

Agricultural chemical prices have been increasing rapidly and the price of Glyphosate based herbicides have seen a considerable price increase in the last few months.

Background

Glyphosate is a main ingredient in many knockdown herbicides, used to kill the majority of annual and perennial plants. Glyphosate is a contraction of an amino acid Glycine and the chemical Phosphorus. Glyphosate comes in two main forms, a free acid form and various salt forms. The salts forms include isopropylamine, trimesium, diphenylamine and mono-ammonium. The most common form of Glyphosate is the isopropylamine salt.

Glyphosate based herbicides work on absorption by the plant, mainly through its leaves or soft stalk tissue which have come into contact with the herbicide. The herbicide is transported throughout the plant and hinders various enzyme systems of the plant, restricting the production of the EPSPS enzyme which is required for plant growth and inhibiting a plant's amino acid metabolism known as the shikimic acid pathway. The shikimic acid pathway converts simple carbohydrate precursors derived from glycolysis and the pentose phosphate pathway to the aromatic amino acids.

Glyphosate is a contact herbicide and does not prevent new weeds from germinating. It is therefore common for Glyphosate based herbicides to include residual herbicides such as atrazine and simazine which prevent the germination of new weeds.

Production and Consumption of Glyphosate

Glyphosate based herbicides are one of the most commonly sold herbicides in the market today. With demand increasing rapidly Glyphosate occupies more than 30% of the world herbicide sales volume¹.

China is the largest producer of Glyphosate. In 2007 China was accountable for more than one third of the global production². Other than China there are around 70 other countries that produce Glyphosate around the world, including the dominant Monsanto Company. Within China the main producers are Zhejiang Xinan Chemical Industrial Group Co. Ltd, Anhui Huaxing Chemical Industry Co. Ltd, Zhejiang Longyou Greenland Pesticides Co. Ltd and Nantong Jiangshan Agrochemical & Chemical Limited Liability Co.

China has been the largest production base of Glyphosate technical in the world and it was estimated that the output of Glyphosate in China was over 240kts and the export volume was up to 200kts in 2007². 80% of China's total production of Glyphosate is exported to over 90 countries and regions worldwide. In recent years Glyphosate has accounted for around 70% of total herbicide exports³. Global consumption of Glyphosate was over 600kts in 2007 and it is expected to increase by a compound annual growth rate of over 12%.

Australia's consumption of herbicides and other chemicals has been growing steadily over the last 30 years. Figure 1 illustrates the increase in sales of herbicides, pesticides and fungicides. Of particular note herbicide sales have seen significant growth with total sales doubling in the last 12 years.

¹ China Glyphosate Industry Report, 2007-2008 sourced from <http://www.researchinchina.com/Report/Agriculture/5290.html> [accessed on 18 February 2008]

² The Future of Glyphosate Industry in China - 2010-2015 sourced from http://www.researchandmarkets.com/reportinfo.asp?report_id=573807 [accessed on 18 February 2008]

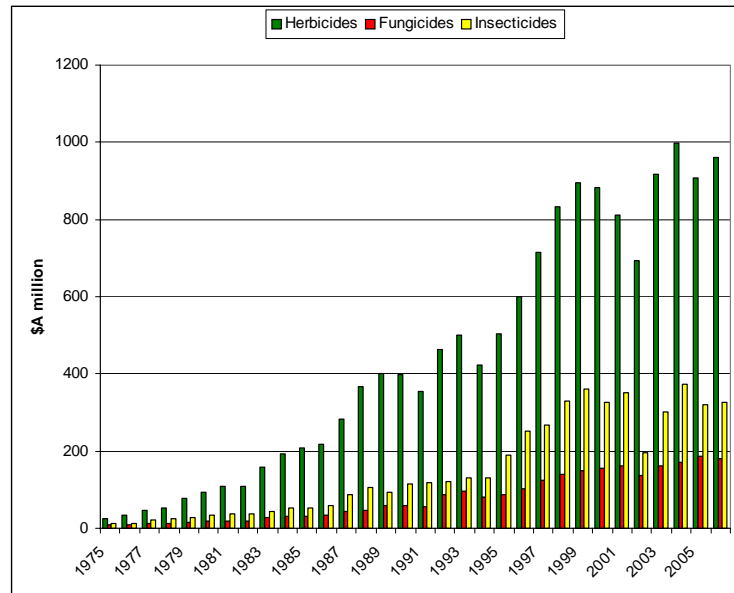
The predominant source of Glyphosate consumed in Australia is China. Figure 2 illustrates that in the last 12 months there has been a general trend in the quantity of Glyphosate imports into Australia and a corresponding increase in the price.

Cause of Glyphosate price increase

1. Chinese production

China is a major source of Glyphosate, exporting around a third of global consumption. Chinese supply is currently experiencing a range of influences that affect their manufacturing and hence the Glyphosate supply availability and prices on the global market. Figure 3 illustrates over the last 3 years the price of Glyphosate has seen a gradual increase with an exponential increase in the latter part of 2007.

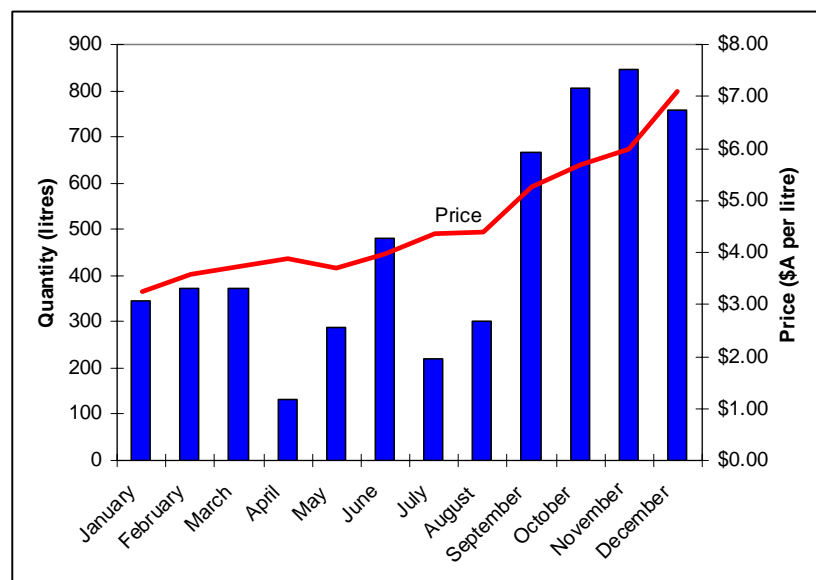
Figure 1 Australian Chemical sales



China is currently undergoing preparations for the 2008 Olympic Games that are going to be held in Beijing and commence on the eighth of August 2008. For China to win the rights to host the Olympic games it provided a commitment that it would deliver a 'Green Olympics'. As a result, Beijing undertook environment initiatives to clean up the city. Polluting factories have been moved or closed, this included several small Glyphosate manufactures around Beijing. In addition the biggest Glyphosate manufacture of Mengshan has shut down part of its production capacity, which has further constricted supply in a market with fast growth in demand.

China's campaign for a green Olympics has required local officials to raise electricity prices to discourage the growth of large energy consuming industries and forcing inefficient companies out of business. The increase in electricity is a cost that carries throughout the industry.

Figure 2 Australia's imports of Glyphosate from China 2007

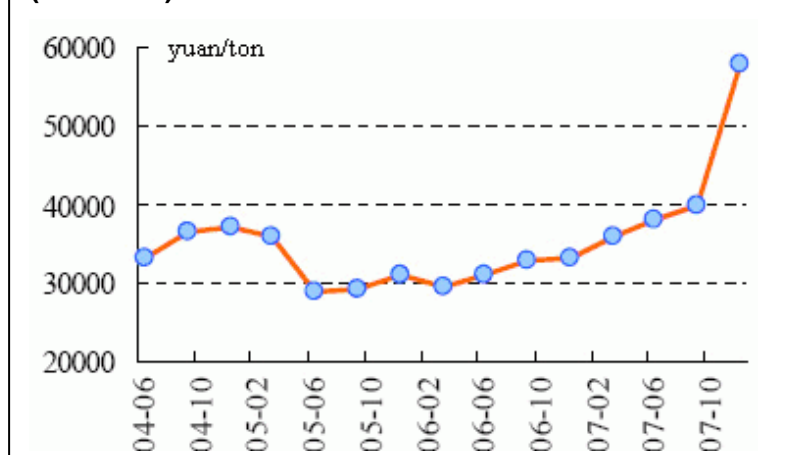


Not only does it affect the manufactures of Glyphosate but also the cost of their inputs. An important ingredient in

Glyphosate production is Yellow Phosphorus. The price of Yellow Phosphorus has fluctuated recently due to supply which is influenced by the availability of hydraulic power and the change of production capacity.

A Chinese subsidy for several export products including Glyphosate has also recently been reduced from 11% to 5%. The subsidy named the Chinese Value-Added Tax Subsidy (VAT) has played an important role in keeping export prices low. Any change to the VAT refund rate will impact the prices charged on export goods as well as the profitability of the exporters.

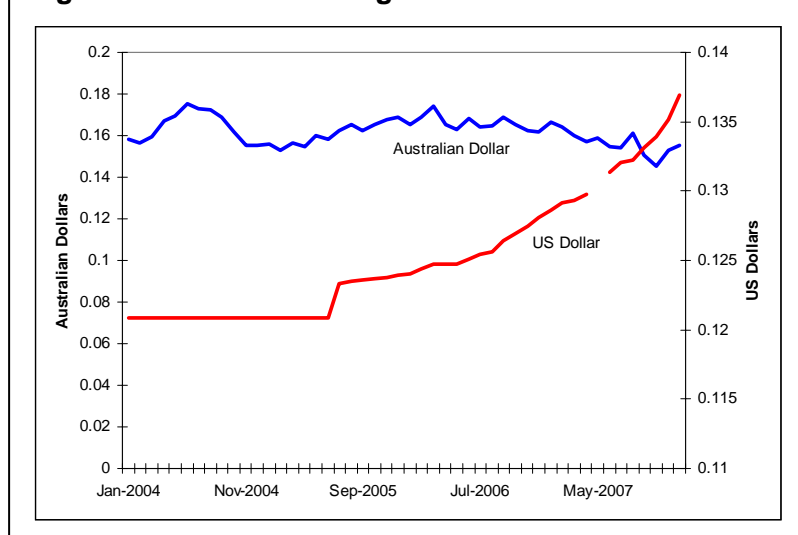
Figure 3 China Glyphosate Price, June 2004-Oct 2007 (Yuan/ton)



The Chinese currency has appreciated increasing the cost of Chinese exports. The average value of the Yuan, a denomination of China's currency also known as the renminbi, had a record high against U.S. dollar since the reform of the Yuan exchange rate regime in 2005 with a rate of 7.2566 on January 14. The Yuan has appreciated about 12 percent since that date.

Statistics from the Chinese Academy of International Trade and Economic Cooperation under the Ministry of Commerce show that when the Yuan appreciated 7 percent against the U.S. dollar, China's export-oriented companies had lost about 10 percent in profit. Because of renminbi appreciation, many companies will be forced to upgrade or transfer to other production. Moreover, as their product prices become less competitive in the international market, some previously profitable companies will suffer losses. Central Bank Governor Zhou Xiaochuan pointed out the recent Yuan appreciation was mainly driven by surging international oil prices, domestic inflation and mounting trade surplus.

Figure 4 Chinese exchange rate



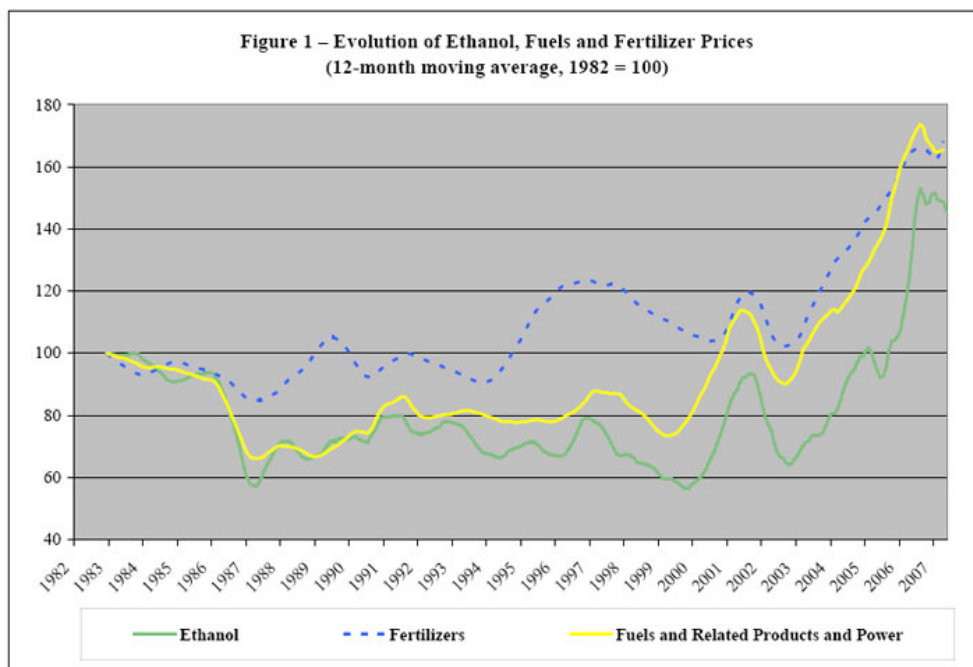
2: The demand for Glyphosate:

Australia's stock of Glyphosate based herbicides has been depleted due unexpected extra applications of knockdown herbicide this season. Normally there are two applications of knockdown herbicides, the first usually in September and the second before sowing. The large amount of pre-Christmas summer rain stimulated plant growth and warranted an extra

application of herbicide. This was followed by further rain after Christmas which also justified another application of herbicide. The end result is that Australia has applied a lot more Glyphosate based herbicides than producers estimated causing a shortage of Glyphosate based herbicides in the Australian market.

Additionally farmers are taking advantage of current ethanol prices. Many farmers especially in the US are switching from livestock enterprises or are having larger plantings due to the biofuel production. This switch of enterprises has drastically increased the area of land that needs to be prepared and sprayed with herbicides, increasing demand of Glyphosate based herbicides. As Figure 5 illustrates there is a strong correlation between Ethanol, Fuel and Fertiliser prices and they have all experienced an increase in the last 4 years.

Figure 5 Evolution of Ethanol, Fuels and Fertilizer prices



Data sources: US Bureau of Labor Statistics and Nebraska Energy Office
<http://www.parl.gc.ca/information/library/PRBpubs/prb0702-e.htm>