

OPERATION MODE ANALYSIS AND ECONOMIC*

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Abstract

Glyphosate was developed by Monsanto in the United States in 1971. It is the world's largest herbicide, and it is mainly used in the cultivation of agricultural products downstream. Glyphosate is a non-selective, non-residual herbicide that is very effective against perennial root weeds. It is widely used in rubber, mulberry, tea, orchards and sugarcane fields. At this stage, there is no new supply on the production side, and the strong agricultural planting boom has caused demand to exceed expectations, the contradiction between supply and demand has expanded, and the price elasticity has risen. Industry concentration has increased, forming a pricing pattern for industry giants. The global currency is over-issued. Under the background of inflation, the price of bulk raw materials has risen and the cost has risen, forming price support. This article has collected a lot of information, combined with its own work experience, and is optimistic about the long-term business cycle of the glyphosate industry.

Keywords: Glyphosate, Industry supply, Demand, Inflation

Introduction

Glyphosate is a highly effective, low-toxic, and broad-spectrum herbicide. Glyphosate was launched by Monsanto in the 1970s and immediately became the world's fastest growing, largest sales, and most successful herbicide so far. However, after the WHO claimed in 2015 that "glyphosate may cause cancer", there has been controversy since then, and some countries around the world have begun to ban it. In 2018, Bayer of Germany acquired the American biotechnology company Monsanto (hereinafter referred to as Monsanto). Afterwards, there have been multiple cases concerning whether the glyphosate developed by Monsanto is carcinogenic. "Glyphosate" is a warning against cancer. Bayer was therefore caught in endless legal disputes after acquiring Monsanto. In June 2020, the German Bayer Company issued a statement stating that it will pay up to 10.9 billion US dollars in compensation to settle a total of more than 100,000 lawsuits related to "herbicide causing cancer." In 2019, Guizhou carried out the cleanup operation of tea gardens, vegetable gardens and orchards, completely banned the use of chemical herbicides, extensively carried out "Prefer grass, not glyphosate" publicity activities, and organized pesticide management and agricultural law enforcement personnel to comprehensively manage and use pesticides in the jurisdiction Check, find problems, and

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resolutely investigate and deal with them. And in the first half of 2019, the Guizhou Provincial Department of Agriculture and Rural Affairs investigated and prosecuted 132 drafting herbicides such as glyphosate, confiscated more than 20 tons of herbicides such as glyphosate, and fined 278,700 yuan. Developed countries have their own strict product evaluation system. To ban a product, it needs to go through comprehensive analysis and verification. However, countries in South America and Africa are not able to challenge these standards. The government may make false judgments based on the above conclusions and propose to ban. One country's ban may have a group effect. At present, there are more than 30 countries in the world. Several countries or regions have begun to ban or restrict the use of glyphosate.

Research Problems

Weeding is an indispensable part of agricultural production, and the use of herbicides is very important. In the field of biocidal herbicides, people are not prosperous. As the herbicide with the largest tonnage in the world, glyphosate accounts for about 48% of the global herbicide market, with a product market value of up to 6 billion US dollars. The high cost performance is incomparable. However, the opposition between glyphosate and other herbicides and ecological agriculture is basically the consensus of the industry. What must be noticed is that there has been a wave of counterattacks from ecological agriculture at home and abroad, a "turning out chaos" to modern agriculture. Where will the glyphosate industry go in the future?

Objective of the study

At present, glyphosate is the largest pesticide variety in China, and it ranks first among all pesticide varieties in terms of production volume, consumption volume, output value and sales. It is still difficult to find an efficient and relatively inexpensive substitute like glyphosate. If glyphosate is banned, not only will it have a huge impact on the agricultural material industry, but it will also increase the cost of weeding in agricultural production, thereby affecting the price of agricultural products. Glyphosate is a very large industrial chain, during which complicated profit calculations are involved. It is a game between highly industrialized agriculture and ecological agriculture. At present, there is no final conclusion on whether glyphosate is carcinogenic.

Scope of the study

Develop the paper through macro-environmental analysis, discuss the background of the topic selection from the macro-environment, and study where the glyphosate industry will go in the future. Through pertinent reading of relevant documents, the research status at home and abroad is summarized and analyzed, and corresponding countermeasures and suggestions are put forward.

Research Significance

Through the analysis of the industry situation, discover its internal economic laws and its position in the industry life cycle, further predict the future industry development

trend, judge the industry investment value, reveal the industry investment risk, guide the business plan of the enterprise, and make the correct investment decision.2. Provide method support for the early warning management of brain drain in IT companies

Theoretical framework

1. Industry capacity

In the short-term dimension, after the outbreak of the new crown epidemic in 2020, Bayer's factories in the United States, Brazil and other places have repeatedly experienced force majeure, and it has increased overseas procurement when self-sufficiency cannot be satisfied. In China, production and supply in Hubei in 1Q20 were affected. The August 2020 floods affected Leshan Fuhua's production and caused inventory losses. In January 2021, a fire broke out in a company in Inner Mongolia. Into the left and right. After many accidents occurred, domestic stocks were far below the status of safety stocks. In the long-term dimension, due to the long-term downturn in the price of glyphosate from 2014 to 2020, the supply continued to withdraw. In the past few years, the glyphosate industry has been affected by safety and environmental constraints and its small production capacity has been quickly cleared. There are 41 glyphosate production enterprises in China, and less than 10 enterprises have started normally. Most of the remaining enterprises have been in a state of suspension for a long time and are expected to be difficult to recover. Produce. The national production capacity was gradually phased out from the peak of 936,000 tons in 2014 to around 730,000 tons in 2017 and remained stable. In 2019, the market issued by the Development and Reform Commission was transferred to the negative list, and the newly built glyphosate production plant was a restricted project. In the future, there will be basically no new domestic production capacity for glyphosate for a long time, and there are no expansion plans overseas, and the total supply of glyphosate will decrease without increasing.

2. Strong demand exceeds expectations

The prosperity of agricultural planting stems from population growth, food security, agricultural product prices, land reclamation in South America, policy changes, and economic development.

2.1 Population growth

Although the population growth rate has slowed down, the world population will still be in a growth phase until the end of this century. The United Nations predicts that in 2019, the world population will be approximately 7.7 billion. By 2030, the world population will reach 8.5 billion, 9.7 billion in 2050, and 10.9 billion in 2100. Judging from the population development trend of China in recent years, the population growth rate in the future will continue to slow down, and the population of China will reach its peak in the future, but the specific time is still uncertain. It is estimated that the total population of China will remain above 1.4 billion in the future. The focus of world population growth will shift from Asia to Africa, and sub-Saharan Africa will become the main force of population growth in the next few decades. Population growth has led to an exponential increase in global food demand, significant changes in the structure of food consumption, and higher requirements for agricultural planting.

2.2 High prosperity of agricultural products

The prices of agricultural products remain high. In 2020, affected by the epidemic and La Niña and other factors, soybean planting in the United States, Brazil and other countries have been delayed, and agricultural products have entered the destocking stage. In 2020, the global soybean stock utilization ratio is close to the lowest in 20 years, and corn has also been reduced for 4 consecutive years. The impact of the 2020 epidemic will further bring about the expectation of food shortages and price increases, which is reflected in the commodity market and will stimulate the increase of food futures prices. The epidemic has weakened food availability by impacting the grain trade. The epidemic has highlighted the strategic material capital quality of food. Some food exporting countries worry about their own agricultural production and insufficient food supply, and then take measures to prohibit or restrict food exports, causing global food prices to rise and exacerbating food crisis panic. The overall situation of my country's food security is good. However, as the world's largest food importer, changes in the world's food situation will inevitably affect my country's food security, and the country has always attached great importance to it. The prices of agricultural products are running at a high level, and the farmers' income from agricultural planting has been significantly improved. According to the latest USDA data, U.S. agricultural net income in 2020 is expected to be USD 121.1 billion, a year-on-year increase of 45.73%, and inflation-adjusted is expected to increase year-on-year by 44.19%; agricultural net cash income is expected to increase by 24.95% year-on-year, and inflation-adjusted is expected to increase year-on-year by 23.71%. Planting income has increased significantly, farmers' willingness to plant has increased, and the planting area has increased, especially high-yield varieties. According to the USDA April report, it is estimated that the global corn sown area in 2021 will increase by 1.89% year-on-year, and the global soybean and corn sown area will increase by 4.32% year-on-year, reflecting to a certain extent that high-yield varieties can be more favored by growers. At the same time, under the influence of corn and soybean planting gains that have been leading other varieties in recent years, the proportion of global corn and soybean planting area has been increasing year by year. About 90% of the demand for glyphosate comes from genetically modified crops based on corn and soybeans. Soybeans and corn are the top two varieties in the global genetically modified crops planted area in 2019. The planting areas are respectively 9190 and 60.9 million hectares, accounting for 48% and 32% of the total area respectively. At the same time, the top two crops for global glyphosate use in 2018 were soybeans and corn, with use amounts of 197,000 and 93,700 tons, respectively, accounting for 19% and 15% of the total market. With the change in planting preferences, the increase in corn and soybean planting area will bring about an increase in the demand for glyphosate. At the same time, as the planting income of crops increases, growers' tolerance for costs will increase, which will also bring about an increase in the demand for glyphosate.

2.3 Reclamation in South America

South American land reclamation creates a continuous increase in glyphosate. The main demand for glyphosate is in genetically modified crops. Genetically modified crops are classified into herbicide tolerance (HT), insect resistance (Bt) or compound varieties (Bt&HT). They are mainly used in three major field crops: corn, potato and cotton. HT is

the core trait of the crop, and glyphosate tolerance is the trait. host. Approximately 90% of the demand for glyphosate is applied to the cultivation of genetically modified crops. As the area of arable land in the United States gradually decreases, the penetration rate of genetically modified organisms is basically saturated. According to USDA data, the planting area of herbicide-tolerant soybeans in the United States has increased from 54% in 2000 to 94% in 2020, and the planting area of herbicide-tolerant corn will account for 89% in 2020, and the planting area of herbicide-tolerant cotton will account for 91%. . The continuous increase of glyphosate in the future will come from the reclamation of wasteland in Brazil and the conversion of forest planting area; the high growth of planting area in emerging countries such as Africa and Paraguay.

2.4 Changes in genetic modification policy

China encourages the industrialization of genetically modified agriculture, and genetically modified planting will become a breakthrough increase in glyphosate. In 2019, my country's genetically modified planting area accounted for only 1.93%, which accounted for only 1.68% of the global genetically modified planting area. Compared with countries with high penetration rates such as the United States and Brazil, there is much room for improvement. In February 2021, the Ministry of Agriculture and Rural Affairs issued the "Notice on Encouraging the Original Innovation of Agricultural Genetically Modified Organisms and Regulating the Transfer of Biological Materials". my country has paid more attention to the development of genetically modified organisms. In the long run, the gradual introduction of GMO encouragement policies and the increasing domestic recognition of GMO crops will accelerate the process of my country's agricultural GMO industrialization.

2.5 Economic development

Crude oil is an important strategic resource that restricts a country's economic development and social progress. Crude oil safety is related to the pace of national economic growth and social development. Judging from the growth trend of world crude oil reserves and consumption, the decline in crude oil reserves and the expansion of consumption have led to a continuous upward trend in crude oil prices. The non-renewability of crude oil and the continued upward trend in prices have led countries around the world, especially developed countries and new economies, to devote themselves to the exploration of new energy sources. In this context, fuel ethanol based on biomass such as corn and sugarcane, as an important renewable clean energy source, has received attention and development under the dual pressures of the prominent energy crisis and the deterioration of the ecological environment. Crude oil is an important material input in modern agricultural production and management. The price of crude oil affects agricultural output and prices of agricultural products from various links such as production, transportation, and consumption. Therefore, the increase in crude oil prices is a fundamental factor driving the increase in agricultural prices. On the other hand, the fuel ethanol industry is inseparable from the corn industry, and the development of the fuel ethanol industry promotes the price increase of corn and related agricultural products. When the price of crude oil rises and the benefits of bio-alternative energy are gradually manifested, it will stimulate new demand for some crops such as corn and sugarcane. The

demand will be reflected in the strengthening of prices and the expansion of planting areas.

3. Industry concentration continues to increase

At present, the global production capacity of glyphosate is approximately 1.1 million tons. Except for Bayer's 380,000 tons of overseas production capacity, the remaining approximately 700,000 tons of production capacity are all concentrated in China. China's glyphosate market is relatively concentrated, and the three oligarchs of Jiangshan + Fuhua, Xingfa + Tenglong, and Xin'an Chemical have initially formed. The industry concentration of these three giants totaled 63%, which is an oligopoly. Jiangshan shares have a production capacity of 70,000 tons of glyphosate, accounting for nearly 10% of the industry. However, in April 2021, Jiangshan announced that it intends to reorganize and acquire 100% of Fuhua Tongda. After the acquisition, the production capacity will be increased to 223,000 tons, becoming the first in the domestic industry. Taisheng Chemical, a subsidiary of Xingfa Group, has a production capacity of 130,000 tons of glyphosate. In February 2018, Xingfa acquired a 100% stake in Inner Mongolia Tenglong for 240 million yuan in cash, increasing its production capacity from 130,000 tons to 180,000 tons. Xin'an has a production capacity of 80,000 tons of glyphosate, ranking third in China. In addition, Hebang Biological and Yangnong Chemical have respectively 50,000 tons and 30,000 tons of glyphosate production capacity.

4. Paraquat is disabled to create marginal increments

Due to the irreversibility of paraquat poisoning, many countries have introduced prohibition policies. my country revoked the registration and production license of paraquat water agent in July 2014, and in September 2020, banned the domestic sales and use of paraquat soluble agent. Under the prohibition policy, my country's domestic paraquat has entered the pace of withdrawal, and the output has gradually declined. Overseas, mainly Brazil, Thailand, Malaysia, etc., have been strictly banned since 2020. We expect the global use of paraquat to decline significantly in 2020, creating incremental demand for alternatives such as glyphosate. my country is a major producer of paraquat, and its output can roughly reflect overseas demand. From the perspective of declining production in recent years, overseas demand has been decreasing year by year. According to Baichuan data, the domestic output per hundred thousand will be 80,000 tons in 2020. If this part is gradually withdrawn in the future, it is expected to replace 160,000-180,000 tons of glyphosate demand (assuming that all are replaced by glyphosate).

5. Prices of main raw materials

The main raw materials of glyphosate are yellow phosphorus and glycine. Yellow phosphorus is an important chemical product with a wide range of downstream applications and a broad market development space in the future. In recent years, as environmental protection supervision has become increasingly stringent and supply-side structural reforms have continued to deepen, some backward production capacity has been gradually eliminated by the market, the production capacity of the yellow phosphorus industry has declined, and the market concentration has continued to increase. Affected by factors such as the new crown pneumonia epidemic and power curtailment in some areas, the operating rate of yellow phosphorus enterprises is low, and the market supply is tightening. Under this background, the market price of yellow phosphorus has a

clear upward trend. At the same time, with the explosive growth of new energy vehicles, driven by the demand for lithium battery materials, since the fourth quarter of 2020, phosphate ore has gradually shown a situation of in short supply, and the price of phosphorus-containing lithium battery raw materials has risen sharply. Under the background of carbon neutrality, the supply of glycine is tight, and the supply and demand of glycine is still tight in the future. The probability that prices will continue to rise is very high.

6. Alternatives

Glufosinate-ammonium is a herbicide based on natural products. It has a fast weeding speed, no drug resistance, and higher safety. There is no carcinogenic controversy at present. It has a harmonious environment and good social recognition for chemical pesticides such as glyphosate. Degree and other advantages. But the cost is much higher, and it is still difficult to be recognized by end users in the face of the price difference between the two. Faced with the current situation, there is no herbicide product that can single out glyphosate, which occupies half of the herbicide market.

Literature Review

In 2012, the global pesticide market reached 53.635 billion U.S. dollars, an increase of 6.6% year-on-year. This is the first time that the global pesticide market exceeded 50 billion U.S. dollars in 2011 and continues to grow rapidly. Among them, the share of herbicides stabilized at about 44%, which is the largest category of pesticides. The rapid growth of the market has also boosted the confidence and desire of purchasers. Affected by this, the production and sales of my country's pesticide industry boomed in 2012, and the benefits improved. The glyphosate market has experienced a three-year downturn after the 2008 financial crisis, and finally showed a recovery trend (Duan,2013).

In 2016, the pesticide market went out of a "V"-shaped reversal trend that first declined and then rose, as did the glyphosate market. Since the fourth quarter of last year, prices have continued to rise, with a cumulative increase of nearly 40%. At the beginning of the new year, the price of glyphosate has not stopped its rising pace, and some pesticide companies have raised the sales price of glyphosate one after another. How will the price of glyphosate in 2017 change in the future? Industry insiders and institutions predict that under the influence of multiple factors such as demand recovery and environmental constraints, the price of glyphosate will probably be a slow upward trend in the future (Ro, 2017).

The glycine production route has been applied earlier in my country and the technology is relatively mature. However, compared with the hydrocyanic acid-IDA method, it has the disadvantages of long route, high cost, high pollution, and low content. Under the situation that the domestic environmental protection pressure is further increased, unable to further expand production capacity and compete with large foreign companies. As diethanolamine is a petrochemical downstream product, and my country's production capacity is insufficient, it mainly depends on imports. With the rise of international oil prices, this raw material will become a major factor restricting the further development of the diethanolamine-IDA process. However, as the domestic technology for the production of hydrocyanic acid from natural gas and the preparation of

iminodiacetonitrile from natural gas is mature, and the technology for the production of glyphosate by the catalytic oxidation of diglyphosate by activated carbon is further developed, domestic enterprises adopt the hydrocyanic acid-IDA method for production. Glyphosate will have the basis to compete with large foreign companies. And through the development of regeneration technology of deactivated activated carbon catalyst to ensure the long-term recycling of the catalyst, it is of great significance for the development of cleaner production and the realization of circular economy, and to improve the competitiveness of the hydrocyanic acid-IDA method (Wang,2018).

At present, 5 herbicide resistance genes have been applied in crops: CP4. EPsP gene, mutant corn EPSP, glyphosate oxidase (GOx) metabolic system, bromoxynil hydrolase and bar or pat of the glufosinate acetylation system [3J]. In the future, the situation of relying solely on glyphosate-resistant crops will come to an end. The next technology will be to combine glyphosate resistance with other herbicides. Such multi-resistant crops will reduce the excessive dependence on a single herbicide. However, as the core glyphosate will continue to play its important role, so its production and application area will continue to expand (Su & Teng,2014).

In the past 20 years, due to the successful commercial application of genetically modified glyphosate-resistant crops, glyphosate has become the most important herbicide in the world. At the same time, the research on glyphosate resistance has become one of the hot spots in plant science and weed science in the world. The research on glyphosate resistance in my country has just started. Therefore, it is of great theoretical and practical significance to discover new glyphosate-resistant materials in production practice, and comprehensively and systematically clarify the mechanism of its resistance to glyphosate. On the one hand, the elucidation of the glyphosate resistance mechanism will help us understand the basic plant biochemical process and the plant's defense mechanism against toxic chemicals; on the other hand, it will help us overcome the occurrence of weed resistance and weeds in the future. The scientific management of the company provides a solid theoretical basis; at the same time, the discovery of new resistance genes with completely independent intellectual property rights will provide new research ideas and methods for the development of glyphosate-resistant transgenic plants (Chen,2017).

Research Methodology

1. Documentary data method

This article will make use of relevant domestic and foreign literature as much as possible, refine and analyze, construct a rigorous theoretical framework, and provide theoretical conditions for the research of this article

2. Case analysis method

checks well-known websites at home and abroad, classify the problems, and conduct in-depth analysis based on the actual situation

3. Logic analysis method

Using logical analysis methods such as induction, analogy, and synthesis, the content of this research is discussed from the current industry conditions, and relevant conclusions and suggestions are derived.

Findings and Conclusion

On the whole, given its excellent effect on weeding, whether it is banned or eliminated by the market in the domestic and global markets will be a long process. Looking to the future, because the expansion of glyphosate is restricted by environmental protection policies, it is difficult to reverse the current supply shortage pattern through expansion. Demand will be strong in the next 1-2 years, and long-term demand changes remain to be seen. The main driving force for the growth of glyphosate demand in the medium and long term comes from the growth of crops, especially the growth of genetically modified planting area (especially in China), and the continued withdrawal of paraquat. Glyphosate is currently the largest herbicide with the greatest potential, and its demand is increasing at a significant rate. Glyphosate has huge potential opportunities in the future, and it is expected to usher in a stage of efficient and rapid growth. The glyphosate industry will maintain a high economic cycle from 2021-2022.

Recommendations

It is recommended that the company further expand its production capacity through technological transformation and investment in new construction, adhere to safety and environmental protection investment, high standards and strict requirements, and develop green and environmentally friendly production to ensure sustainable development.

The industrial chain extends upstream and downstream to avoid the risk of upstream raw material fluctuations, stabilize the supply of raw materials, enhance the advantages of downstream channels, enrich crop protection solutions, strengthen terminal plant protection service capabilities, and actively expand to the terminal. Combining with the changes in the policy of genetically modified crops, the layout of glyphosate and seed industries in advance, and the selection of dominant varieties provide the basis for genetically modified transformation. Deepen the global layout, allocate global resources, carry out cooperation projects around Brazil and other South American wasteland markets, try to configure localized preparations, introduce local teams, and realize localized operations.

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