have been implemented for fertilizer production and circulation, including state tax exemption, preferential shipping rates, electricity prices, gas prices, etc.

Having undergone development for ten years amid favorable policies, the phosphate fertilizer industry entered a mature period in 2000. However, due to the low entry threshold, the industry surplus gradually emerged. In addition, excessive and blind use of chemical fertilizers brought cost increases and environmental pollution. As a result, China's phosphate fertilizer industry has turned from self-sufficiency to overcapacity since 2008.

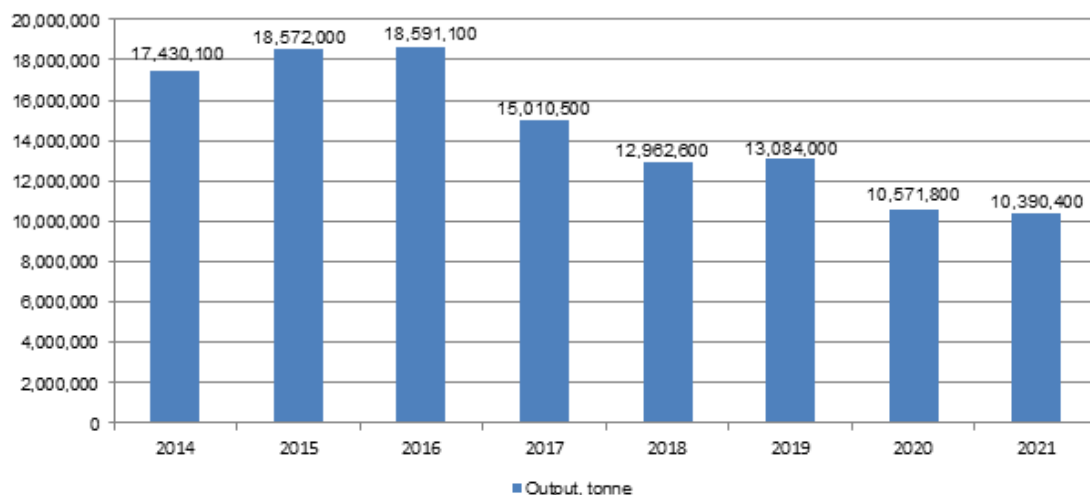
In recent years, with the increasingly stringent environmental regulation and the deepening supply-side structural reform in China, some substandard enterprises have gradually withdrawn from the market and the construction of new production capacity for phosphate fertilizers has been restricted. Consequently, both capacity and output of China's phosphate fertilizers decreased significantly and are concentrated in the leading enterprises.

In 2012, China's phosphate fertilizer industry began to reduce capacity, and the growth rate of output slowed down. Since 2015, China has gradually canceled the preferential policies for fertilizer enterprises; in 2015, China launched the *Action Plan for the Zero Growth of Chemical Fertilizer Use by 2020*, aiming to lower the growth rate of chemical fertilizer usage.

In April 2019, China's Ministry of Ecology and Environment issued *the Action Plan for the Special Investigation and Rectification of "Three Phosphorus" in the Yangtze River*, instructing provinces including Hubei, Sichuan, Guizhou, Yunnan, Hunan and Jiangsu as well as Chongqing Municipality to carry out intensive investigation and rectification on phosphate rock, phosphorus chemical enterprises, and phosphogypsum reservoirs. The "Three Phosphorus" regulation prompted the elimination of small and medium-sized backward capacity, which imposed a significant impact on China's phosphate fertilizer industry.

According to National Bureau of Statistics (NBS) of China, the output of phosphate fertilizers in China showed an upward trend in 2014–2016. The output increased from 17,430,100 tonnes in 2014 to 18,591,100 tonnes in 2016, representing a growth rate of 6.66%. In 2017–2018, the output saw huge declines, and arrived at about 12,962,600 tonnes in 2018. The output went up slightly to 13,084,000 tonnes in 2019. However, the situation reversed in 2020, with output dropping to 10,571,800 tonnes. The output fell further by 1.72% in 2021.

Figure 2.1-1 Output of phosphate fertilizers (converted to 100% P2O5) in China, 2014–2021



Note: Data for 2022 is not available.  
Source: NBS

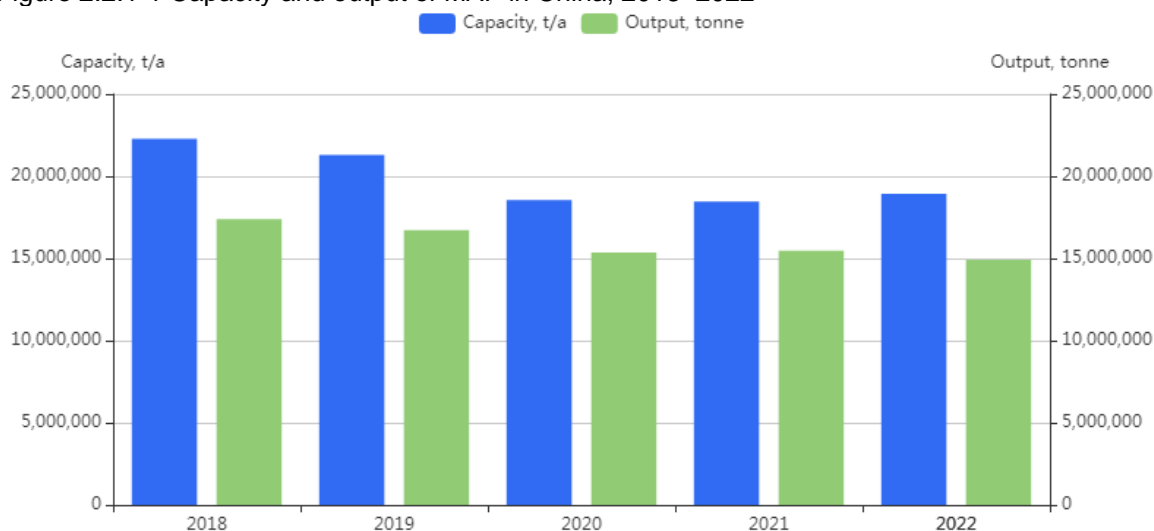
## 2.2 MAP in China, 2018–2022

### 2.2.1 Production

China's MAP industry has long suffered from overcapacity. However, Chinese authorities' moves to regulate the phosphate fertilizer industry in recent years, which were taken for the sake of environmental protection, had also affected the MAP industry. Resultantly, the production capacity for MAP in China dropped from 22,280,000 t/a in 2018 to 18,460,000 t/a in 2021, presenting a decrease of 29.89%. In 2022, production capacity slightly increased, but the impact on MAP production was not significant.

In 2018–2022, the output of MAP in China saw a continuous downtrend. In 2020, the output of MAP dropped by 8.2% YoY to 15,350,000 tonnes, mainly affected by environmental protection regulations and the COVID-19 pandemic. In 2021, driven by increased exports, the MAP output rose slightly. However, in 2022, due to the changes in an export policy related to fertilizers, the output of MAP declined once again.

Figure 2.2.1-1 Capacity and output of MAP in China, 2018–2022



Note: The calculation is based on actual volume.  
Source: CCM

The capacity for MAP is mainly concentrated in Central and Western China, where phosphate ore is abundant. MAP enterprises in China are mainly located in provinces including Hubei, Yunnan, Sichuan, Anhui and Guizhou.

In 2022, with the continuous elimination of backward production capacity, the production of MAP in China was increasingly concentrated in leading enterprises with strong financial strength and prominent resource advantages. The top three producers produced a total of 3,922,100 tonnes, accounting for 26.32% of China's total MAP output in 2022. Notably, Xinyangfeng Agricultural Technology Co., Ltd.'s output of MAP in 2022 totalled 1,661,700 tonnes, ranking first in China.

Table 2.2.1-1 Capacity and output of MAP producers in China, 2020–2022

No.	Producer	Location	Capacity, t/a			Output, tonne		
			2020	2021	2022	2020	2021	2022
1	Xinyangfeng Agricultural Technology Co., Ltd.	Hubei Province	1,800,000	1,850,000	1,850,000	1,636,000	1,561,400	1,661,700
2	Hubei Xiangyun (Group) Chemical Co., Ltd.	Hubei Province	1,500,000	1,500,000	1,500,000	1,400,000	1,460,000	1,134,000
3	Sichuan Development Lomon Co., Ltd.	Sichuan Province	800,000	800,000	1,000,000	750,000	961,500	1,126,400
4	Anhui Sierte Fertilizer Industry Co., Ltd.	Anhui Province	850,000	850,000	850,000	809,300	884,100	619,600
5	Yunnan Yuntianhua Co., Ltd.	Yunnan Province	700,000	800,000	800,000	648,300	751,800	604,800
6	Guizhou Kailin Group Co., Ltd.	Guizhou Province	800,000	800,000	800,000	600,000	640,000	604,800
7	Hubei E-zhong Ecological Engineering Co., Ltd.	Hubei Province	700,000	700,000	700,000	480,000	530,000	529,200
8	Xiangyang Zedong Chemical Group Co., Ltd.	Hubei Province	535,000	535,000	535,000	450,000	480,000	404,460
9	Hubei Shilong Chemical Co., Ltd.	Hubei Province	500,000	500,000	500,000	400,000	420,000	378,000
10	Chengdu Wintrue Holding Co., Ltd.	Sichuan Province	430,000	430,000	430,000	524,700	491,800	467,652
11	Hubei Sanning Chemical Co., Ltd.	Hubei Province	360,000	360,000	360,000	352,800	374,400	272,160
12	Sichuan Hongda Co., Ltd.	Sichuan Province	360,000	350,000	350,000	364,000	259,000	264,600
13	Anhui Liuguo Chemical Co., Ltd.	Anhui Province	300,000	300,000	300,000	353,200	452,800	501,862
14	Hubei Fengli Chemical Co., Ltd.	Hubei Province	220,000	220,000	220,000	130,000	136,000	166,320
15	Hubei Xingfa Chemicals Group Co., Ltd.	Hubei Province	200,000	200,000	200,000	262,400	223,300	151,200
16	Yichang Xibu Chemical Co., Ltd.	Hubei Province	200,000	200,000	200,000	150,000	120,000	151,200
Others			8,305,000	8,065,000	8,335,000	6,039,300	5,726,900	5,864,046
<b>Total</b>			<b>18,560,000</b>	<b>18,460,000</b>	<b>18,930,000</b>	<b>15,350,000</b>	<b>15,473,000</b>	<b>14,902,000</b>

Note: The calculation is based on actual volume.

Source: CCM

### 2.2.2 Price

In 2018, MAP price dropped due to weak downstream demand and oversupply. The price of MAP declined in the first half of the year, and the price fluctuated a little in the second half of the year, maintaining at a relatively low level.

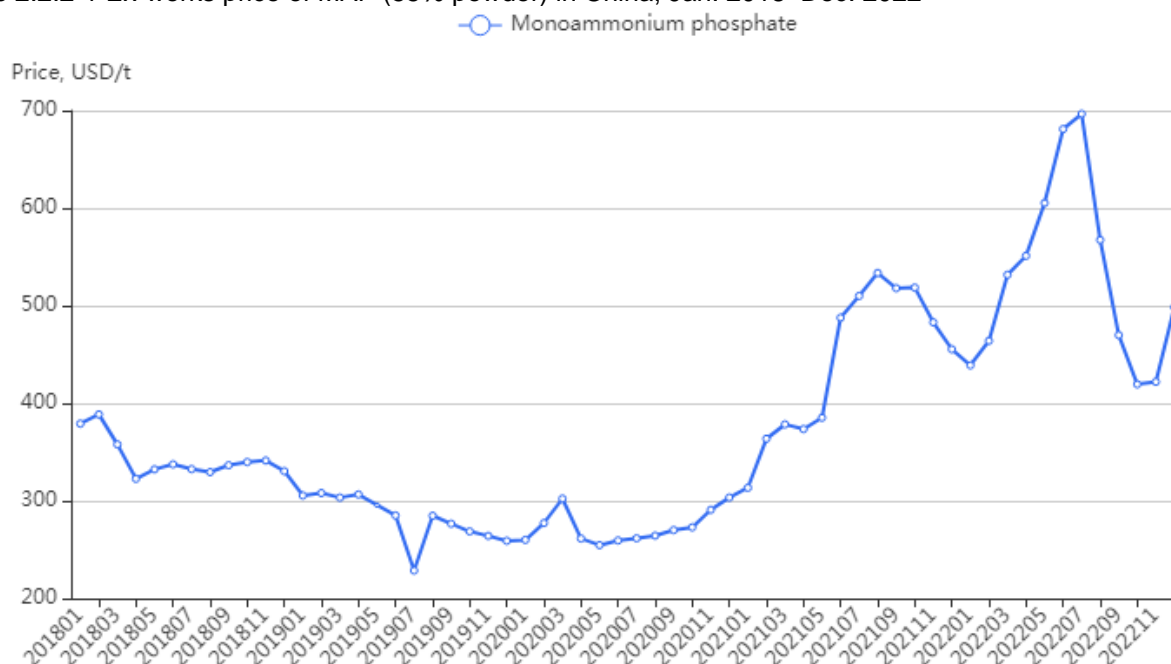
In 2019, the price showed a wavelike downtrend and hit a trough of USD229/t in July. The price drop was mainly due to weak demand and decreasing raw material prices.

In 2020, the price of MAP in China showed an "up-down-up" pattern, in which the price went up in Q1, fell back by May and then climbed to above USD300/t at the end of the year. In Q1, the price rose, which was bolstered by higher raw material prices and demand. However, the price declined slightly in Q2 due to weak demand. The demand for downstream remained weak, and the supply of MAP was sufficient. As a result, the price stayed stable in Q3. In Q4, there was an inflection point in the price trend, as MAP price was boosted by positive factors such as tight supply and increasing production costs.

In 2021, the price of MAP continued to rise from the beginning of the year. After rising to the highest point in Aug., the price dipped in remaining months of the year, hit by slumping demand. In Jan.–Aug., the price increase was mainly affected by the continuous increase in prices of raw materials such as sulfur and phosphate rock. At the same time, MAP producers' operating rates decreased, which resulted in a shortage of market supply.

In 2022, MAP price showed an inverted "V" shape overall. In H1, due to the Russia-Ukraine conflict and other factors, energy price and prices of bulk commodities rose. Also, prices of MAP's raw materials, such as phosphate rock and synthetic ammonia, stayed at a high level. The production costs of MAP were high. Besides, demand for MAP grew during the busy farming season, and operating rates of MAP producers remained low. Therefore, MAP price presented an ascending trajectory in the first half of 2022. In H2, prices of upstream raw materials such as sulfur and synthetic ammonia significantly decreased, which resulted in a decrease in production costs of MAP and consecutive declines in prices for several months. It was not until Dec. 2022 that MAP price started to rebound, because fertilizers were stockpiled in winter.

Figure 2.2.2-1 Ex-works price of MAP (55% powder) in China, Jan. 2018–Dec. 2022



Source: CCM

### 2.2.3 Import and export

As a large phosphate fertilizer supplier in the world, China has exported a large quantity of phosphate fertilizers.

From 2018 to 2020, the export volume of MAP remained relatively stable. In 2021, some countries attached great importance to grain cultivation, and the international market had a strong demand for fertilizers; export volume of MAP in the year increased by 49.61% YoY.

The MAP export volume in 2022 dipped 46.36% YoY, in part due to the policy factor. According to China Customs, starting from 15 Oct., 2021, certain chemical fertilizer products including MAP shall undergo



mandatory exit inspection and quarantine before they are exported. The policy change has lengthened the time for clearance procedures and has dampened the willingness to export involved fertilizer products, a Chinese fertilizer exporter revealed.

From 2018 to 2022, China's import volume of MAP was generally low, and annual import volume of MAP in the period was less than 40,000 tonnes. In 2021, affected by the COVID-19 pandemic, the MAP import price was high and the MAP import volume declined rapidly. In 2022, the MAP import volume edged up, but still staying at a low level.

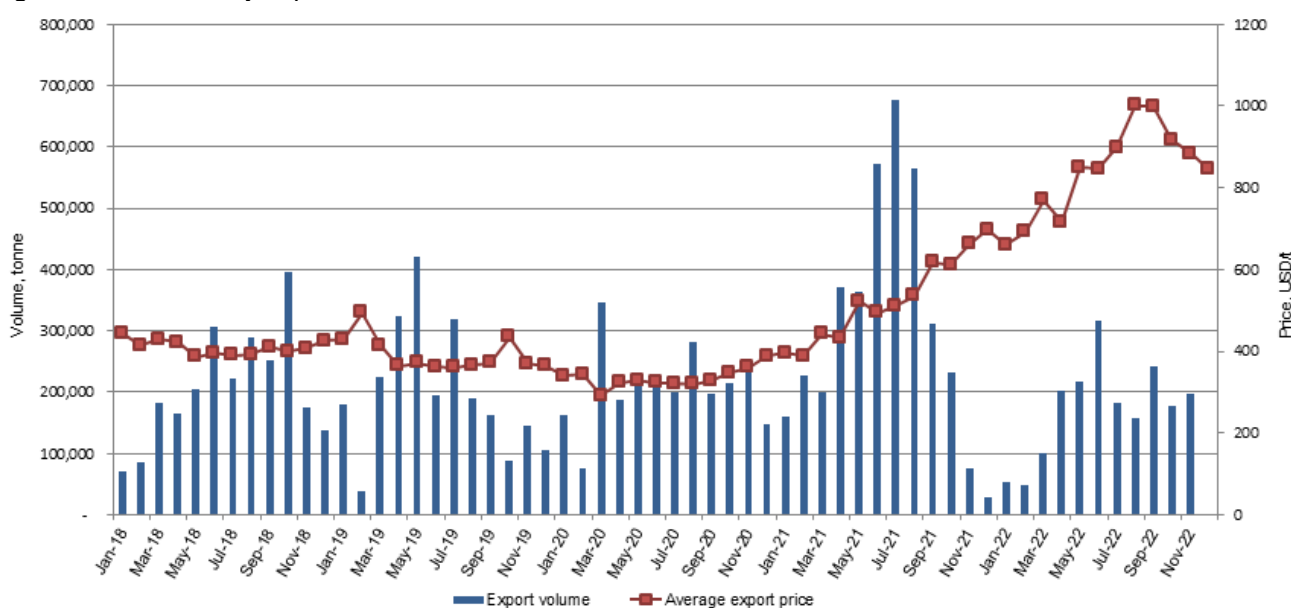
Table 2.2.3-1 Imports and exports of MAP in China, 2018–2022

Year	Import			Export		
	Volume, tonne	Value, USD	Price, USD/t	Volume, tonne	Value, USD	Price, USD/t
2018	4,233	1,118,976	264	2,489,556	1,008,240,830	405
2019	20,831	5,139,844	247	2,391,366	909,067,751	380
2020	13,149	2,929,598	223	2,530,497	836,353,386	331
2021	27	19,331	724	3,785,796	1,927,428,744	509
2022	388	234,747	605	2,030,855	1,758,418,395	866

Source: China Customs

In 2019, the decline in export volume of MAP led to a decrease in total export value. The average export price also decreased to USD380/t. It is worth noting that due to the decrease in prices of raw material sulfur and international phosphate fertilizers, the yearly average export price of MAP decreased to USD331/t in 2020. Monthly MAP export price hit a five-year low in March 2020—USD292/t. In 2021 and 2022, driven by the tightening of domestic fertilizer export policies and the rise in fertilizer raw material prices, the total MAP export value and export prices continued to rise. Monthly MAP export price in Aug. 2022 was USD1,000/t, registering the highest point in this five-year period; it maintained at USD1,000/t in the subsequent month.

Figure 2.2.3-1 Monthly exports of MAP from China, Jan. 2018–Dec. 2022



Source: China Customs

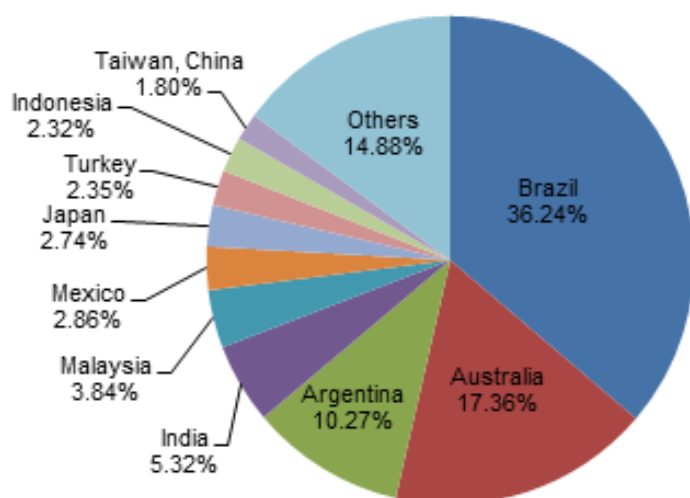
During 2020–2022, the top three destinations of China's MAP exports were Brazil, Australia and Argentina. 1,297,211 tonnes of MAP were exported to these three countries in 2022, accounting for about 63.88% of China's total MAP exports.

Table 2.2.3-2 Top ten export destinations of MAP in China, 2020–2022

No.	2020			2021			2022		
	Destination	Volume, tonne	Price, USD/t	Destination	Volume, tonne	Price, USD/t	Destination	Volume, tonne	Price, USD/t
1	Brazil	694,182	277	Brazil	1,829,330	485	Brazil	735,962	807
2	Australia	571,630	313	Australia	480,320	497	Australia	352,635	749
3	Argentina	321,016	284	Argentina	419,427	509	Argentina	208,614	828
4	India	134,750	386	Uruguay	190,519	508	India	108,002	950
5	Chile	97,759	331	India	153,558	594	Malaysia	78,027	694
6	Uruguay	91,248	270	Chile	103,343	535	Mexico	58,148	1,198
7	Japan	67,347	371	Japan	71,577	595	Japan	55,636	1,014
8	Malaysia	57,743	296	Malaysia	68,810	463	Turkey	47,772	1,279
9	Taiwan, China	55,987	291	Indonesia	48,351	452	Indonesia	47,128	703
10	Turkey	47,696	523	Mexico	46,836	621	Taiwan, China	36,646	694
	Others	391,140	464	Others	373,726	589	Others	302,285	1076
	<b>Total/Average</b>	<b>2,530,497</b>	<b>331</b>	<b>Total/Average</b>	<b>3,785,796</b>	<b>509</b>	<b>Total/Average</b>	<b>2,030,855</b>	<b>866</b>

Source: China Customs

Figure 2.2.3-2 Share of top ten export destinations of MAP in China, 2022



Source: CCM & China Customs

In China, the major exporters of MAP are located in provinces including Yunnan, Hubei, Guizhou, and Anhui, as well as Beijing Municipality.

In 2022, the province with the largest export volume of MAP was Yunnan, with the export volume of 594,859 tonnes, which accounted for 29.3% of the total. Hubei Province followed with 511,020 tonnes, which

accounted for 25.2% of the total. Sichuan Province ranked third, with the export volume of 258,197 tonnes, which took up 12.7% of the total.

Table 2.2.3-3 China's export volume of MAP by province/region/municipality, 2020–2022

No.	2020			2021			2022		
	Province/Region/Municipality	Export volume, tonne	Share	Province/Region/Municipality	Export volume, tonne	Share	Province/Region/Municipality	Export volume, tonne	Share
1	Yunnan	1,038,462	41.0%	Yunnan	1,112,818	29.4%	Yunnan	594,859	29.3%
2	Hubei	586,939	23.2%	Hubei	828,363	21.9%	Hubei	511,020	25.2%
3	Guizhou	372,385	14.7%	Guizhou	513,668	13.6%	Sichuan	258,197	12.7%
4	Sichuan	212,660	8.4%	Beijing	356,522	9.4%	Guangzhou	202,214	10.0%
5	Anhui	137,182	5.4%	Anhui	277,769	7.3%	Anhui	174,672	8.6%
6	Fujian	36,545	1.4%	Sichuan	200,874	5.3%	Shandong	103,146	5.1%
7	Beijing	34,372	1.4%	Fujian	193,116	5.1%	Hainan	72,713	3.6%
8	Heilongjiang	20,000	0.8%	Jiangsu	62,387	1.6%	Jiangsu	32,938	1.6%
9	Hebei	15,108	0.6%	Shandong	57,442	1.5%	Inner Mongolia	30,700	1.5%
10	Chongqing	13,606	0.5%	Inner Mongolia	52,000	1.4%	Tianjin	11,635	0.6%
	Others	63,239	2.5%	Others	130,836	3.5%	Others	38,761	1.9%
	<b>Total</b>	<b>2,530,497</b>	<b>100.0%</b>	<b>Total</b>	<b>3,785,796</b>	<b>100.0%</b>	<b>Total</b>	<b>2,030,855</b>	<b>100.0%</b>

Source: China Customs

## 2.3 DAP in China, 2018–2022

### 2.3.1 Production

Due to the significant elimination of outdated production capacity before 2018 and the impact of restrictions on the capacity growth from 2018 to 2022, China's DAP production capacity, which barely witnessed any large fluctuation, maintained around 22 million t/a. As for output, except for a slight increase in 2020, DAP production showed a downward trend from 2018 to 2022.

Figure 2.3.1-1 Capacity and output of DAP in China, 2018–2022



Note: The calculation is based on actual volume.

Source: CCM

The production of DAP in China is highly concentrated. In terms of regional distribution, production capacity is mainly distributed in Hubei Province, Yunnan Province, and Guizhou Province, which are rich in phosphorus ore resources. Moreover, production capacity is mainly concentrated in leading enterprises, with the top 5 enterprises accounting for 54.83% of the total production capacity in 2022.

In 2022, the top three producers in terms of output were Yunnan Yuntianhua Co., Ltd., Guizhou Kailin Group Co., Ltd., and Hubei Yihua Chemical Industry Co., Ltd. The three major manufacturers produced a total of 8,365,797 tonnes of DAP, accounting for 62.90% of the entire industry's production.

Notably in 2022, the DAP output of Shandong Lubei Chemical Co., Ltd. (Lubei Chemical) was only 77,759 tonnes and its utilization rate of DAP capacity was merely 25.92%—far below the industry's average level. According to Lubei Chemical's 2022 annual report, the drop in its output was caused by slack DAP sales, which sank by 39.92% YoY.

Table 2.3.1-1 Production situation of DAP producers in China, 2020–2022

No.	Producer	Location	Capacity, t/a			Output, tonne		
			2020	2021	2022	2020	2021	2022
1	Yunnan Yuntianhua Co., Ltd.	Yunnan Province	4,450,000	4,450,000	4,450,000	4,533,000	4,477,000	4,096,400
2	Guizhou Kailin Group Co., Ltd.	Guizhou Province	4,200,000	4,200,000	4,200,000	2,500,000	2,600,000	3,070,200
3	Hubei Yihua Chemical Industry Co., Ltd.	Hubei Province	1,260,000	1,260,000	1,260,000	1,296,000	1,427,000	1,199,197
4	Yunnan Xiangfeng Chemical Fertilizer Co., Ltd.	Yunnan Province	1,000,000	1,000,000	1,000,000	800,000	780,000	731,000
5	Hubei Xingfa Chemicals Group Co., Ltd.	Hubei Province	400,000	800,000	800,000	413,500	589,600	584,800
6	Hubei Dayukou Chemical Co., Ltd.	Hubei Province	830,000	830,000	830,000	750,000	550,000	606,730
7	Anhui Liuguo Chemical Co., Ltd.	Anhui Province	640,000	640,000	640,000	677,000	583,900	421,239
8	Hubei Dongsheng Chemical Group Co., Ltd.	Hubei Province	600,000	600,000	600,000	400,000	350,000	438,600
9	Gansu Jinchang Chemical Industry Group Co. Ltd.	Gansu Province	400,000	400,000	400,000	280,000	260,000	292,400
10	Hubei Sanning Chemical Co., Ltd.	Hubei Province	300,000	300,000	300,000	336,000	330,000	219,300
11	Hubei Huangmailing Phosphate Chemical Co., Ltd.	Hubei Province	300,000	300,000	300,000	250,000	210,000	219,300
12	Shandong Lubei Chemical Co., Ltd.	Shandong Province	300,000	300,000	300,000	180,000	160,000	77,759
13	Shaanxi Shanhua Coal Chemical Group Co., Ltd.	Shaanxi Province	250,000	250,000	250,000	220,000	200,000	182,750
Others			7,220,000	6,720,000	6,080,000	2,007,500	1,026,500	1,160,325
<b>Total</b>			<b>22,150,000</b>	<b>22,050,000</b>	<b>21,410,000</b>	<b>14,643,000</b>	<b>13,544,000</b>	<b>13,300,000</b>

Note: The calculation is based on actual volume.

Source: CCM

### 2.3.2 Price

Similar to prices of MAP in 2018, due to weak downstream demand and oversupply, DAP prices showed a significant downward trend in H1, while overall price fluctuations were not significant in H2.

In 2019, the domestic DAP price declined steadily, dragged by weak demand and the continuous decline of international prices.

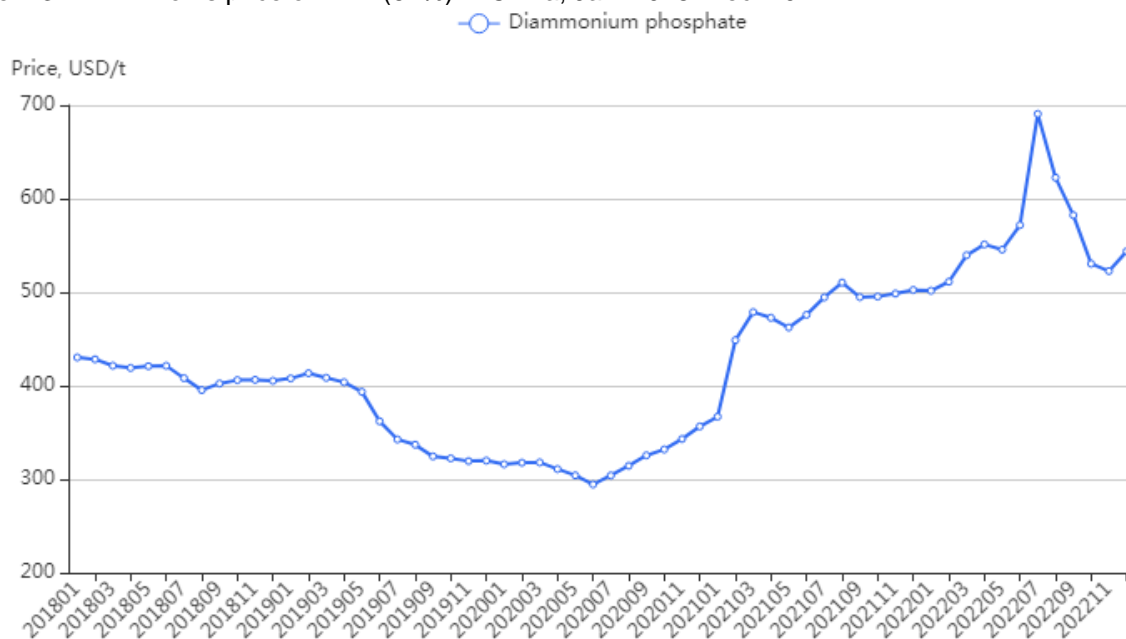
In Q1 2020, although the market supply decreased due to the impact of the COVID-19 pandemic, Chinese authorities introduced a series of policies to ensure supply and stabilize prices; thus, the ex-works price of DAP in China remained stable. In Q2, the price fell owing to the weak demand. In July, the price continued to rise, mainly driven by increased exports and domestic demand.

In 2021, the price of DAP in China increased overall: in Q1, the price surged, supported by tight supply, rising raw material prices, and strong demand. But during April–May, the situation took a turn for the worse because of insufficient demand. Since June, the price rose again and peaked at USD510/t in Aug., due to

improved export markets and rising costs. Subsequently, the DAP price levelled off in Q4.

In 2022, DAP price also showed an inverted "V" shape, generally maintaining at a high level throughout the year. In Q1, spring plowing commenced, and downstream demand for fertilizers like DAP went up as a result, which propped up DAP price and allowed it to ascend steadily. Although spring plowing reached its end in second quarter, DAP price was rapidly climbing up in Q2, owing to the price rises of raw materials like sulfur, phosphate rock, and synthetic ammonia. Then it marked a five-year high in July—USD690.67/t. Afterwards, it began declining as market demand turned sluggish. However, downstream customers' move to stockpile fertilizers in winter boosted the DAP price, enabling it to rebound in Dec.

Figure 2.3.2-1 Ex-works price of DAP (64%) in China, Jan. 2018–Dec. 2022



Source: CCM

### 2.3.3 Import and export

The stipulation of China Customs about mandatory exit inspection and quarantine of certain chemical fertilizer products also covers DAP, becoming one of the factors suppressing the DAP export volume. At the same time, the rise of geopolitical conflicts and trade protectionism have to some extent reduced the Chinese DAP producers' willingness for export. In 2022, the export volume of DAP decreased by 42.77% YoY and the total export value decreased by 10.75% YoY.

With regard to export prices, DAP's monthly export price basically remained consistent with the ex-works price trend of DAP in China. The export price reached its highest point in Sept., USD952/t.

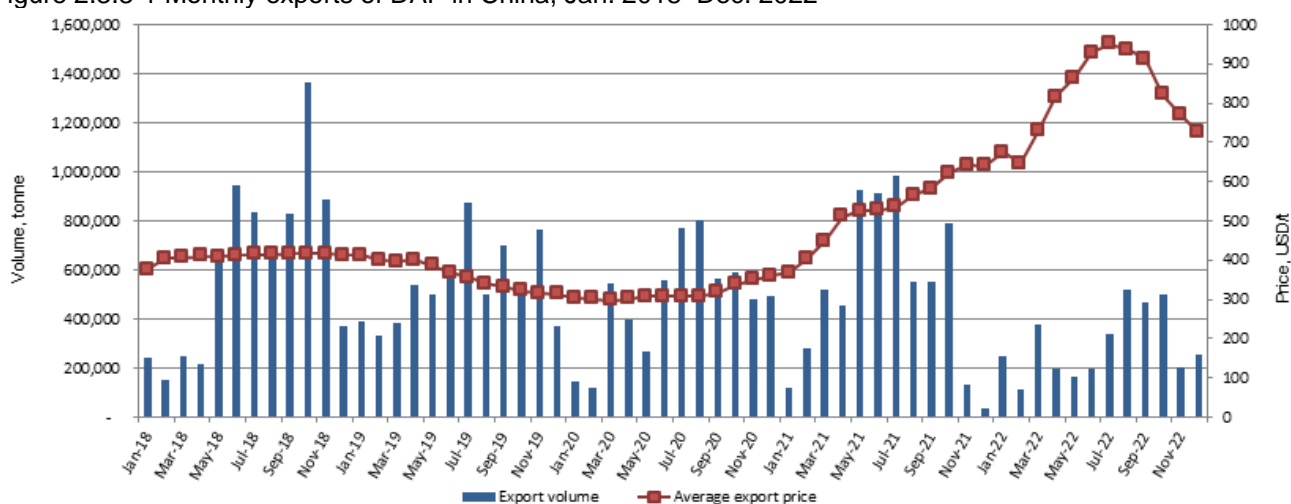
As for imports, DAP produced domestically in China basically meets the needs of domestic market, so China's annual DAP imports were relatively small and unstable in 2018–2022.

Table 2.3.3-1 Imports and exports of DAP in China, 2018–2022

Year	Import			Export		
	Volume, tonne	Value, USD	Price, USD/t	Volume, tonne	Value, USD	Price, USD/t
2018	64,658	24,545,226	380	7,468,248	3,080,522,605	412
2019	2	13,800	8,214	6,475,003	2,312,900,732	357
2020	62,792	18,600,683	296	5,732,478	1,826,479,734	319
2021	5	32,757	5,964	6,254,733	3,347,837,553	535
2022	328	641,384	1,954	3,579,293	2,988,097,695	835

Source: China Customs

Figure 2.3.3-1 Monthly exports of DAP in China, Jan. 2018–Dec. 2022



Source: China Customs

With regard to export destinations in 2022, China's DAP was mainly exported to India, Pakistan, Vietnam, Japan, Thailand, etc. In 2022, top three destinations of China's DAP were India, Bangladesh and Thailand; the volume of exports to these three countries was 1,203,428 tonnes, 604,597 tonnes and 298,803 tonnes respectively, accounting for 58.86% of the total.

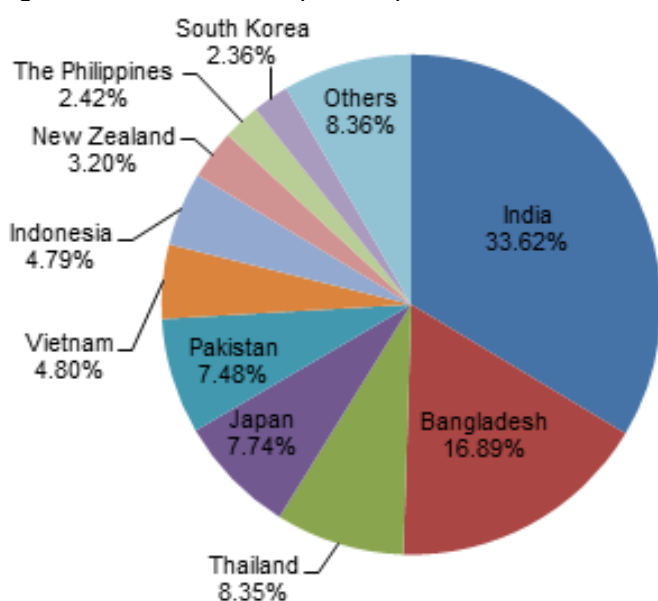


Table 2.3.3-2 Top ten export destination of DAP in China, 2020–2022

No.	2020			2021			2022		
	Destination	Volume, tonne	Price, USD/t	Destination	Volume, tonne	Price, USD/t	Destination	Volume, tonne	Price, USD/t
1	India	1,754,893	312	India	1,736,497	561	India	1,203,428	822
2	Pakistan	745,534	322	Pakistan	867,714	547	Bangladesh	604,597	853
3	Vietnam	573,740	317	Bangladesh	629,855	533	Thailand	298,803	821
4	Thailand	483,343	315	Thailand	591,321	522	Japan	276,991	856
5	Japan	373,874	326	Vietnam	437,692	489	Pakistan	267,702	858
6	Bangladesh	344,243	330	Japan	408,841	544	Vietnam	171,701	784
7	New Zealand	321,601	323	New Zealand	203,806	590	Indonesia	171,298	830
8	Indonesia	278,230	315	Indonesia	195,202	482	New Zealand	114,484	932
9	Australia	186,574	330	Argentina	183,450	520	The Philippines	86,772	816
10	The Philippines	128,402	321	Australia	145,224	527	South Korea	84,339	841
	Others	542,045	322	Others	855,130	505	Others	299,178	820
	<b>Total/Average</b>	<b>5,732,478</b>	<b>319</b>	<b>Total/Average</b>	<b>6,254,733</b>	<b>535</b>	<b>Total/Average</b>	<b>3,579,293</b>	<b>835</b>

Source: China Customs

Figure 2.3.3-2 Share of top ten export destinations of DAP in China, 2022



Source: CCM & China Customs

With regard to Chinese DAP exporters' domiciles, the main exporters of DAP in China are located in Yunnan Province, Hubei Province, Guizhou Province, Beijing Municipality, Fujian Province, Anhui Province and so on.

In 2022, the DAP exporters in Hubei Province, ranking first in terms of export volume, exported 1,441,973 tonnes of DAP, which accounted for 40.3% of the total; following that, the exporters in Yunnan Province exported 1,130,379 tonnes, which accounted for 31.6%; the exporters in Guizhou Province came in third and exported 580,406 tonnes, which took up 16.2%.

Table 2.3.3-3 China's DAP export volume by province/region/municipality, 2020–2022

No.	2020			2021			2022		
	Province/Region/Municipality	Export volume, tonne	Share	Province/Region/Municipality	Export volume, tonne	Share	Province/Region/Municipality	Export volume, tonne	Share
1	Yunnan	2,267,884	39.6%	Hubei	1,975,013	31.6%	Hubei	1,441,973	40.3%
2	Hubei	1,436,045	25.1%	Yunnan	1,754,768	28.1%	Yunnan	1,130,379	31.6%
3	Guizhou	1,149,523	20.1%	Guizhou	1,093,314	17.5%	Guizhou	580,406	16.2%
4	Fujian	267,149	4.7%	Beijing	313,864	5.0%	Inner Mongolia	134,795	3.8%
5	Chongqing	167,636	2.9%	Shanghai	290,985	4.7%	Shandong	57,347	1.6%
6	Inner Mongolia	119,712	2.1%	Fujian	231,626	3.7%	Anhui	52,998	1.5%
7	Beijing	117,104	2.0%	Anhui	178,237	2.8%	Chongqing	41,458	1.2%
8	Anhui	59,964	1.0%	Chongqing	167,061	2.7%	Fujian	32,903	0.9%
9	Shanghai	52,052	0.9%	Shandong	68,626	1.1%	Jiangsu	24,834	0.7%
10	Jiangsu	38,948	0.7%	Inner Mongolia	55,532	0.9%	Beijing	22,977	0.6%
	Others	56,462	1.0%	Others	125,708	2.0%	Others	59,223	1.7%
	<b>Total</b>	<b>5,732,478</b>	<b>100.0%</b>	<b>Total</b>	<b>6,254,733</b>	<b>100.0%</b>	<b>Total</b>	<b>3,579,293</b>	<b>100.0%</b>

Source: China Customs

### 3 Yellow phosphorus in China

#### 3.1 Capacity and output of yellow phosphorus, 2018–2022

Since the reform and opening up in 1978, China has become the world's largest yellow phosphorus producer after more than 40 years of rapid development. However, in recent years, under the national supply-side structural reform, backward production capacity has been eliminated.

In terms of production in 2018, some yellow phosphorus producers' production was adversely affected in the period, since the environmental authorities in the local areas urged producers to rectify the non-conforming waste gas emissions. Additionally, some downstream industries were replacing thermal process phosphoric acid with purified wet process phosphoric acid, which also imposed an impact on the output of yellow phosphorus. Therefore, the domestic yellow phosphorus output in 2018 decreased by about 11.0% compared to the 910,000 tonnes in 2017.

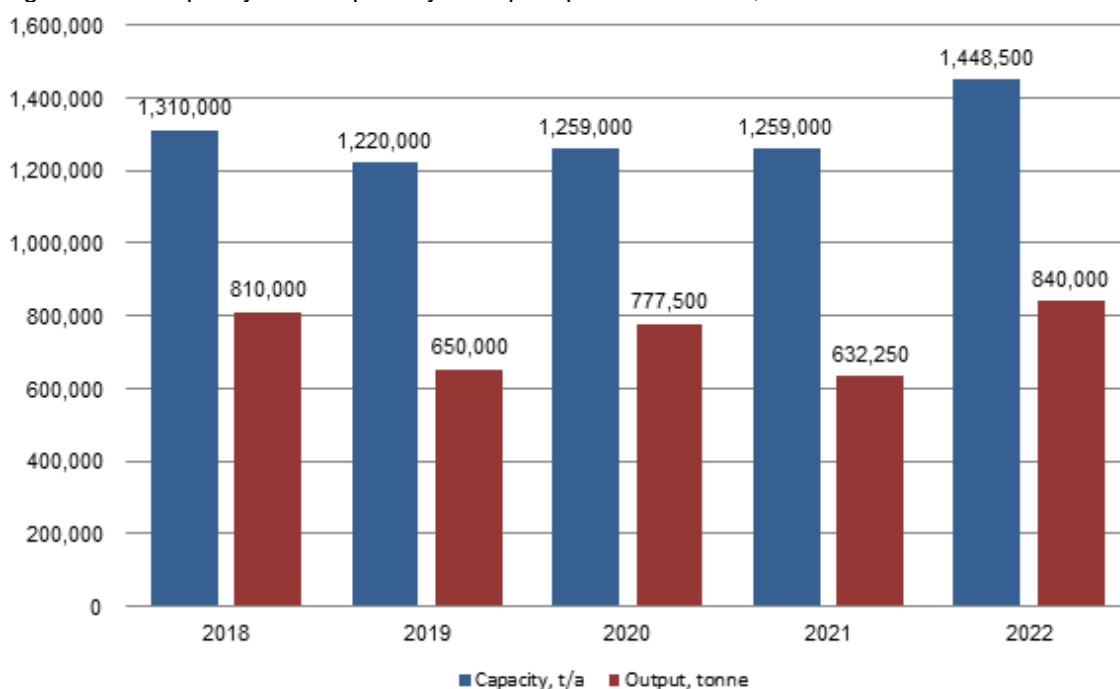
In 2019, the capacity shrank by 90,000 t/a, down 6.9% year on year; the output also decreased, dropping to 650,000 tonnes. The average operating rate reduced to around 53% because the production in Hubei Province was limited by high electricity price, and some of the producers in Yunnan Province were only producing yellow phosphorus during wet season.

In 2020, the capacity increased to 1,259,000 t/a as some enterprises in provinces like Guizhou and Yunnan had passed acceptance inspection on technical renovations that were conducted in order to meet the standards for production resumption. The output reached 777,500 tonnes due to uptick in operating rate, which was encouraged by high price of yellow phosphorus the year before.

Owing to the temporary impact of limited power supply and restricted production in a certain period of 2021, the average operating rate in 2021 decreased compared to that in 2020. Although the production capacity remains unchanged from the last year, the output in 2021 declined by about 18.7% year on year.

In 2022, the capacity and output of yellow phosphorus rebounded, growing by 15.1% YoY and 32.9% YoY respectively. On the one hand, the reason for the growth was an increase in demand from downstream industries—mainly phosphoric acid and phosphorus trichloride. In 2022, the capacity and output of downstream phosphoric acid and phosphorus trichloride increased. On the other hand, the price of yellow phosphorus was at a high level in 2022. The yellow phosphorus producers had high production enthusiasm and maintained a high operating rate, which led to an increase in yellow phosphorus output.

Figure 3.1-1 Capacity and output of yellow phosphorus in China, 2018–2022

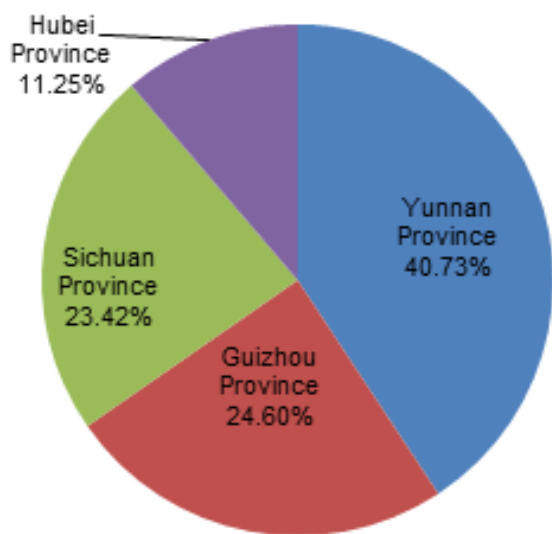


Source: CCM

At present, the production capacity for yellow phosphorus in China is mainly distributed in Southwest China

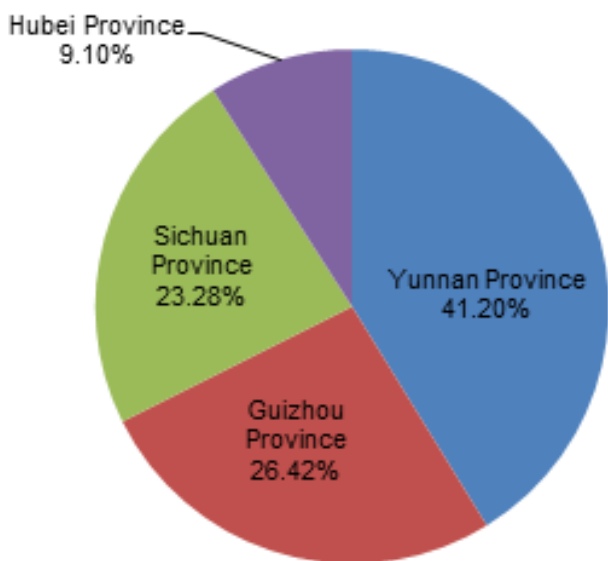
and Hubei Province, which have abundant hydropower and phosphate rock resources. In 2022, Yunnan Province, Guizhou Province and Hubei Province, where the raw materials are easily accessible, made up 40.73%, 24.60% and 11.25% of the total yellow phosphorus capacity respectively; Sichuan Province took up 23.42%, which boast rich hydropower resources in the local areas that can help producers save certain costs.

Figure 3.1-2 Capacity distribution of yellow phosphorus in China, 2022



Source: CCM

Figure 3.1-3 Output distribution of yellow phosphorus in China, 2022



Source: CCM

### 3.2 Price of yellow phosphorus, 2018–2022

From 2018 to 2020, the overall price of yellow phosphorus fluctuated within the range of USD2,000/t–USD3,000/t. In 2021 and 2022, the price of yellow phosphorus remained relatively high.

Ex-works price of yellow phosphorous in China showed a general downward trend during Jan. to Aug. 2018, because the downstream demand was sluggish. Most of yellow phosphorous producers ran at low operating rates in this period. During Sept. to Nov. 2018, the price ticked up, mainly owing to increased production costs.

In 2019, under the tightened environmental regulation on yellow phosphorous production, many enterprises shut down their production lines, which led to short supply of yellow phosphorous. Thus, the average price in 2019 rose to USD2,457/t, up 7.6% year on year. Moreover, monthly price peaked in July because

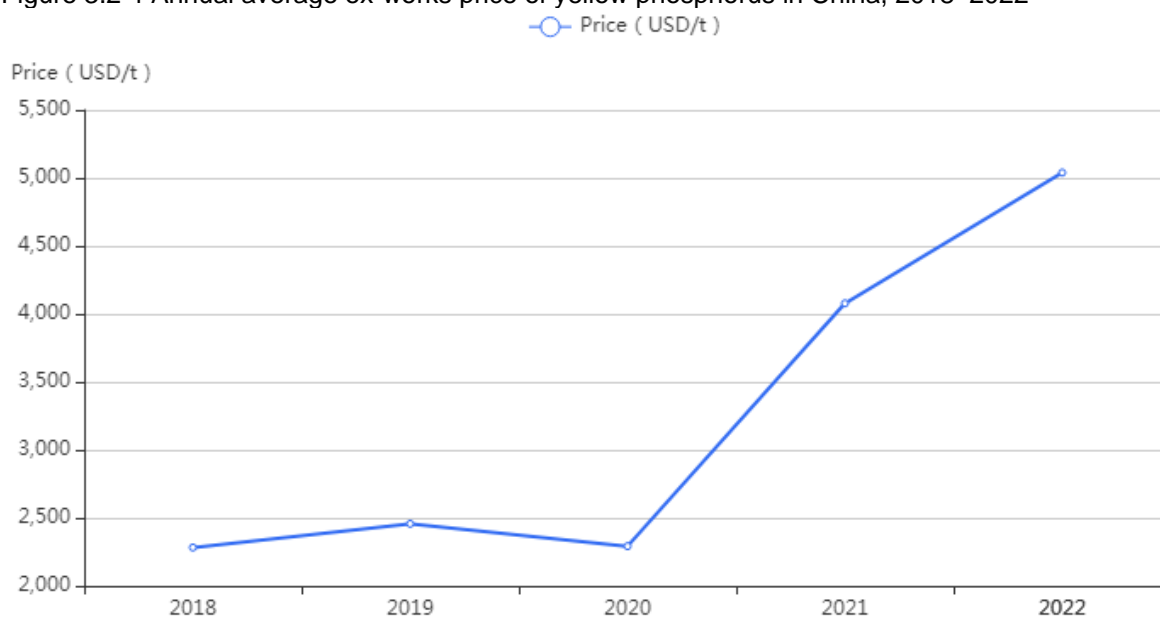
comprehensive environmental rectification was carried out in major production areas, which resulted in low operating rates.

In 2020, the average price decreased to USD2,292/t, down 6.7% year on year. The price saw big fall in June because of falling prices of raw material and electricity, as well as sluggish downstream demand. However, the price rebounded since July, as some yellow phosphorous enterprises were shut down due to the floods in Sichuan Province.

In 2021, the price of yellow phosphorous increased significantly. In May, Southern rivers were in dry season, which made the producers run at low operating rates in this period. Yellow phosphorus was in short supply and prices rose. In Aug., Yunnan Province implemented the "Dual Control" policy (governmental control on energy consumption and energy intensity). Since producers in Yunnan Province deliver a large amount of supplies, it stimulated yet another rise in the price of yellow phosphorous. In Oct., the price of yellow phosphorous dropped due to decreased production costs, which can be attributed to the fact that the high price of commercial electricity started to slide. However, the price of yellow phosphorous was still at a high level. The price of yellow phosphorus in Yunnan Province reached the highest point at USD7827.91/t in Oct, 2021.

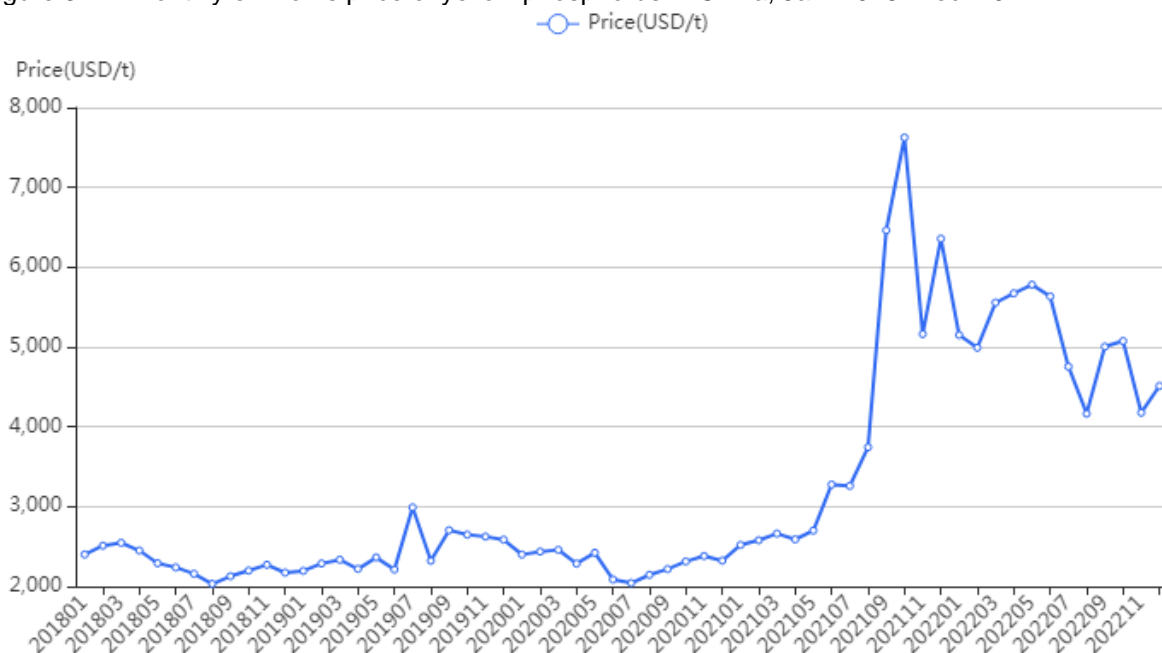
In 2022, the price of yellow phosphorus fluctuated greatly. From Jan. to Feb., due to the fact that demand for downstream phosphoric acid was low and the market was resistant to highly priced yellow phosphorus, a decrease was witnessed in yellow phosphorus price. From March to May, due to factors such as environmental policies, rising prices of raw materials, and production facility inspections, the operating rates of producers in major yellow phosphorus producing areas such as Yunnan, Guizhou, and Sichuan provinces were not high, which resulted in tight supply of yellow phosphorus and rising prices. From June to Aug., the weak demand for downstream phosphoric acid led to a decrease in yellow phosphorus price. Afterwards, due to the power rationing in the Yunnan Province, yellow phosphorus price experienced another round of increases in Sept. and Oct. The upward trend then stopped. In Nov., the price fell again, and it was not until Dec. that the price rose again due to power restrictions in Guizhou Province.

Figure 3.2-1 Annual average ex-works price of yellow phosphorus in China, 2018–2022



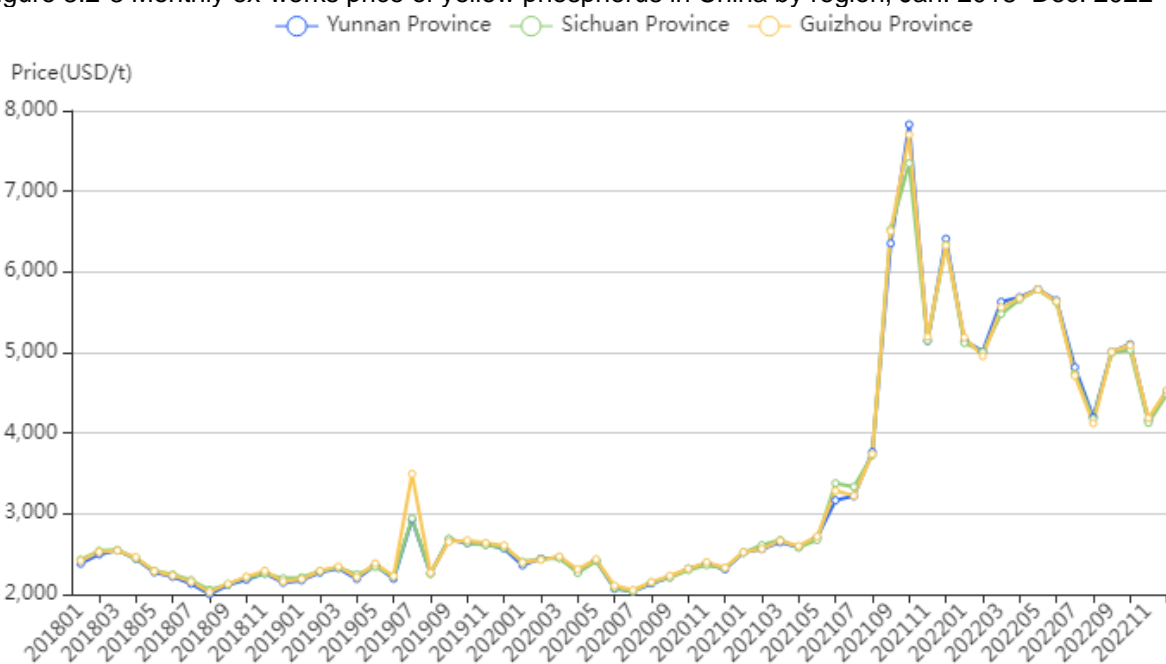
Source: CCM

Figure 3.2-2 Monthly ex-works price of yellow phosphorus in China, Jan. 2018–Dec. 2022



Source: CCM

Figure 3.2-3 Monthly ex-works price of yellow phosphorus in China by region, Jan. 2018–Dec. 2022



Source: CCM

### 3.3 Export analysis of yellow phosphorus, 2018–2022

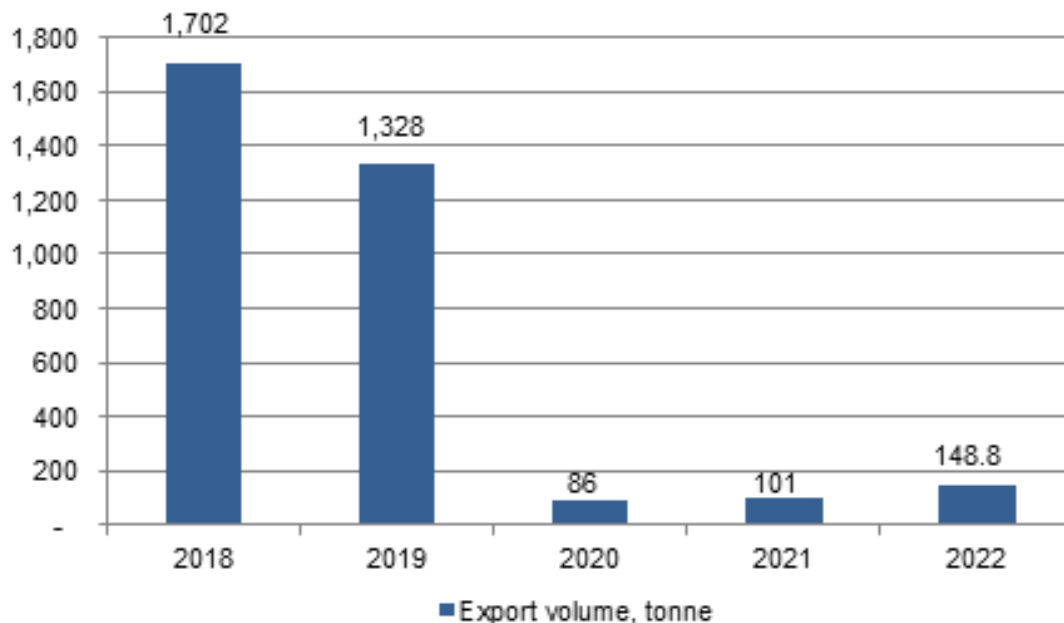
Since the reform and opening up in 1978, China has gradually become a major exporter of yellow phosphorus in the world. In the wake of China's economic development, higher requirements of environmental protection and energy conservation have been imposed on the industrial production in China. And the rectification of environmental nonconformities in the yellow phosphorus industry is in progress. Like the lessening output, China's exports of yellow phosphorus fell in recent years. Instead, growth in exports has been seen in its downstream products, such as glyphosate and sodium tripolyphosphate.

In 2019, China's export volume of yellow phosphorus was 1,328 tonnes, down 22.0% YoY, with an average monthly export price of USD3,236/t.

The export volume of yellow phosphorus plummeted by 93.5% to 86 tonnes in 2020; the export price was USD3,237/t, which was averaged from the prices of two only months when there were yellow phosphorus exports—July and Nov.

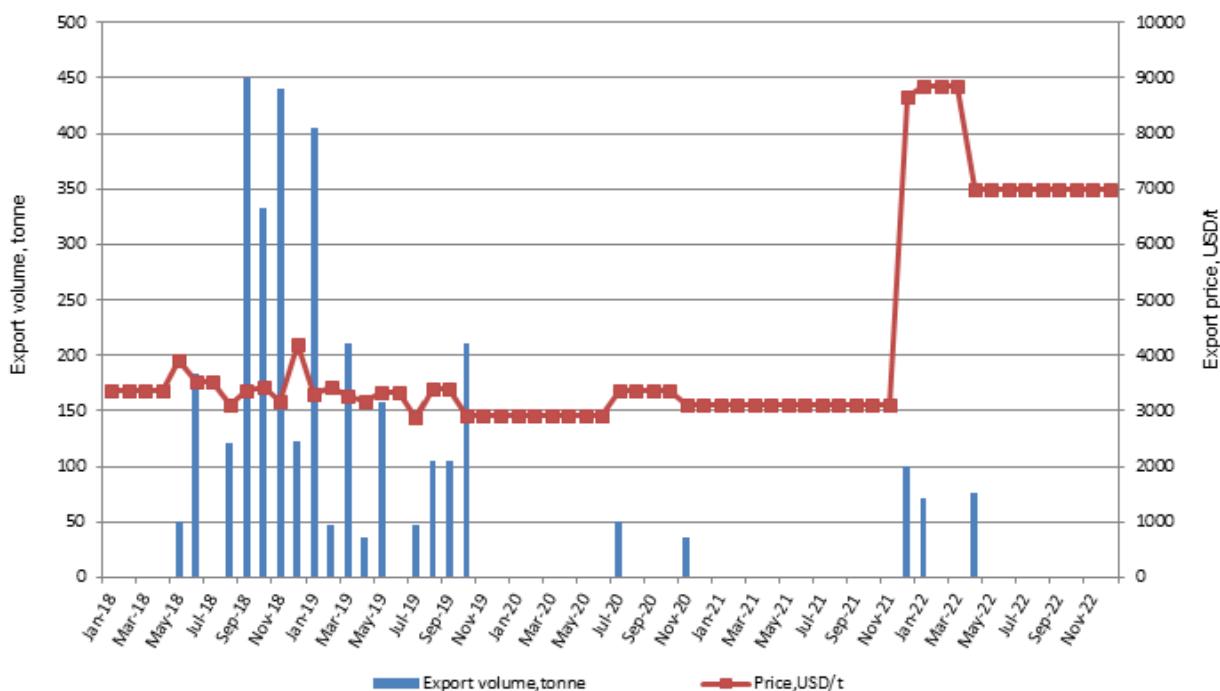
In 2021 and 2022, even though the export volume of yellow phosphorus increased, it was still at a relatively low level compared to that before 2020. In Dec. 2021, China only exported 52.8 tonnes of yellow phosphorus to South Africa and 48.0 tonnes to the UK, with an average export price of USD8,650/t. In 2022, the export volume increased by 47.62% YoY, with yellow phosphorus mainly being exported to the UK and South Africa. Affected by the increase in domestic ex-work price, export price of yellow phosphorus significantly increased in 2022 compared to previous years.

Figure 3.3-1 China's export volume of yellow phosphorus, 2018–2022



Source: China Customs, CCM

Figure 3.3-2 Monthly exports of yellow phosphorus from China, Jan. 2018–Dec. 2022



Note: China's export volume of yellow phosphorus was 0 in Jan. 2018, Feb. 2018, March 2018, July 2018, June 2019, Nov. 2019–June 2020, Aug. 2020–Oct. 2020, Dec. 2020, and Jan. 2021–Nov. 2021, Feb. 2022, March 2022, May 2022–Dec. 2022.

Source: China Customs, CCM



Table 3.3-1 China's exports of yellow phosphorus by destination, 2022

No.	Destination	Export volume, tonne	Export price, USD/t
1	The UK	72	8,847
2	South Africa	76.8	6,980

Source: China Customs, CCM

#### 4 Key phosphorus producers in China, 2022

Currently, most of China's producers in the phosphorus industry are still located in regions with abundant phosphate rock reserves, such as Yunnan Province, Guizhou Province and Hubei Province.

Table 4-1 List of major phosphate rock producers in China, 2022

No.	Producer	Abbreviation	Location	Capacity, t/a
1	Guizhou Phosphate Chemical (Group) Co., Ltd.	Guizhou Phosphate Chemical	Guizhou Province	17,000,000
2	Yunnan Yuntianhua Co., Ltd.	Yuntianhua	Yunnan Province	14,500,000
3	Hubei Xingfa Chemicals Group Co., Ltd.	Hubei Xingfa	Hubei Province	5,850,000
4	Sichuan Development Lomon Co., Ltd.	SD Lomon	Sichuan Province	4,100,000
5	Guizhou Chanhen Chemical Corporation	Chanhen	Guizhou Province	3,000,000

Source: CCM

Table 4-2 List of major yellow phosphorus producers in China, 2019–2022

No.	Producer	Abbreviation	Location	Capacity, t/a			
				2022	2021	2020	2019
1	Jiangsu Chengxing Phosph-Chemical Co., Ltd.	Jiangsu Chengxing	Jiangsu Province	160,000	180,000	180,000	180,000
2	Hubei Xingfa Chemicals Group Co., Ltd.	Hubei Xingfa	Hubei Province	160,000	160,000	160,000	160,000
3	Yunnan Phosphorus Group Co., Ltd.	Yunnan Phosphorus Group	Yunnan Province	90,000	90,000	120,000	120,000
4	Yunnan Jianglin Group Co., Ltd.	Jianglin Group	Yunnan Province	37,400	37,400	31,000	31,000
5	Chengdu Wintrue Holding Co., Ltd.	Wintrue Holding	Sichuan Province	60,000	60,000	60,000	60,000

Source: CCM

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