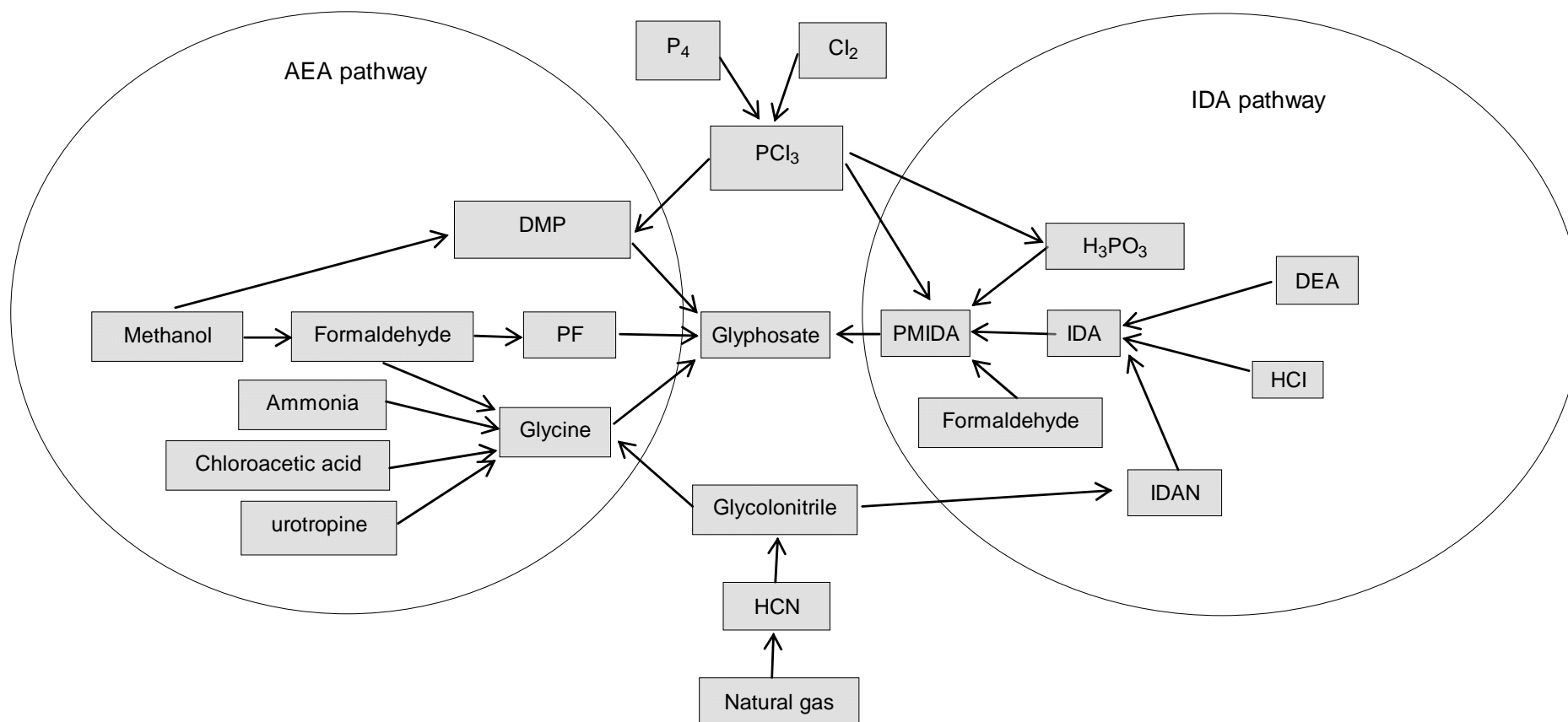


## II Glyphosate upstream industry

### II-1 Brief introduction to raw materials & intermediates involved in glyphosate production

As glyphosate is produced by both AEA pathway and IDA pathway in China, the raw materials are diverse. Yellow phosphorus is a public raw material needed by both AEA pathway and IDA pathway, and the supplying situation of yellow phosphorus largely influences the production of glyphosate.

Figure II-1-2 Glyphosate by different pathways and value chain of key raw materials



## II-2.5 Glycine in China

Glycine is an important raw material for glyphosate production with AEA pathway, and about [REDACTED] tonne of glycine of industrial grade is needed to produce 1 tonne of glyphosate.

Table II-2.5.1-2 Industrial grade glycine producers in China as of May 2008 (tonne)

No.	English name	Status	Location	Capacity May 08	Output '07
1	[REDACTED]	active	[REDACTED]	[REDACTED]	[REDACTED]
2	[REDACTED]	active	[REDACTED]	[REDACTED]	[REDACTED]
3	[REDACTED]	active	[REDACTED]	[REDACTED]	[REDACTED]
4	[REDACTED]	active	[REDACTED]	[REDACTED]	[REDACTED]
5	[REDACTED]	active	[REDACTED]	[REDACTED]	[REDACTED]
6	[REDACTED]	active	[REDACTED]	[REDACTED]	[REDACTED]
7	[REDACTED]	active	[REDACTED]	[REDACTED]	[REDACTED]
8	[REDACTED]	active	[REDACTED]	[REDACTED]	[REDACTED]
9	[REDACTED]	active	[REDACTED]	[REDACTED]	[REDACTED]
10	[REDACTED]	active	Jiangsu	5,000	2,000
11	[REDACTED]	active	[REDACTED]	[REDACTED]	[REDACTED]
12	[REDACTED]	active	[REDACTED]	[REDACTED]	[REDACTED]
13	[REDACTED]	active	[REDACTED]	[REDACTED]	[REDACTED]
14	[REDACTED]	active	[REDACTED]	[REDACTED]	[REDACTED]
15	[REDACTED]	stopped	[REDACTED]	[REDACTED]	[REDACTED]
16	[REDACTED]	potential	[REDACTED]	[REDACTED]	[REDACTED]
	Total	-	[REDACTED]	[REDACTED]	[REDACTED]

### III-4.1.1 Overall situation of glyphosate technical producers

The number of active glyphosate technical manufacturers in 2008 increases compared to that in 2007. As of May 2008 there are totally [REDACTED] active manufacturers, who produce both glyphosate technical and its formulations as well in China, but the number was much smaller in 2006 and 2007, which was only [REDACTED] and [REDACTED] respectively.

Table III-4.1.1-2 Overview of glyphosate technical manufacturers in China-2

[illegible]

Table III-4.1.1-1 Number of glyphosate producers in China, by province

No.	Province	2001	2003	2005	2006	2007	2008
1			10				
2			8				
3			1				
4			6				
5			0				
6			1				
7							
8							
9	Hunan						
10	Fujian						
11	Ningxia						
12	Hebei						
13							
14							
	Total						

#### - Capacity by pathway

Table III-4.1.2-2 Capacity of glyphosate technical in China by different pathway (tonne)

Year/ Pathway			2001	2002	2003	2004	2005	2006	2007	2008
AEA	Capacity									
	Producers									
IDA	DEA	Capacity								
	route	Producers								
	IDAN	Capacity								
	route	Producers								
	PMIDA	Capacity								
	route	Producers								
Other		Capacity								
Total		Capacity								
		Producers								

#### - Capacity expanding

Stimulated by the huge market and the fat profits, many enterprises in China including etc. are planning to expand their capacity to make glyphosate. There are also XX potential producers of glyphosate in the second half of 2008 or 2009. As calculated, about XXkt/a new production installations of glyphosate were put into commercial production in the first half of 2008 in China, and about

Table III-4.1.2-3 Capacity expanding of glyphosate technical in China, 2008-2009 (tonne) -1

No.	Company	Status '08	2008 (A)	End 2008 (B)	B-A	2009 (C)	C-A	Pathway
VII-1.01		active						
VII-1.05		active						
VII-1.06		active						
VII-1.07		active						
VII-1.08		active						
VII-1.09		active						
VII-1.11		active						
VII-1.13		active						
VII-1.18		active						
VII-1.21		active						
VII-1.26		active						
VII-1.27		active						
VII-1.30		active						
VII-1.37		active						
VII-1.40		active						
VII-1.46		idle						
VII-1.47		potential						
VII-1.48		potential						
VII-1.49		potential						
VII-1.50		potential						
VII-1.51		potential						
VII-1.52		potential						
VII-1.53		potential						
VII-1.54		potential						
VII-1.55		Potential						
VII-1.56		potential						
VII-1.57		potential						
Total								

## III-4.2 Glyphosate formulations















### III-4.2.1 Overall situation of glyphosate formulations

#### - Overview of formulations species

The solubility of glyphosate technical is quite weak (1.2% at 25°C). But glyphosate salts have good solubility in the water without losing the activity. E.g. the solubility of both glyphosate isopropyl ammonium (IPA) and glyphosate sodium is 500g/L, and the solubility of glyphosate

## Water formulation

Age Group	Percentage of Respondents
18-29	90%
30-49	85%
50-64	85%
65+	60%

Specifications	Number of producers			
	2003	2005	2006	2007
	1	1	1	1
	1	1	1	1
	1	1	1	1
	1	1	1	1
	1	1	1	1
	1	1	1	1
	1	1	1	1
	1	1	1	1
	1	1	1	1
	1	1	1	1
	1	1	1	1
	1	1	1	1
	1	1	1	1
	1	1	1	1
41%IPA	1	1	1	1
48%IPA	1	1	1	1
62%IPA	1	1	1	1

China began to export glyphosate since 1991. Originally the Chinese people only export glyphosate 95% technical. The export in 1992 was less than 100 tonne.

Year	Export				Import
	Technical	41%IPA	62%IPA	WP	41%IPA
2002					
2003					

2004					
2005					
2006					
2007					

### III-7.1.4 Roles of China's glyphosate in global markets

Table III-7.1.4-1 Situation of China's glyphosate output in global market, 2005-2007 (tonne)

Year	Global output	Output	Share	Output of PMIDA	Total*	Share
2005						
2006						
2007						

Total\* including the glyphosate technical and converting PMIDA to glyphosate technical

### III-7.2 Domestic demand for glyphosate

#### III-7.2.1 Overview of Chinese glyphosate technical consumption

As China seldom imports glyphosate technical, CCM considers that all of domestic glyphosate formulation is made from domestic glyphosate technical.

For describing the export and domestic consumption situation of Chinese glyphosate technical, CCM calculates output and export (including 10% SL, 41% IPA, 62% IPA, 95% and other specifications) volume by 95% technical. The data and the chart are displayed as follows:

Table III-7.2.1-1 The consumption pattern of glyphosate technical (tonne)

Item	2004		2005		2006		2007	
	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage
Output								
For Export								
For formulation*								

For formulation\* including the formulation consumed in China and exported