National Profile of Chemicals Management in China

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Introduction

Various types of chemicals, developed by human community in the past decades and widely used in agriculture, industry and various realms of social life, have become a category of indispensable products for modern society. Despite their extensive social and economic values for people, a variety of hazards have been generated during the production, processing, transport, use and disposal processes of chemicals. Particularly with the increasingly scientific understanding of chemical hazards, the potential health and environmental risks in relation to chemicals have become increasingly prominent, and the chemicals management issues have drawn more and more attention from all countries in the world.

In 1992, the United Nations Conference on Environment and Development (UNCED) initiated the integration of chemicals management into the Global Strategic Plan for Sustainable Development --- "Agenda 21" by promoting "Environmentally Sound Management of Toxic Chemicals, Including Prevention of Illegal International Traffic in Toxic and Dangerous Products", based on which the establishment of international chemicals management policy platform and action plans has been proposed, and a number of chemicals management international coordination mechanisms such as "Intergovernmental Forum on Chemical Safety" (IFCS) and "Inter-Organization Programme for the Sound Management of Chemicals" (IOMC) have been established, and a series of chemical-associated international conventions such as "Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade" ("Rotterdam Convention") and "Stockholm Convention on Persistent Organic Pollutants (POPs)" ("Stockholm Convention") have been signed. In a word, chemicals management has become an important subject in global environmental protection and sustainable development.

The 2002 World Summit on Sustainable Development (WSSD) inherited and further developed the international chemicals management strategies proposed by "Agenda 21", i.e., to integrate the time-bound goal into the "WSSD Implementation Plan": "to achieve, by 2020, the sound management of chemicals and hazardous waste for sustainable development, and that chemicals are used and produced in ways that lead to the minimization of significant adverse effects on human health and the environment" ("2020 Goal"). In order to realize the 2020 Goal, as organized by UNEP, a "Strategic Approach to International Chemicals Management" (SAICM) was agreed by the countries' governments, international organizations, industry and NGOs in 2006, comprising the Overarching Policy Strategy (OPS) and accompanied by the Global Plan of Action (GPA), which involves all relevant sectors such as environmental protection, public health and occupational safety and requires for concerted implementation by all countries, aiming to protect human health and the environment in a comprehensive way and realize sustainable development.

As the major producer and user of chemicals in the world, China's chemical industry, as well as associated industries, plays a significant role in the national economy. Chinese Government has been paying high attention to chemical risks, in addition to the vigorous measures for improving its domestic

chemicals management, it has also been actively participating in international chemicals management agendas and global actions. Chinese Government has dispatched the multi-sector delegations to take part in every round of intergovernmental negotiations in relation to SAICM formulation and implementation, and has also specially established a formal official contact point. In recent years, China has been actively promoting the effective national implementation of SAICM programme through active implementation of various international conventions on chemicals management, rigorous promotion of Globally Harmonious System of Classification and Labeling of Chemicals (GHS) and continuous improvement of domestic regulations on chemicals management.

For addressing chemicals management---the complicated issue involving multi industries, sectors and stakeholders, the national implementation of SAICM programme has to be a step-by-step process, especially for a major developing country like China. According to the international experience and practice, the primary step and key starting point for SAICM implementation shall be the research and preparation of "National Profile of Chemicals Management" ("National Profile"), that is to say, based on the status quo of domestic production and use of chemicals, a comprehensive assessment on the basic situation of national chemicals management shall be conducted, including the laws, institutions, management and technology that cover the entire life cycle of chemicals management, so as to systematically understand the capacity, needs and priorities in relation to national chemicals management. Through the preparation of "National Profile", first at the national level, the existing national capacity of chemicals management shall be evaluated for identifying the gaps in SAICM implementation and indicating the potential partnership opportunities between the Government and the stakeholders; second at the international level, the national profile of chemicals management shall provide a comprehensive understanding of the existing national capacity and needs, which shall bring wider access to available international resources and facilitate the domestic chemicals environmental management.

In 1999, China used to prepared a "National Profile" (formerly named "China Chemicals Management National Profile"). However, due to the rapid economic and social development in the past ten years, significant changes have happened to China's situation of chemical industry development, such as the chemicals management regulations, systems, government administrative system as well as scientific research and technologies. In cooperation with United Nations Institute for Training and Research (UNITAR) and Peking University(PKU), , the Ministry of Environmental Protection (MEP) of China successfully applied the SAICM Quick Start Programme (QSP)Trust Fund project, titled "*Enabling Activities for the Development of a SAICM Implementation Plan as a Key Contribution towards an Integrated National Programme for the Sound Management of Chemicals in the People's Republic of China*", mainly targeting re-development of the National Profile of Chemicals Management in China(NP-CHINA), as an important capacity building toward developing the implementation plan of SAICM in China, through an overall review and analysis on the status, gaps and needs of the national chemicals magement of the nation. The QSP implementation obtained active support and cooperation from China's Ministry of Foreign Affairs (MOFA), National Development and Reform Commission (NDRC), Ministry of Science and Technology (MOST), Ministry of Industry

and Information Technology (MIIT), Ministry of Commerce (MOC), Ministry of Agriculture (MOA), General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) and National Health and Family Planning Commission (NHFPC). Particularly, a Steering Committee (SC) has been established, whose members include the representatives from the abovementioned Ministries as well as the experts from CRAES (Chinese Research Academy of Environmental Sciences), CPCIF (China Petroleum and Chemical Industry Federation) and MEP's Center of Solid Waste and Chemical Management Technology (MEPSCC).

In June 2012, MEP, UNITAR and PKU jointly convened the "Establishment of the Steering Committee and Inception of SAICM-QSP Enabling Activities of China" in Beijing. While the Steering Committee of the project was formally established, the Task Force led by Dr. Jianguo Liu from PKU(the leading technical support institute for the project) and experts from MEPSCC and CPCIF was established to carry out the research and development of NP-CHINA. After series of workshops and consultation meetings for one year and a half, the Task Force developed the draft of NP-CHINA for commentation in December of 2013. Then, after about six months of circulating review and commentation among the ministries and relevant organizations, and the public commentation during the National Forum for SAICM Implementation in China in June 2014, with additional suggestions from UNITAR, the formal National Profile document was finalized by October 2014.

Fundamentally, the format and content of the NP-CHINA are developed by following the Guidance--*Preparing a National Profile to Assess Infrastructure and Capacity Needs for Chemicals Management (Second Edition, 2012)*developed by UNITAR, with necessary adjustment according to China's national situation. The Task Force has been making all efforts in collecting, analyzing and integrating the existing information and data on national chemicals management as required by the Guidance. However, as a globally major producer and user of chemicals, China has numerous types of chemical enterprises in a various magnitude, but without an sufficient data collection, registration or reporting systems for existing chemicals. The management of chemicals involves a wide range of social, economic and administrative areas, including highly complicated chemical-related legal and regulatory systems, and associated institutions and organizations, so that the level of difficulty and workload for preparing NP-CHINA is much higher than that of small and medium countries. As a result, NP-CHINA cannot fully meet all of the data requirements specified by the Guidance. Meanwhile, due to the limitation or shortage on data collection and knowledge of the experts of the Task Force, there should be some important information missing, data deficiency and one-sided views in this version of NP-CHINA. However, As almost the first overview and analysis of contemporary chemicals management in China, we hope this NP-CHINA could serve as starting point to understand and promote the sound management of chemicals in China.

Chapter 1: National Background Information

1.1 Geographic Context

Located in the east of Asia and adjoining the western coast of the Pacific Ocean, China has a land area of 9,600,000km^{2}in four directions: north to the middle of Heilongjiang River (near Mohe City) and south to Zengmu Reef of Nansha Islands, west to Pamirs Plateau and east to the convergence of Heilongjiang and Wusuli Rivers.

China's territorial waters encompass one inner sea (Bohai Sea) and three open seas: Huanghai, Donghai and Nanhai Seas, forming an 18,000km coastline in east and south and a total water area of 4,700,000km^2 in which 7,600 big or small islands are distributed, including the biggest one: Taiwan Island (35,798km^2).

The 22,800m land border of China adjoins it with its east neighbor North Korea, north neighbor Mongolia, northeast neighbor Russia, northwest neighbors Kazakhstan, Kyrgyzstan and Tajikistan, west and southwest to Afghanistan, Pakistan, India, Nepal and Bhutan, south to Burma, Laos and Vietnam, in addition to South Korea, Japan, the Philippines, Brunei, Malaysia and Indonesia across the sea in east and southeast. The Provincial-level divisions include 4 direct-controlled Municipalities, 23 Provinces, 5 Autonomous Regions and 2 special administrative regions, with Beijing as the capital.

Figure 1.1 is the map of China.

Figure 1.1 Map of China

Various types of climate are found in China: temperate monsoon climate, subtropical monsoon climate, tropical monsoon climate, temperate continental climate, and plateau and mountain climate. Spanning from south to north there are the following climatic zones: tropics, subtropics, warm temperate zone, mid temperate zone, cold temperate zone and frigid zone, and the temperature zones are: cold temperate zone, mid temperate zone, warm temperate zone, subtropical zone, tropical zone and vertical plateau temperate zone. China's three climatic features are: typical monsoon climate, distinctive continental climate and various types of climate. Low temperature is universal in winter, with the temperature differences between warm south and cold north distinctively exceeding 50 degrees Celsius.

The cascading terrain encompasses various landforms from the high west to the low east. The primary terrain is the Tibetan Plateau with an average altitude higher than 4,000 meters and the borderline is formed by Kunlun, Qilian and Hengduan Mountains in the east and north sides, right above the secondary terrain where large basins and highlands are distributed with the altitude averaging at 1,000～2,000 meters, to which the eastern Greater Khingan, Taihang, Wushan and Xuefeng Mountains function as the borderline between the secondary and the

tertiary terrains. The vast plains stretching on the tertiary terrain are interrupted by hills and low mountains, mostly below 500 meters. Among the five types of basic terrains in China, 67% of the land area is dominated by mountains, plateaus and hills, and the rest 33% is basins and plains.

Frequent occurrences of natural disasters are caused by complicated geological conditions in China's vast land area, statistically including an average rate of 20 earthquakes per year measured at Richter scale 5.0 or above and 7 occurrences of tropical cyclones, the average annual loss caused by floods and mudflows is RMB206.6bn, while the loss caused by drought is RMB71.7bn. The structure of China's natural disaster risk levels shows a tendency of "higher in east, medium in central China, lower in west". The seven regions of high risk of natural hazards are: Delta and lower reaches of Yangtze River, Huaihe Basin, North China Plain and Beijing-Tianjin-Tangshan Region, Hunan-Hubei Region, Fen-Wei Basin, Sichuan Basin, and Lower Liaohe Region.

1.2 Demographic Context

The total population of China in the sixth census 2010 is 1,370,536,875, including mainland population 1,339,724,852, Hongkong SAR population 7,097,600, Macao SAR population 552,300 and Taiwan region population 23,162,123. Currently China mainland's birth rate and mortality rate are 11.93‰ and 7.14‰ respectively, contributing to a natural growth rate of 4.79‰, which is a slow growth rate.

As to the age structure of mainland population, 16.60% are 0-14 age population, 70.14% are 15-59; 13.26% are 60 and above, including 8.87% population aged at 65 and above. According to the statistics in 2011, the median age of Chinese population is 34.5.

The proportion between urban residents and rural residents is 49.68% to 50.32%, respectively representing 665,575,306 and 674,149,546 people.

In terms of educational attainment, the mainland population's literacy rate (illiterates above 15 years of age) is 4.08%, a drop of 2.64 percentages compared to ten years ago. The compulsory 9-year education programme has helped realize a primary school net enrollment rate of 99.7%, a junior high school gross enrollment rate of 100.1%, and a higher education gross enrollment rate of 26.5%.

1.3 Nationalities and Languages

China has 56 nationalities, the dominating Han Nationality accounts for 91.59% of the total population. Mandarin is the official language used in China, meanwhile some non-mandarin languages are largely spoken by some minority nationalities, such as Mongol, Tibetan, Uigur and other Turkic languages (as spoken in Xinjiang) and Korean (as spoken in Northeast China).

1.4 Political Structure of China

The system of multiparty cooperation and political consultation under the leadership of the Communist Party is a basic political system of the People's Republic of China. In organizational form of the Chinese People's Political Consultative Conference, the system of political consultation is a system in which important issues relating to national policies and political, economic, cultural and social sectors previous to decision-making as well as important problems emerged during the process of decision implementation to be consulted by various democratic parties, mass people's organizations, ethnic groups and various sectors of the society under the leadership of the Communist Party of China.

The National People's Congress of the People's Republic of China is the top national authority, with the Standing Committee of the National People's Congress acting as the permanent organ. The National People's Congress, as well as the Standing Committee, has the right to exercise the national legislative power.

The Chairman and Vice-Chairman of the People's Republic of China are elected by the National People's Congress. According to the decisions made by the National People's Congress and the decisions by the Standing Committee of the National People's Congress, the Chairman of the People's Republic of China has the right to promulgate laws, appoint and remove the Premier and Vice-Premier of the State Council, State Councilors, Ministers, each Committee's Chairman, Auditor-General and Secretary-General, award the national medals and honorary titles, announce amnesties, declare a state of emergency, and proclaim a mobilization order.

The State Council of the People's Republic of China is the Central People's Government, is the implementation organ of the highest organ of state power, and also the highest State Council. The overall responsibility is assumed by the Premier with assistance by Vice-Premier, State Councilors, Ministers, each Committee's Chairman, Auditor-General and Secretary-General.

The Central Military Commission of the People's Republic of China takes leadership of the national armed forces and is responsible to the National People's Congress and the Standing Committee of the National People's Congress, and the overall responsibility is assumed by the President with assistance by Vice-Presidents and Members of the Military Commission.

The Supreme People's Court is the highest judicial organ responsible to the National People's Congress and the Standing Committee of the National People's Congress by supervising the judicial work conducted by Local People's Courts and Special People's Courts at various levels, and the upper level People's Courts supervise the judicial work conducted by lower level People's Courts, and all Local People's Courts are responsible to the state power organ from which they originate.

The Supreme People's Procuratorate is the highest procuratorial organ responsible to the National People's Congress and the Standing Committee of the National People's Congress by guiding the work conducted by Local People's Procuratorates and Special People's Procuratorates at various levels, and the upper level People's Procuratorates supervise the work conducted by lower level People's

Procuratorates, and all Local People's Procuratorates are responsible to the state power organ from which they originate as well as the upper level People's Procuratorate.

All Provinces, Direct-controlled Municipalities, Counties, Cities, Municipal Districts, Townships, Ethnic Townships and Towns have the setup of a Local People's Congress and Local People's Government. Local People's Congresses and Local People's Governments at various levels are organized according to laws, and all Autonomous Regions, Autonomous Prefectures and Autonomous Counties have an autonomous organization. The autonomous organs in autonomous ethnic areas include the People's Congress and People's Government of each Autonomous Region, Autonomous Prefecture and Autonomous County, in which the representatives attending the People's Congress include those from the autonomous ethnic group as well as certain number of representative from other ethnic groups living in this autonomous area, while the Chairman of each Autonomous Region, the Governor of each Autonomous Prefecture and the Magistrate of each Autonomous County are citizens from the autonomous ethnic groups.

China has 34 Provincial administrative divisions, including 4 direct-controlled Municipalities (Beijing, Shanghai, Tianjin and Chongqing), 23 Provinces such as Hebei, Shanxi and Taiwan, 5 Autonomous Regions for ethnic groups (Tibet, Xinjiang, Inner Mongolia, Guangxi and Ningxia), and 2 special administrative regions (Hongkong and Macao). The Central People's Government, namely the State Council, consists of 25 Ministries concerning various sectors of national economy and social activities, such as foreign affairs, civil defense, finance, trade, education, science and technology, health, and culture. Local Administrations at various levels, namely Local People's Governments at various levels, are the executive agencies of state power organs at corresponding levels. The system of Provincial governor responsibility, Municipality mayor responsibility, County magistrate responsibility, district chief responsibility, township head responsibility and town mayor responsibility is executed at People's Governments at various levels. The autonomous organs in autonomous ethnic areas include the People's Congress and People's Government of each Autonomous Region, Autonomous Prefecture and Autonomous County.

1.5 National Economy

The current standard used in China for classifying national economic sectors is basically the "International Standard Industrial Classification of all Economic Activities" recently revised by the United Nations in 2008 (ISIC4), in which adjustments and modifications have been made in terms of category 0, category 1, category 2 and category 3 based on the status and prospects of recent years' economic development. The statistical classification of national economic sectors in China is usually conducted based on traditional industrial classification, i.e., primary industry, including agriculture, forestry, animal husbandry and fishing, of which production of consumable products or industrial raw materials is based on natural force without further processing, collectively referred to as agriculture; secondary industry, including industry and construction for processing the products from both the primary and secondary industries, specifically the mining, manufacturing and production and supply of power, heat, gas and water, collectively referred to as industry; tertiary industry, namely the other

industries other than the primary and secondary industries, including traffic and transport, storage and postal service, information transmission, computer service and software industry, wholesale and retail industry, accommodation and catering, finance, real estate industry, rental and business services, scientific research, technology service, geological exploration, water, environment and public installations management industry, residents service and other services, education, health, social security and social welfare industry, culture, sports and entertainment, public management, social organization and international organization.

The operation of national economic sectors in China is summarized in Table 1.1. The secondary industry, mainly industrial manufacturing, contributes the highest percentage of GDP (46.6%); the tertiary industry, composed by various types of social services, also contributes a high percentage of GDP (43.4%); while the primary industry represented by agriculture accounts for only 10% GDP.

Table 1.1 Overview of National Economic Sectors (2011)

Economic Sectors	Number of Employees (10,000p)	Major Products in Each Sector	Contribution to GDP (%)	GDP (0.1bn yuan)	5-year Growth Rate (%)
Primary Industry	26594	Agricultural, forestry, animal husbandry and fishing products	10	47486.2	65.88
Secondary Industry	22544	Various types of manufactured industrial products and energy and resource products	46.6	220412.8	75.17
Tertiary Industry	27282	Traffic, transport and related services	43.4	204982.5	84.09
Total	76420		100	472881.6	

(Source of data: National Bureau of Statistics, "2012 China Statistics Yearbook", China Statistics Press, 2012)

Regional operation of agriculture and industry sectors in China's economy is shown in tables 1.2 and 1.3, respectively, in which: North China includes Beijing, Tianjin, Hebei, Shanxi and Inner Mongolia; Northeast area includes Liaoning, Jilin and Heilongjiang; East China includes seven: Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi and Shandong; South China includes six Provinces: Henan, Hubei, Hunan, Guangdong, Guangxi and Hainan; Southwest includes Chongqing, Sichuan, Guizhou, Yunnan and Tibet; Northwest includes five: Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang. Overall, China's industrial and agricultural production is mainly located in the eastern region, in which food production is mainly in the Northeast, North and South, cash crops mainly in the southern region, while industry sectors are relatively concentrated in the East, South and North China.

Table 1.4 shows the operation of industrial enterprises and practitioners in industry sector in China, as can be seen, raw chemical materials and chemical products manufacturing plays an important role in the national economy, accounting for 7.2% of GDP.

Table 1.2 Breakdown of Agricultural Production by Region in China (2011)

Regions	Major Products	Total Value of Crop (0.1bn)	Total Number of Employees (10,000p)	Size of Productive Areas (1,000ha)
North China	Grain, dairy and livestock products such as wool	9020.57	38.11	20451.60
Northeast	Crops such as grains	9132.29	136.73	21590.90
East China	Fruits, oilseeds, meat, eggs and fish	23894.54	39.94	38187.40
South China	Grain, oil, hemp, sugar cane, silkworms, fruit, timber and other forestry products and meats, honey, aquatic products, etc.	23689.90	52.89	42077.00
Southwest	Sugar cane, tobacco, rubber, aleurites fordii seeds, etc.	9779.38	19.91	24908.80
Northwest	Cotton, sugar beets, sheep wool, etc.	5787.24	71.94	15067.40

(Source of data: National Bureau of Statistics, "2012 China Statistics Yearbook", China Statistics Press, 2012)

Table 1.3 Breakdown of Industrial Production and Mining by Region in China (2011)

Regions	Main Products and Minerals Mined	Total Value of Production (0.1bn)	Number of Employees (10,000p)	Number of Industrial/Mining Installations
North China	Coke, pig iron, crude steel, etc.	108863.82	958.88	28179
Northeast	Crude oil, cement, etc.	70208.9	642.66	25449
East China	Chemical raw materials, home appliances, electronic products, etc.	367310.44	3811.23	156870
South China	Finished sugar, cement, etc.	210613.28	2726.31	85147
Southwest	Natural gas, crude salt, etc.	55707.79	702.97	22021
Northwest	Crude oil, natural gas, etc.	31564.55	325.23	7943

(Source of data: National Bureau of Statistics, "2012 China Statistics Yearbook", China Statistics Press, 2012)

Table 1.4 Breakdown of Industrial/Mining Installations and Practitioners in China (2011)

Economic Sectors	Total Value of Production (0.1bn)	Number of Industrial/Mining Installations	Number of Employees (10,000p)	Percentage in Total Value of Production (100%)
Coal mining and washing preparation	28919.81	7695	520.98	3.43
Agricultural by-products processing	44126.1	20895	360.71	5.23
Food production	14046.96	6870	176.86	1.66
Beverage production	11834.84	4874	136.76	1.40
Textile	32652.99	22945	588.83	3.87
Leather, fur, feather (down) and its products	8927.54	6081	259.75	1.06
Papermaking and paper products	12079.53	7073	146.75	1.43
Petroleum processing, coking and fuel processing	36889.17	1974	96.12	4.37
Raw chemical materials and chemical products manufacturing	60825.06	22600	454.86	7.20
Pharmaceutical manufacturing	14941.99	5926	178.6	1.77
Non-metallic mineral products	40180.26	26530	517.03	4.76
Black metal smelting and rolling processing	64066.98	6742	339.92	7.59
Non-ferrous metal smelting and rolling processing	35906.82	6765	192.62	4.25
Metallic products	23350.81	16573	311.51	2.77
General equipment manufacturing	40992.55	25877	494.52	4.86
Transportation equipment manufacturing	63251.3	15012	579.48	7.49
Electricity and heating production and supply	47352.67	5287	252.6	5.61
Gas production and supply	3142.03	875	19.86	0.37
Water production and supply	1178.11	1153	36.63	0.14

Total	844268.8	325609	9167.29	100

(Note: industrial enterprises with annual main business income ≥RMB20,000,000. Source of data: National Bureau of Statistics, "2012 China Statistics Yearbook", China Statistics Press, 2012)

1.6 Releases of Concern by Major Economic Sectors

According to the first national survey of pollution installations, China's major pollutants from major sectors in 2007 are shown in Table 1.5. As can be seen, higher air pollutant emissions come from the chemical industry where raw chemical materials and chemical products are manufactured.

Table 1.5 Releases of Pollutants by Major Economic Sectors

Economic	Related Activities	COD (10,000t)	NH (10,000t)	Oils (10,000t)	Heavy Metal (10,000t)	TP (10,000t)	TN (10,000t)	SO_2 (10,000t)	Smoke (10,000t)	NOx (10,000t)	Volatile Phenol (t)	Dust (10,000t)
Industrial Sector	Coal mining and washing preparation			0.46								
	Agricultural by-products processing	117.42	1.79						26.29			
	Food production	22.54	1.12									
	Beverage production	51.65	1.49									
	Textile	129.60	1.60									
	Leather, fur, feather (down) and its products		1.49									
	Timber processing and wood, bamboo, vine and straw products manufacturing											55.72
	Papermaking and paper products	176.91							29.83		346.04	
	Petroleum processing, coking and fuel processing		2.57	0.57				65.30		29.80	5110.68	59.51
	Raw chemical materials and chemical products manufacturing	60.21	13.16	0.66				130.15	78.81	41.98	861.82	
	Pharmaceutical manufacturing	21.93										
	Non-metallic mineral products							269.44	271.68	201.24		222.18

	Black metal smelting and rolling processing			0.90				220.67	97.73	81.74	717.72	193.92
	Non-ferrous metal smelting and rolling processing		3.13					122.04				
	Metallic products			0.64								
	General equipment manufacturing			1.25								
	Transportation equipment manufacturing			0.75								
	Electricity , gas and water production and supply							1068.70	314.62	733.38	194.41	
	Subtotal	564.36	20.76	5.54	0.09			2119.75	982.01	1188.44	7000	764.68
Agricultural	Crop production					10.87	159.78					
	Poultry and livestock cultivation	1268.26				16.04	102.48					
	Culture fishery	55.83				1.56	8.21					
	Subtotal	1324.09				28.47	270.46					
Domestic		1108.05	148.93	72.62		13.80	202.43	199.40	183.51	607.85		
Total		**3028.96**	**172.91**	**78.21**	**0.09**	**42.32**	**472.89**	**2320.00**	**1166.64**	**1797.70**		

(Source of data: MEP, “Bulletin of the First National Survey of Pollution Installations”, released on February 6, 2010)

1.7 Assessment

China is a vast territory with a large population and rapid industrialization development in the world, and chemical industry and its related industries has a significant share in the national economy. In China, the large scale and continued growth of industrial and agricultural production, trade and residents consumption is facilitating the flourishing development of chemical industry, with numerous chemical producers and processing installations distributed extensively and the frequent storage, transport, trading and circulating of chemicals, and the chemical application activities and chemical products have infiltrated into all aspects of economic sectors and social activities, which has brought a significant challenge for sound chemicals management in control of chemical-related environmental and health risks.

The vigorous government management system, the steadily progressing industry structure adjustment and technology upgrading, as well as the continuously strengthening environmental protection policies and management measures, have been providing significant basis and beneficial conditions for sustainable improvement of national chemicals management system. In recent years, Chinese government has been unceasingly strengthening the chemicals management regulations and actively conducting chemical-related international convention implementation activities, meanwhile, the chemical sectors have also been promoting “Environment, Health & Safety” (EHS) and “Responsible Care” (RC) actions, as a result, all sectors of the society have been experiencing higher level of recognition of and research on chemical risks and higher awareness of risks management (See the later chapters).

Nevertheless, as a developing country and a major producer and consumer of chemicals in the world, China is facing a more complicated situation than any other country in terms of economy, technology and management, and the realization of sound chemicals management in accordance with the strategic and sustainable development shall remain a tremendously challenging task demanding for endless efforts.

Chapter 2: Chemical Production, Import, Export, Storage, Transport, Use, and Disposal

2.1 Overview of Chemical Industry Development

China's chemical industry is in fact a basic raw material industry, an important industry for producing pesticides, organic and inorganic basic materials, synthetic materials, refined and specialized chemicals and for providing basic raw materials and matching products to various sectors, so it plays an extremely important role in economic construction and people's life. After having experienced a continuous average annual growth rate of 20% or above during the past decade, China's chemical industry has developed into an industry system with certain scale and basis and including over 20 sub-industries such as chemical mining, chemical fertilizers, inorganic chemicals, soda ash, chlor-alkali, basic organic chemicals, pesticides, dyestuff, paints, fine chemicals, rubber processing and new materials, in which the main sub-industries are fully developed with necessary varieties.

According to the statistics conducted by CPCIF, the total national production of chemicals in 2012 was about 0.46bn tons. The production of fertilizers, pesticides and synthetic fibers has been increasing significantly. China's bulk production of over 20 types of products such as nitrogen fertilizer, phosphate fertilizer, soda ash, caustic soda, sulfuric acid and methanol, as well as the consumption of major chemical products, is ranking top in the world.

Table 2.1 shows the industry structure of China's chemical sectors and installations. According to statistics provided by the National Bureau of Statistics, in 2012, China's chemical industry has had 24347 installations above designated scale[1] and 5,124,000 practitioners, the annual total output value has reached 7.2 trillion yuan, and the added valued contributed by chemical industry accounts for 7.0% of that contributed by national above-designated-scale industries. The operation of chemical installations is illustrated in Figure 2.1, the number of above-designated-scale chemical installations in North, Northeast, East, South, Southwest and Northwest China respectively account for 9%, 7%, 51%, 23%, 7% and 3% of total number of above-designated-scale chemical installations, in particular, chemical industry is relatively more concentrated in the following seven Provinces: Hebei, Liaoning, Jiangsu, Zhejiang, Shandong, Henan and Guangdong, of which each has over 1,000 above-designated-scale chemical installations.

Table 2.1 Breakdown of Chemical Sectors and Installations (2012)

[1] According to the national statistics, above-designated-scale installations with annual main business income larger than 20,000,000 yuan are included.

Chemical Sectors	Number of Installations	Total Output Value (10,000yuan)
Subtotal of Chemical Sectors	24347	720356585
Chemical mining	287	5230375
Basic raw chemical material manufacturing	5666	192512152
Fertilizer manufacturing	2203	80470368
Pesticides manufacturing	804	24401810
Paints, inks, dyestuff and similar products manufacturing	3040	48116402
Synthetic material manufacturing	2569	130454465
Special-use chemical products manufacturing	6431	155512730
Rubber products manufacturing	3347	83658282
Special-use equipments manufacturing	1290	29887292

Source of data: NBS, 2012

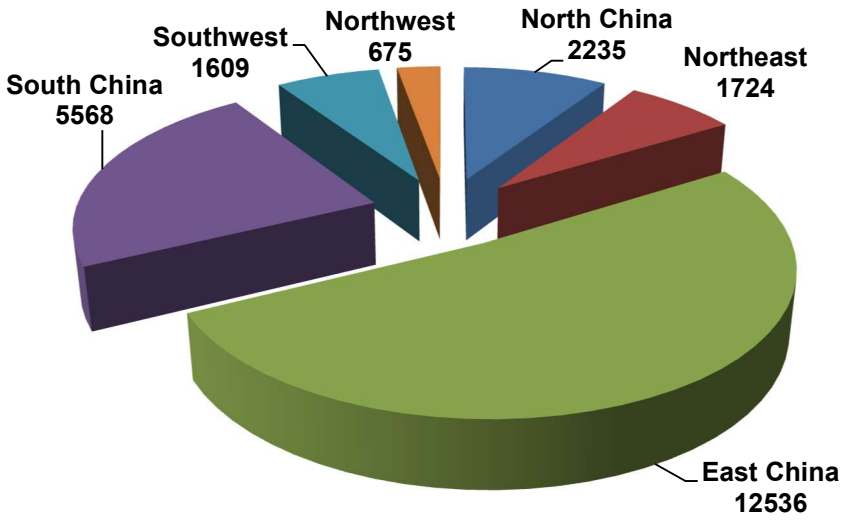

Figure 2.1 Breakdown of Chemical Installations by Region in China

(Source of data: CPCIF, 2012)

2.2 Chemical Production

In 2012, the national chemical production was about 0.46bn tons, including 74,324,000t fertilizers (converted to pure, same as below), 3,549,000t primary pesticides (converted to 100%), 14,868,000t ethane, 26,405,000t methanol, 76,366,000t sulfuric acid, 26,988,000t caustic soda, 18,692,000t calcium carbide, 10,945,000t chemical agents, 52,133,000t synthetic resin, 22,081,000t synthetic fiber monomer, 0.892bn pieces of cover tires. The breakdown of chemical production in 2012 is shown in Table 2.2.

Table 2.2 Breakdown of Chemical Production by Type (2012)

(unit: 10,000t)

Type	Number of Installations	Current Year	Previous Year	Year-on-Year Increase/Decrease ±%
Ammonia (anhydrous ammonia)	366	5458.9	5040.2	8.3
Fertilizer Total (converted to pure)	763	7432.4	6702.9	10.9
Nitrogen fertilizer (converted to 100% content N)	504	4946.6	4445.0	11.3
Urea (converted to 100% content N)	172	3003.8	2636.9	13.9
Phosphate fertilizer (converted to 100% content P_2O_5)	306	1955.9	1766.3	10.7
Potassic fertilizer (converted to 100% content K_2O)	67	529.9	491.5	7.8
Monoammonium phosphate (physical)	91	1454.8	1263.7	15.1
Diammonium phosphate (physical)	54	1570.8	1317.9	19.2
Primary pesticides (converted to 100% effective ingredients)	312	354.9	298.2	19.0
Primary insecticides (converted to 100%)	142	81.3	92.4	-12.0
Primary fungicides (converted to 100%)	65	14.4	15.5	-7.1
Primary herbicide (converted to 100%)	98	164.8	115.6	42.5
Sulphuric acid (converted to 100%)	438	7636.6	7286.5	4.8
Hydrochloric acid (incl. HCl content ＞31%)	187	876.4	839.4	4.4
Concentrated nitric acid (converted to 100%)	29	262.5	246.9	6.3
Sodium hydroxide (caustic soda) (converted to 100%)	203	2698.6	2600.1	3.8
Ion-exchange membrane caustic soda (converted to 100%)	152	2297.0	2109.9	8.9
Soda ash (sodium carbonate)	54	2403.9	2254.2	6.6
Monocrystal silicon	119	3.89	4.25	-8.7
Polycrystal silicon	66	11.56	11.82	-2.3
Calcium carbide (converted to 300L/kg)	311	1869.2	1710.7	9.3
Ethene	28	1486.8	1524.5	-2.5
Pure benzene	103	662.6	691.0	-4.1
Extract methanol	192	2640.5	2294.5	15.1
Glacial acetic acid	25	430.3	424.5	1.4
Paints	1034	1271.9	1137.7	11.8
Chemical agent	519	1094.5	928.1	17.9

Synthetic resin and copolymer	733	5213.3	4941.2	5.5
Polyvinyl resin	83	1030.0	1015.2	1.5
Acrylic resin	117	1121.6	995.6	12.7
Polyvinyl chloride resin	102	1317.8	1311.2	0.5
Polystyrene resin	23	210.1	205.3	2.3
ABS resin	25	105.7	102.6	3.0
Synthetic rubber	121	378.6	353.6	7.1
Synthetic fiber monomer	51	2208.1	1993.7	10.8
Synthetic fiber copolymer	129	1561.5	1441.6	8.3
Polyester	75	1140.1	1110.0	2.7

Source of data: NBS, 2012

2.3 Chemical Import and Export

In 2012, China's net import of organic chemicals was 24,631,000 tons, the net import of synthetic resin reached 27,611,000 tons, and 40% of synthetic fiber monomers relied on import. Table 2.3 shows the national import and export of major chemicals.

Table 2.3 National Statistics of Import and Export by Major Petroleum and Chemical Sectors (2012)

(unit: 10,000t, $10,000)

Sectors and Products	Import		Export	
	Tons	Value	Tons	Value
Chemical products Subtotal	—	18072941	—	13993030
Inorganic chemicals	—	974772	—	1387297
Organic chemicals	3521.4	4835372	1058.3	3406765
Fertilizer (physical)	842.6	404715	1814.1	734210
Fertilizer (converted to pure)	450.6		757.9	
Pesticides	6.8912	59204	89.74	285985
Synthetic resin	3139.1	4876124	378.1	840435
Synthetic rubber	145.0	512961	22.2379	72693
Synthetic fiber monomer	1463.3	1709496	2.7265	4448
Synthetic fiber copolymer	117.3	378323	160.3	277662
Rubber products	—	987086	—	4387374
Paints, inks and dyestuff	74.5	416080	171.7	547168
Special-use chemicals	—	2058257	—	1702395
Chemical minerals	1228.9	249517	621.4	125262
Other chemical products	145.6	611032	204.8	221335

Specialized equipments (10,000 set)	1140.7	631600	13734.0	625505

Source of data: NBS, 2012

2.4 Chemical Use

In 2012, the national total apparent consumption[2] of major chemicals was about 0.43bn tons, while the total apparent consumption of major products by chemical sectors is shown in Table 2.4.

Table 2.4 Statistical Apparent Consumption of Major products by Chemical Sectors (2012)

(unit: 10,000t)

Category	Production	Import	Export	Apparent Consumption
Sulphuric acid (converted to 100%)	7636.6	104.7	8.1	7733.2
Nitric acid (converted to 100%)	262.5	4.8	1.4	265.9
Hydrochloric acid	876.4	1.5	1.0	876.9
Chlor-alkali (converted to100%)	2698.6	1.1	207.9	2491.9
Soda ash	2403.9	3.1	171.5	2235.6
Calcium carbide	1869.2	0.0	15.8	1853.4
Ethene	1486.8	142.2	0.0	1629.0
Pure benzene	662.6	43.9	4.9	701.6
Methanol	2640.5	500.1	6.7	3133.9
Synthetic resin	5213.3	3139.1	378.1	7974.3
Synthetic rubber	378.6	145.0	22.2	501.4
Synthetic fiber monomer	2208.1	1463.3	2.7	3668.7
Polyester	1140.1	20.7	136.9	1023.8
Fertilizer production (converted to pure)	7432.4	450.6	757.9	7125.1
Primary pesticides (converted to 100%)	354.9	6.9	89.7	272.1
Paints	1271.9	18.1	17.0	1272.9
Pigments	—	33.8	116.4	
Dyestuff	—	18.8	33.3	
Inks	—	3.8	4.9	

Source of data: NBS, 2012

[2] Apparent consumption = domestic production + import + export.

2.5 Chemical Storage

China's large-scale oil refinery and chemical projects have almost been equipped with petrochemical storage and logistic installations; world class chemical logistic parks have been built around the chemical parks and ports in Yangtze River Delta, Pearl River Delta and Bohai area where chemical sectors are densely located. In Shanghai, Tianjin, Sichuan and other regions, a number of hazardous chemical trading markets have been established where qualified large-scale enterprise can conduct centralized trading, targeted stocking and uniform operation. Large cities such as Beijing, Shenzhen and Changsha have shut down the hazardous chemical warehouses in downtown area and relocated them to safer zones around the city.

There are lots of China's legal instruments regulating storage of hazardous chemicals, include "Production Safety Law of the People's Republic of China", "Regulation on the Safety Management of Hazardous Chemicals", "Emergency Plan for Hazadous Chemical Accidents and Disasters" and "Regulations on Safe Use of Chemicals in Workplace". A number of national standards have been also in place for classification and labeling of stored hazardous chemicals: "Rule for Storage of Chemical Dangers" (GB 15603-1995), "Specifications for Storage and Preservation of Combustible and Explosive Goods" (GB 17914-1999), "Specifications for Storage and Preservation of Corrosive Goods" (GB 17915-1999), "Specifications for Storage and Preservation of Toxicant Goods" (GB 17916-1999) and "Safety Signs and Guidelines for Use" (GB2894-2008). Until now, China has not established a system of detailed statistical information on chemical storage installations.

2.6 Chemical Transport

In China, the bulk chemicals include pesticides, fertilizers, petroleum products, industrial chemicals, consumer chemicals and solid waste, whose means for transport are mainly railway, waterway and land transport, but no statistics are available concerning the transportation volume.

With the reference to "International Maritime Dangerous Goods Code" (IMDG Code), China has promulgated the "Waterway Dangerous Goods Transportation Code" for regulating the labeling of ship transported hazardous chemicals. Under the "Globally Harmonized System of Classification and Labeling of Chemicals" (GHS), China has formulated the "General Rules for Preparation of Precautionary Label for Chemicals" (GB15258-2009). In addition, China has published the "General Rule for Classification and Hazard Communication of Chemicals" (GB13690-2009); as to the labeling of pesticides, the "Measures for the Administration of Pesticide Labels and Manuals" shall be carried out.

2.7 Chemical Waste Management

In China, the management of discarded chemicals is mainly conducted in the way of hazardous waste management. China has promulgated the "Law of the People's Republic of China on the Prenention and Control of Environmental Pollution by Solid Waste" as well as a series of sector-related rules for hazardous waste notification, transfer manifestation, operation licensing and classified

disposal, including the "Measures for the Prevention and Control of Environment Pollution by Discarded Dangerous Chemicals" specially formulated for discarded and hazardous chemicals, as shown in Table 3.1 in Chapter 3.

Large variety and quantity of hazardous waste have been generated by a wide range of industries. As shown in 2012 "China Statistical Yearbook", in 2011, China produced 3,227,723,400 tons of industrial solid waste, including 34.3122 million tons of hazardous waste, of which 17.7305 million tons has been used comprehensively and 9.1648 million tons has been disposed, and 8.2373 million tons has been stored, as shown in Table 2.7. As of 2010, the national capacity for annual disposal of hazardous waste by licensed installations has reached 23.25 million tons, including a capacity of 590,000 metric tons annual disposal of medical waste. As planned in the "National Construction Plan for Hazardous Waste and Medical Waste disposal Installations", 23 centralized hazardous waste disposal installations and 215 centralized medical waste disposal installations have been built respectively. Table 2.8 is a list of some centralized hazardous waste disposal installations.

Other than those centralized hazardous waste treatment and disposal installations planned by the State, industrial enterprises, industrial parks and mines which may produce massive hazardous waste have also built hazardous waste treatment and disposal installations. For example, according to the "Design Specification for Environmental Protection Enterprise use in Petrochemical Industry" (SH3024-1995), "an isolation-type discarded goods disposal facility should be designed for disposal of highly toxic residues (liquids) such as mercury, cadmium, organic chloride and so on", therefore, some of China's petrochemical enterprises have built their own landfill installations.

Table 2.7 Solid Waste Treatment and Reuse by Regions (2011)

(unit: 10,000t)

Regions	Generation of Industrial Solid Waste	Generation of Hazardous Waste	Comprehensive Utilization of Hazardous Waste	Disposal of Hazardous Waste	Storage of Hazardous Waste
National	322772.34	3431.22	1773.05	916.48	823.54
Beijing	1125.59	11.92	5.05	6.86	
Tianjin	1752.22	10.27	3.09	7.18	
Hebei	45128.51	52.04	33.27	18.79	
Shanxi	27555.90	22.21	18.06	4.11	0.04
Inner Mongolia	23584.11	111.88	54.43	49.93	11.65
Liaoning	28269.61	78.49	59.86	25.30	0.09
Jilin	5378.59	90.04	60.13	29.90	0.03
Heilongjiang	6016.68	19.56	3.70	15.16	0.73

Shanghai	2442.20	56.36	30.13	26.01	0.34
Jiangsu	10475.50	188.94	95.29	93.33	1.01
Zhejiang	4445.75	78.47	31.83	46.08	1.31
Anhui	11473.25	24.28	21.27	2.95	0.19
Fujian	4414.89	10.31	4.38	5.71	0.27
Jiangxi	11372.43	23.24	17.89	5.20	0.19
Shandong	19532.59	937.84	657.52	290.96	0.26
Henan	14573.83	47.62	39.42	7.05	1.37
Hubei	7595.79	40.53	26.85	20.85	0.32
Hunan	8486.74	246.68	194.38	44.22	23.15
Guangdong	5848.91	126.79	70.20	56.91	0.46
Guangxi	7438.11	22.94	13.49	5.71	7.44
Hainan	420.76	0.71	0.12	0.52	0.07
Chongqing	3299.18	46.50	5.64	43.61	0.51
Sichuan	12684.47	115.85	77.97	46.75	1.12
Guizhou	7598.24	38.89	12.95	1.05	25.69
Yunnan	17335.30	134.10	87.74	19.51	27.05
Tibet	301.39				
Shaanxi	7117.63	33.15	17.32	9.86	6.06
Gansu	6523.79	24.68	10.88	17.92	8.06
Qinghai	12017.17	355.98	56.36	6.10	298.06
Ningxia	3344.12	10.81	9.81	0.64	0.36
Xinjiang	5219.09	470.14	54.01	8.33	407.91

Source of data: China Statistical Yearbook, 2012

Table 2.8 Some of China's Centralized Hazardous Waste Disposal Installations

Name	Description	Treatment Mode*	Treatment Capacity
Gansu Province Hazardous Waste	Rotary kiln incineration device, obsolete halogenated organic solvents recycling and comprehensive utilization facility,	1) D10 2) R2 3) R4	1) Annual disposal of hazardous waste by rotary kiln incineration plant: 4950t/a; 2) Annual treatment of hazardous waste by obsolete halogenated organic solvents

disposal Center	waste battery recycling and comprehensive utilization facility, hazardous waste stabilization/solidification treatment device, safe landfill	4) D1	recycling and comprehensive utilization facility: 1,200t/a; 3) Annual treatment of discarded lead-acid batteries by waste battery recycling and comprehensive utilization facility: 5,000t/a; annual storage of discarded nickel batteries: 400t/a, pre-reserved room for annual treatment of discarded lead-acid batteries: 5,000t/a; 4) Safe landfill, total capacity: 326,000m^3
Kunming Hazardous Waste disposal Center	High-temperature incineration plant, laboratory analysis center, comprehensive utilization workshop, physico-chemical treatment plant, wastewater treatment plant, stabilization/solidification treatment workshop, safe landfill	1) D10 2) D9 3) D1	1) Annual treatment by high-temperature incineration plant: 9,000t/a; 2) Annual treatment by physico-chemical treatment plant: 10,000t/a; 3) Annual treatment by safe landfill: 10000t/a, total capacity: 250,000m^3
Yichang Hazardous Waste disposal Center	Physico-chemical treatment system, incineration system, sewage treatment plant, safe landfill	1) D9 2) D10 3) D1	1) Annual treatment of hazardous waste (including medical waste) by incineration system: 3,653.1t/a; 2) Annual treatment of hazardous waste by physico-chemical treatment system: 3,300t/a; 3) Annual treatment by safe landfill: 9,004t/a

* D1: Placed under or on the ground (such as landfill); D9: Physico-chemical treatment not specified in the annexes of the "Basel Convention", and final compounds or mixtures generated by above to be disposed according to any disposal means listed in Section A of "Basel Convention" (Annex IV), for example, evaporation, drying, incineration, neutralization, and precipitation; D10: Land incineration; R2: solvent recycling/regeneration; R4: recycling/recovery of metals and metal compounds.

2.8 Hazardous Chemical By-products

In China, the release of dioxins is mainly from steelmaking, non-ferrous metal smelting and waste incineration. In order to implement the "Stockholm Convention" for reduction and control of dioxins release, MEP has continuously conducted survey on pollution source for many years, at the same time, it has promulgated the "Directive Opinion on Strengthening Prevention and Control of Dioxins Pollution" jointly with nine Ministries and commissions, and it has also published with 12 Ministries the "National '12th Five-Year' Plan on Prevention and Control of Persistent Organic Pollutants from Main Industries", mainly about the control and reduction of dioxins release. In addition, each provinces has also formulated their own dioxins reduction and control plan. The national situation of dioxins pollution source has been basically grasped, while the intensity and total quantity of dioxins release has been preliminarily under control.

2.9 Assessment

Over the past 10 years, China's chemical industry output value has increased at an average annual rate 25% or more. According to the OECD prediction, from 2012-2020, the world's chemical industry growth will come mainly from developing countries, dominated by China at the rate of 66% (GEO, 2012). China's chemical production in large scale makes it a leading producer in the world, however, as a developing country, China's chemical production technology is at a low level. At present, Chinese chemical products are still dominated by low-end and common varieties, which the output of basic chemicals such as caustic soda and sulfuric acid as well as general industrial and agricultural chemicals such as fertilizer, pesticides, dyestuff and synthetic fibers ranks first in the world, on the other hand, proportion of high-end products is low, core technologies with intellectual property rights is also in need, and technological innovation is not strong. In addition, technology and management level of processing, use and environmentally sound disposal of chemicals need to be improved.

China has a large number of enterprises producing and using chemicals, extensively distributed in the vast land and rapidly changing with the fast market change, which presents China certain challenge for gathering basic information on production and use of chemicals. At present, the basic information on production, use, import and export of chemicals relies largely on the annual national economic statistics provided by National Bureau of Statistics, which covers only information on bulk chemicals, while production, use, import and export of most non-bulk chemicals, especially industrial and agricultural refined chemical products still lacks of efficient information-gathering mechanisms. At the same time, dedicated and reliable statistical data is still in need for chemical storage, transport and disposal.

Release of chemicals from hazardous chemical production, use and transport installations in daily operation or emergency incidents may cause adverse impact on human health and ecological environment, China has established a series of comparatively strict risks management systems focused on occupational safety and environmental protection related to hazardous chemicals as in abovementioned processes, such as safety assessment and safety supervision, environmental impact evaluation and environmental monitoring, major hazard source management and emergency planning (see Chapter 3), so as to strictly control health and environmental risks potentially caused by hazardous chemicals. However, due to large magnitude of chemical enterprises, including a considerable number of small and medium enterprises (SMEs) and even micro-enterprises, the overall level of the practitioners' safety and environmental awareness as well as their capability is fairly low, results in that production incidents and environmental pollution occurrences are still frequent. At the same time, Chinese farmers' knowledge and capability about safe use of agro-chemicals (such as pesticides) and environmental protection still need to be improved, therefore, health and environmental problems caused by pesticides deserve certain attention.

In recent years, China has been continuously strengthening the construction of hazardous waste disposal installations, and the environmentally sound disposal of waste chemicals has been improved gradually. As a party to the "Basel Convention" and an active participant, China has paid a lot attention

to the strict control of transnational movement of hazardous waste.

The existing main problems in chemical production, import, export, storage, transport, use and disposal, as well as priorities for action, are listed in Table 2.9.

Table 2.9 Priority Issues and Possible Actions: Chemical Production, Import, Export, Storage, Transport and Use

Priority Issues	Level of Existing Capacity	Capacity Gaps and Needs	Possible Actions	Concerned Actors
Level of chemical industry production and application technology and innovation capability	Low	Backward chemical production and application technology, high yield of basic chemicals, small yield of high-end and high-value-added chemicals, weak capability in technology innovation	Facilitate the adjustment and upgrading of industry structure, eliminate backward production capacity, push forward industry technology progress, strictly control admission to chemical parks, promote the development of a green, low-carbon and safe chemical industry	NDRC, SAIC, MEP, governmental institutions at various levels, chemical industry associations and enterprises
Capacity of chemical industry basic information collection	Medium	Lack of efficient information-gathering mechanisms for non-bulk chemicals' industrial and agricultural production, use, import and export; lack of reliable statistical data on storage, discard and land transport of chemicals	Establish and improve the chemical industry statistical system and mechanisms, including enterprise reporting system and information exchange platform; strengthen information statistics on chemical storage, transport and discard.	NDRC, SAIC, MEP, MOT, Firefighting Department of MPS, governmental institutions at various levels, chemical industry associations and enterprises
Safety and environmental protection awareness and capability of hazardous chemical production, use, storage and transport installations	Low	Frequent occurrences of hazardous chemical safe production incidents and environmental pollution accidents, urgent need of enterprises for improvement of safety and environmental protection awareness and capacity	Strengthen the training of safety and environmental protection awareness and capacity improvement as well as the supervision on chemical production, use, storage and transport enterprises	SAIC, SAWS, MEP, MOT, governmental institutions at various levels, chemical industry associations and enterprises

Knowledge on and capacity of pesticides and other agro-chemicals' safe use and environmental protection	Low	Farmers' lack of knowledge on health and environmental problems caused by pesticides and other agro-chemicals and the lack of prevention awareness and capability	Strengthen farmers ' training in safe and rational use of pesticides and other agro-chemicals for protecting health and the environment	MOA, MEP, MOH, governmental institutions at various levels, chemical industry associations and enterprises

Chapter 3: Legal Instruments and Non-Regulatory Mechanisms for the Sound Management of Chemicals

3.1 Overview of Legal Instruments which Address the Management of Chemicals[3]

China's chemicals management legislation involves various areas such as economy and industry, circulation trade , product quality, occupational safety, agriculture, public health and environmental protection, it is composed of a series of laws, regulations, rules and standards. According to the features of chemicals management system in China as well as the regulation classes, Table 3.1 summarizes the laws, regulations and rules (excluding standards and codes) themed on or directly related to chemicals management in China, basically following these aspects: industrial chemicals management, agricultural chemicals management, toxic or particular hazard chemicals management, chemicals environmental management, as well as chemical production, circulation, use and disposal. (laws, regulations and rules indirectly related to chemicals management shall be described in Section 3.5). China has established a series of standards matching the laws, regulations and rules listed in Table 3.1, these standards involve hazardous chemical classification, storage, transport, packaging and labeling, chemical pollutants release, hazardous waste disposal, pesticides management, food safety and other aspects, some of the important standards and codes shall be described in Section 3.4.

Table 3.1 China's Chemicals Management Laws, Regulations and Rules

Legal Instrument	Responsible Ministries or Bodies	Category of Chemicals, Type of By-product or Type of Related Waste	Chemical Life Cycle Stage Covered	Objective of Legal Instrument
"Regulations on the Safety Management of Hazardous Chemicals" (regulation, 2011 rev.)	SAWS (State Administration of Work Safety), MIIT (Ministry of Industry and Information Technology), MPS (Ministry of Public Security), AQSIQ (General Administration of Quality Supervision, Inspection and	Hazardous chemicals	Production, operation, use, storage, transport, disposal and incident rescue	To strengthen safety management of hazardous chemicals, prevent and reduce hazardous chemicals incidents, guarantee people's life and property safety, and protect the environment.

[3] According to chemicals management practices, chemicals covered in management regulations in this Chapter include all types of industrial chemicals, agrochemicals and consumer chemicals, excluding pharmaceuticals.

	Quarantine), MEP (Ministry of Environmental Protection), NHFPC (National Health and Family Planning Commission), MOT (Ministry of Transport), MOA (Ministry of Agriculture), SAIC (State Administration of Industry and Commerce), SPB (State Post Bureau)			
"Regulations on Pesticide Administration" (regulation, 2001 rev.)	MOA, NDRC (National Development and Reform Commission), MIIT, AQSIQ, NHFPC, MEP	Pesticides, hygienic insecticides	Production, use, import and export	To strengthen the supervision on production, operation and use of pesticides, guarantee the quality of pesticides, protect the agriculture, forestry and environment, and to maintain human and animal safety.
"Regulations on Labor Protection in Workplaces Where Toxic Substances Are Used" (regulation, 2002)	NHFPC, SAWS	Toxic chemicals	Use	To ensure the safe use of toxic substances in workplace, prevent, control and eliminate occupational poisoning hazards, and to protect workers' safety, health and related rights and interests
"Regulations on the Administration of Precursor Chemicals" (regulation, 2005)	MPS, CFDA (China Food and Drug Administration), SAWS, MOC (Ministry of Commerce), NHFPC, GAC (General Administration of Customs) etc.	Precuror chemicals	Production, operation, transport, import and export management	To strengthen the management of precursor chemicals, regulate the production, operation, purchase, transport, import and export behavior of precursor chemicals, prevent the manufacture of drugs by using precursor chemicals, and to maintain the economic and social order.
"Regulations of the Peoples Republic of China on	MIIT	Chemicals subjected to supervision and	Production, operation and use	To strengthen the management of chemicals subjected to supervision

Administration of Chemicals Subjected to Supervision and Control" (regulation, 2009)		control		and control, guarantee citizens' personal safety and protect the environment.
"Regulations Concerning the Hygiene Supervision over Cosmetics" (regulation, 1990)	NHFPC	Cosmetics	Production, import and operation	To strengthen the sanitary supervision on cosmetics, ensure cosmetic hygiene quality and use safety, and to guarantee consumers' health.
"Regulation on the Administration of Ozone Depleting Substances" (regulation, 2010)	MEP, MOC, GAC, AQSIQ	Ozone-depleting substances	Production, marketing, use, import and export	To strengthen the management of ozone-depleting substances, fulfill the obligations under the "Vienna Convention for the Protection of the Ozone Layer" and the "Montreal Protocol", protect the ozone layer and the ecological environment, and to guarantee human health.
"Measures Concerning Import and Export Management of Ozone Depleting Substances" (rule, 2014)	MEP, MOC, GAC	Ozone-depleting substances	Import and export	To implement the "Montreal Protocolon Substances that Deplete the Ozone Layer" and its amendments, strengthen China's management of import and export of ozone-depleting substances.
"Measures for Environmental Management of New Chemical Substances" (rule, 2010 rev.)	MEP	New chemical substances	Research, production, import, processing and use	To control environmental risks of new chemical substances, guarantee human health and protect the ecological environment, and to implement the new chemical substance notification system.
"Provisions on Import and Export Environmenal	MEP, GAC	Toxic chemicals whose import and export is	Import and export	To strengthen the import and export environmental management of toxic

Management of Toxic Chemicals" (rule, 2003 rev.)		banned or strictly restricted in China		chemicals, and to implement the prior informed consent (PIC) procedure in international trade of toxic chemicals.
"Measures for Administration of Chromium Compound Production Permits" (rule, 2010)	MIIT	Chromium compound	Production	To strengthen the management of chromium compounds production and construction permits, guarantee the citizens' lives, health and safety, protect the ecological environment, and to regulate chromium compound production and construction activities.
"Measures for the Administration of Registration of Hazardous Chemicals" (rule, 2012 rev.)	SAWS	Hazardous chemicals	Production, storage and use	To strengthen the safety management of hazardous chemicals, regulate the registration of hazardous chemicals, and to provide technical and information support for prevention of hazardous chemical incident and emergency rescue.
"Measures for the Implementation of Work Safety License of Hazardous Chemical Production Enterprises" (rule, 2012 rev.)	SAWS	Hazardous chemicals	Production	To strictly regulate the safe production conditions for hazardous chemical producers, and to regulate the issuance and management of hazardous chemical producers' safe production permits.
"Measures for the Administration of Operating License for Hazardous Chemicals" (rule, 2012 rev.)	SAWS	Hazardous chemicals	Operation	To strictly regulate the safe operation conditions for hazardous chemical, regulate hazardous chemicals management activities, and to safeguard people's life and property safety.
"Measures for Implementing the 'Regulations on	MOA	Pesticides	Production, operation and use	To ensure the implementation of the "Regulations on Pesticide

Pesticide Control' " (rule, 2007 rev.)				Control" (the "Regulations"), strengthen the supervision on pesticide registration, operation and use, promote the technology advancement of pesticide industry, ensure the stable development of agricultural production, protect the ecological environment, and to guarantee human and animal safety.
"Management Measures for the Production of Pesticides" (rule, 2005)	NDRC	Pesticides	Production	To strengthen the management of pesticide production and promote the healthy development of the pesticide industry.
"Measures for the Administration of Registration of Fertilizers" (rule, 2000)	MOA	Fertilizers	Production, operation and use	To strengthen the management of fertilizers, protect the ecological environment, guarantee human and animal safety, and to promote agricultural production.
"Data Requirement on Pesticide Registration" (rule, 2007)	MOA	Pesticides	Production, operation and use	To regulate the registration of pesticides, ensure the quality of pesticide products, promote agricultural development, and to protect the ecological environment.
"Measures for Environmental Management Registration of Hazardous Chemicals (Provisional)" (rule, 2012)	MEP	Hazardous chemicals	Production, use, import and export	To strengthen the environmental management of hazardous chemicals, prevent and reduce the hazardous chemicals' impact on environment and human health, prevent environmental risks, and to fulfill international conventions.
"Provisions on the	MOT	Hazardous	Road	To regulate the market

Administration of Road Transport of Dangerous Goods" (rule, 2012)		chemicals transported on road	transport	order of road transport of dangerous goods, guarantee people's lives and property safety, protect the environment, and to guarantee the legitimate rights and interests of the concerned parties in road transport of dangerous goods.
"Rules for the Railway Transport of Dangerous Goods" (rule, 2008)	MOT	Hazardous chemicals transported by railway	Railway transport	To ensure the safety of railway transport of dangerous goods.
"Measures for the Prevention and Control of Environment Pollution by Discarded Chemicals (rule, 2005)	MEP	Discarded hazardous chemicals	Generation, collection, transport, storage, use and disposal	To prevent and control environmental pollution by discarded hazardous chemicals.
"Measures for the Administration of Permit for Operation of Hazardous Wastes" (regulation, 2004)	MEP	Hazardous wastes	Collection, storage and disposal	To strengthen the supervision on hazardous waste collection, storage and disposal, prevent and control environmental pollution by hazardous wastes.
"Measures for the Administration of Hazardous Waste Transfer Manifests" (rule, 1999)	MEP	Hazardous wastes	In-country transfer	To strengthen the effective supervision on hazardous waste transfer.
"Interim Provisions on Environmental Protection Administration of Waste import" (rule, 1996)	MEP, MOC, GAC, AQSIQ, SAIC	Wastes to be recycled as raw material	Import and export	To strengthen the environmental management of waste import and prevent environmental pollution by waste import.
"Measures for the Prevention and Control of Environment Pollution by Electronic Wastes" (rule, 2007)	MEP	E-wastes	Generation, dismantling, transport, use, disposal and related activities	To prevent and control environmental pollution by electronic wastes, enhance environmental management of e-wastes.

"Regulations on Prevention of Environmental Pollution by PCB-Containing Power Device and Wastes" (rule, 1991)	MEP, former Ministry of Energy	PCB power device and its wastes	use, transfer, transport, storage, disposal import and export	To strengthen the management of PCBs-containing power device and waste, prevent PCBs-related environmental pollution.
"Joint Announcement to ban the Production, Operation, Use, Import and Export of DDT, Heptachlor, Mirex and HCBs" (policy document, 2009)	MEP, NDRC, MIIT, MOHURD (Ministry of Housing and Urban-Rural Development), MOA, MOC, NHFPC, GAC, AQSIQ, SAWS	China's 4 types of existing pesticide POPs as regulated under the "Stockholm Convention"	production, circulation, use, import and export	To implemet the "Stockholm Convention", phase out production and use of existing pesticides POPs.
"Guidelines Concerning Strengthening Dioxins Pollution Prevention and Control" (policy document, 2010)	MEP, MOFA (Ministry of Foreign Affairs), NDRC, MOST (Ministry of Science and Technology), MIIT, MOHURD, MOC, AQSIQ	Dioxins	Pollutants release	To implement the "Stockholm Convention", reduce and control dioxins emissions, protect the ecological environment, and to guarantee people's health.

3.2 Additional Details on Key Legal Instruments Relating to Chemicals

3.2.1 Safety Management of Hazardous Chemicals

The "Regulations on the Safety Management of Hazardous Chemicals" aims to strengthen the safety management of hazardous chemicals, prevent and reduce hazardous chemical incidents, guarantee people's lives and property safety, protect the environment, which covers the aspects of occupational safety, public security and environmental protection related to hazardous chemicals. The "Regulations", published by the State Council on February 17, 1987 and revised for the third time on February 16, 2011, has entered into force as of December 1, 2011. According to the "Regulations on the Safety Management of Hazardous Chemicals", the targets to be regulated denote "extremely toxic chemicals and other chemicals with toxic, corrosive, explosive, combustion or combustion-supporting properties and having adverse impact on human body, equipment and environment". The Work Safety Commission of the State Council, in conjunction with the Ministries of industry and information technology, public security, environmental protection, health, quality supervision, inspection and quarantine, transport, railway, civil aviation and agriculture, shall formulate and announce "The Catalogue of Hazardous Chemicals" and conduct timely adjustment based on the identification and category of chemicals' hazard properties. The "Regulations on the Safety Management of Hazardous Chemicals" provides a whole-process safety management system covering hazardous chemicals production, use, transport, storage, import, export, discard and incident rescue, as well as a multi-sector

hazardous chemicals management mechanism, as shown in Table 3.2.

Table 3.2 China's Existing Administration System for Management of Hazardous Chemicals

Administrations under the Central Government	Regulatory and Supervisory Responsibilities
SAWS (State Administration of Work Safety)	Responsible for: general work of chemicals safety supervision and administration; formulation, announcement and adjustment of "The Catalogue of Hazardous Chemicals"; safety review of newly built, rebuilt or expanded construction of hazardous chemical production and storage installations (including the transport of hazardous chemicals by using long-distance pipelines); approval and issuance of hazardous chemicals safety production license, hazardous chemicals safety use license and hazardous chemicals safety operation license; and registration of hazardous chemicals.
MIIT (Ministry of Industry and Information Technology)	Responsible for: industry planning and layout of hazardous chemicals' production and storage; co-formulation of "The Catalogue of Hazardous Chemicals" and the scope of extremely toxic chemicals and other hazardous chemicals banned in inland water transport; co-development of hazardous chemical emergency response plans, etc.
MPS (Ministry of Public Security)	Responsible for: public safety management of hazardous chemicals; approval and issuance of extremely toxic chemicals' purchase permits and extremely toxic chemicals' road transport permits; safety management of road traffic for hazardous chemicals' transport vehicles.
AQSIQ (General Administration of Quality Supervision, Inspection and Quarantine)	Responsible for: approval and issuance of industrial products production permits for manufacturers of hazardous chemicals and encasement/containers (excluding fixed large storage tanks for storing hazardous chemicals, same as below) and monitoring of the product quality according to law; inspection of import and export hazardous chemicals and packaging.
MEP (Ministry of Environmental Protection)	Responsible for: supervision and control of disposal of hazardous chemicals wastes; organizing the identification of hazardous chemicals' environmental hazards and environmental risk assessment; determining hazardous chemicals for special environmental management; environmental management registration of hazardous chemicals and environmental management registration of new chemical substances; investigation of environmental pollution incidents and ecological damage incidents related to hazardous chemicals in accordance with assigned responsibilities; on-site environmental emergency monitoring of hazardous chemical incidents.
MOT (Ministry of Transport)	Responsible for: road transport and water transport licensing of hazardous chemicals as well as safety management of transport vehicles; supervision on water transport safety of hazardous chemicals; qualification of drivers, crews, loading and unloading supervisors, escorts, reporting staff and container field

	inspectors of road transport and water transport enterprises of hazardous chemicals; railway authorities are responsible for the safety management of hazardous chemicals' railway transport, the qualification approval of hazardous chemicals' railway transport carriers and shippers as well as the safety management of transport vehicles; Civil Aviation Authority is responsible for the safety management of hazardous chemicals' air transport and airliners as well as the transport vehicles.
NHFPC (National Health and Family Planning Commission)	Responsible for: managing toxicity identification of hazardous chemicals; organizing and coordinating medical rescue work for injured personnel in hazardous chemical incidents.
MOA (Ministry of Agriculture)	Responsible for: co-formulation of "The Catalogue of Hazardous Chemicals"; determination and announcement of the list of chemical enterprises qualified for hazardous chemicals safety use license by coordinating with SAWS, MPS and MOA.
SAIC (State Administration of Industry and Commerce)	Responsible for: approval and issuance of business license for hazardous chemical production, storage, operation and transport enterprises based on permits from relevant Ministries; investigating and dealing with hazardous chemical operators' illegal purchasing of hazardous chemicals.
SPB (State Post Bureau)	Responsible for: investigating and dealing with the mailing of hazardous chemicals according to law.

The "Regulations on the Safety Management of Hazardous Chemicals" provides fundamental systems for safety management of hazardous chemicals, including registration of hazardous chemicals, hazardous chemicals safe production licensing, hazardous chemicals safety use licensing, hazardous chemicals operation licensing, as well as review of hazardous chemical construction projects' safety conditions, at the same time, it provides regulations on the planning and layout of production and storage of hazardous chemicals, emergency response of hazardous chemical incidents, transport safety, operational safety, MSDS and safety labels, major hazard installation management and environmental management. Furthermore, in accordance with the corresponding provisions of the "Regulations on the Safety Management of Hazardous Chemicals", major Administrations such as SAWS, MOT and MEP have respectively developed and been implementing a series of important Ministerial Rules relating to hazardous chemicals' registration, safe transport, environmental management registration and disposal (as shown in Table 3.1), mainly including "Implementation Measures for Work Safety Licensing of Hazardous Chemical Production Enterprises", "Measures for the Administration of Operation License for Hazardous Chemicals", "Provisions on the Administration of Road Transport of Dangerous Goods", "Rules for the Administration of Railway Transport of Dangerous Goods", "Measureas for Environmental Management Registration of Hazardous Chemicals" and "Measures for the Prevention and Control of Environment Pollution by Hazardous Chemical Wastes", and so on. Specific chemicals management systems established through the "Regulations on the Sound Management of Hazardous Chemicals" and the abovementioned rules are described in Section 3.4 of

this Chapter.

3.2.2 Management of Pesticides and Fertilizers

The “Regulation on the Control of Agricultural Chemicals” was issued by the State Council on May 8, 1997 and revised in 2001. Pesticides described in the “Regulations” include synthetic chemicals used for preventing, eliminating or control of hazards, insects, weeds and other pests in agriculture and forestry or for purposeful regulating biological growth of plants and insects, or a substance or mixture and its preparation from biological and natural substances. All pesticide producers, operators and users in the territory of the People's Republic of China must abide by the “Regulations”. The “Regulations” is a comparatively complete set of pesticide safety management systems involving pesticides registration, production, use, import and export, whose basic system including pesticide registration system, pesticide production licensing system, pesticide import and export management system, pesticide quality monitoring system and waste disposal supervision systems, etc. China’s Ministry of Agriculture has developed the “Measures for Implementing the ‘Regulations on Pesticide Control’ ”, in which detailed regulations on the management of pesticides registration, operation and use have been provided.

For regulating the key link of pesticides registration, MOA has purposefully developed the “Data Requirement on Pesticide Registration”, and for specific requirements for pesticide labels and manuals, it has promulgated the “Measures for the Administration of Pesticide Labels and Manuals” and “General Rules for Pesticide Products Labeling” (NY608-2002). In addition, MOA has developed the “Measures for the Administration of Registration of Fertilizers” for strengthening fertilizers management by regulating the production, operation and use of fertilizers, so as to protect the ecological environment, guarantee human and animals’ safety and promote the agricultural production.

3.2.3 Occupational Safety and Hygienic Management of Hazardous Chemicals in Workplace

According to provisions of the “Law on the Prevention and Treatment of Occupational Diseases” as well as other laws and administrative rules, the State Council promulgated the “Regulations on Labor Protection in Workplaces Where Toxic Substances Are Used” in 2002, aiming to ensure the safe use of toxic substances in workplace, prevent, control and eliminate the occupational poisoning hazards, and to protect the labors’ safety, health and relevant rights and interests. According to the degrees of occupational poisoning hazards caused by toxic substances, toxic substances are divided into generally toxic substances and highly toxic substances.

According to “The Catalogue of Highly Toxic Substances” (2003) released by the former Ministry of Health, currently there are 54 types of highly toxic substances. The “Regulations” provides a series of systems for enterprises using toxic substances and their workplaces, such as occupational hygiene evaluation system and occupational hygiene safety licensing, gives detailed provisions on poisoning prevention measures in workplace and during labor process, and establishes the occupational safety and hygienic management system of toxic chemicals use.

3.2.4 Public Security Management of Precursor and Regulatory Chemicals

The "Regulations on the Administration of Precursor Chemicals" was announced by the State Council on August 26, 2005, aiming to strengthen the management of precursor chemicals, regulate the production, operation, purchase, transport, import and export of precursor chemicals, prevent precursor chemicals from being used in the manufacture of drugs, and to maintain economic and social order. According to the "Regulations", classified management and licensing system is applicable for production, management, purchase, transport, import and export of precursor chemicals.

The "Regulations of the People's Republic of China on Management of Chemicals Subjected to Regulation" was released on December 27, 1995, aiming to strengthen the management of chemicals subjected to regulation, guarantee the citizens' personal safety, and to protect the environment, targeted at the production, operation and use of chemicals subjected to regulation in the territory of the People's Republic of China. The chemicals subjected to regulation include chemicals that shall be used as chemical weapons or be used as precursors or as main raw materials for making chemical weapons, as well as designated organic chemicals except for explosives and pure hydrocarbons.

3.2.5 Public Health Management of Consumer Chemicals

"Regulations Concerning the Hygiene Supervision over Cosmetics" is a safety management regulation aimed at consumer cosmetic, in which the "cosmetics" means the daily-use chemical industry products applied or sprayed or by other means on any part of human body surface (skin, hair, nails, mouth/lips) for cleaning, eliminating odor, skin care, beauty and cosmetic purposes. Targeted at units and individuals engaged in the production or operation of cosmetic products, the "Regulations" proposed to implement hygiene licensing system for supervising the cosmetic manufacturer's hygiene conditions, raw materials, auxiliary materials used for manufacturing cosmetics and the containers and packaging materials directly contacting cosmetic products must comply with national hygiene standards, in particular, the use of new raw materials for making cosmetic products must be approved by the State Council's Health Administration in advance; previous to marketing activities, the manufacturer must conduct product hygienic quality inspection according to the National "Hygienic Standard for Cosmetics" and stamp a proof mark for qualified products. Those cosmetic products not inspected or not up to hygienic standard must not be allowed to leave the factory.

China's Ministry of Health (MOH) has also developed the "Hygienic Standard for Cosmetics" (2007) with reference to EU cosmetic directives; in regard to the chemicals contained in food, MOH has formulated the "National Standard for Food Safety --- Standard for Use of Food Additives" (GB 2760-2011) and promulgated "National Standard for Food Safety --- Maximum Limit for Pesticide Residues in Food" (GB 2763-2012) by working with MOA. These standards have provided certain restriction on the magnitude of chemical residue in cosmetics and food respectively.

3.2.6 Environmental Management of Chemicals

The "Measures for Environmental Management of New Chemical Substances" was promulgated by former State Environmental Protection Administration (SEPA, currently MEP) in 2003 and the

revised “Measures” was released in January 2010, aiming to control the environmental risks caused by new chemical substances and implement the new chemical substances’ market access and environmental access system. The “Measures” proposed a basic environmental management system for conducting pre-production and pre-import notification/registration and tracking control of new chemical substances to be produced in or import to the territory of China mainland, regulated the new chemical substances’ notification categories and procedure, hazard test and risk assessment requirements, review and management procedure, risk assessment procedure, tracking control and legal responsibilities. As a chemicals management system established for honoring the commitment to World Trade Organization (WTO) and integrating with international systems, the “Measures” shall be used for preventing risks caused by new chemical substances by hazard identification, risk assessment report preparation, expert review, post-registration supervision, etc.

In order to implement the “London Guidelines for the Exchange of Information on Chemicals in International Trade” (the “London Guidelines” for short), in 1994, the former State Environmental Protection Administration (SEPA), the General Administration of Customs (GAC) and the former Ministry of Foreign Trade and Economic Cooperation (MOFTEC) jointly promulgated the “Regulations on Import and Export Environmental Management of First Time Import and Toxic Chemicals” (the “Regulations”), establishing the toxic chemicals’ import and export registration system. And in order to implement the commitment to WTO, it was revised in 2003 with the new title “Regulations on Import and Export Environmental Management of Toxic Chemicals”. According to the “Regulations”, GAC, MOC and MEP jointly promulgated “The Catalogue of Commodities Prohibited from Import” and “The Catalogue of Commodities Prohibited from Export”; MEP and GAC jointly published “The Catalogue of Toxic Chemicals Strictly Restricted from Import and Export in China”. For toxic chemicals whose import and export are strictly restricted as listed in this “Catalogue”, the enterprise must go through the import and export registration formalities as required in the “Regulations” and then they can import or export the toxic chemicals that have been approved as qualified. In September 2009, in order to further strengthen the supervision on toxic chemicals’ import and export, MEP released the “Notification on Strengthening the Import and Export Environmental Management Registration of Toxic Chemicals” (HuanBan〔2009〕113) and published the modified “Procedure for Approving the Import and Export Environmental Management Registration of Toxic Chemicals”, in which it is required to conduct earlier stage preliminary examination and later stage supervision for toxic chemicals’ import and export approval.

In 2012, according to the “Regulations on the Safety Management of Hazardous Chemicals”, MEP promulgated the “Measures for Environmental Management Registration of Hazardous Chemicals (Provisional)”, in which the environmental management registration system for hazardous chemicals’ production and use, the risk assessment system for environmental management of key hazardous chemicals, as well as the pollutant release and transfer registration system have been established for the first time. The “Measures” is applicable to the following activities conducted in the territory of China mainland: production of hazardous chemicals, use of hazardous chemicals for production, as well as import and export of hazardous chemicals. According to the “Measures”,

producers and users of hazardous chemicals must register at the Department of Environmental Protection for getting a Chemicals Environmental Management Certificate, risk assessment must be conducted for key environmental management chemicals, and enterprises shall disclose the data on release, transfer and monitoring of hazardous chemicals.

The environmental management of toxic and hazardous chemical wastes is one of the important responsibilities of MEP. According to the "Measures for the Prevention and Control of Environment Pollution by Solid Wastes" and "Measures for the Prevention and Control of Environment Pollution by Discarded Hazardous Chemicals", China's MEP has established a comparatively complete set of legal instruments for environmental management of various types of hazardous wastes containing toxic and hazardous chemicals, for which descriptions shall be omitted here as they have been described in Table 3.1.

3.2.7 Implementation of International Conventions for Chemicals Management

In order to implement the "Montreal Protocol on Substances that Deplete the Ozone Layer" ("Montreal Protocol"), "Rotterdam Convention" and "Stockholm Convention", Chinese Government has adopted a series of administrative and legislative measures.

"Regulation on the Administration of Ozone Depleting Substances" was promulgated by the State Council on April 8, 2010 based on the "Law of the People's Republic of China on the Prevention and Control of Air Pollution", for strengthening the management of ozone-depleting substances, fulfilling the responsibilities as specified in the "Vienna Convention" and the "Montreal Protocol" protecting the ozone layer and ecological environment and safeguarding human health. The so-called "ozone-depleting substances" in the "Regulation" denote the chemicals having been put on "The List of Controlled Ozone-Depleting Substances in China" for being harmful to the ozone layer, and the "Regulations" is applicable to the production, marketing, use, import and export of ozone-depleting substances in the territory of China. In January 2014, in order to implement the "Montreal Protocol on Substances that Deplete the Ozone Layer" and the amendment and strengthen China's import and export management of ozone-depleting substances, MEP, MOC and GAC jointly formulated and released the "Measures Concerning Import and Export Management of Ozone Depleting Substances" based on the "Regulation on the Administration of Ozone Depleting Substances".

As described above, as early as 1994, Chinese Government has promulgated the "Regulations on Environmental Management of First Time Import of Chemicals and Import and Export of Toxic Chemicals" for implementing the "London Guidelines", which was elevated into the "Rotterdam Convention", of which itself became the fundamental rules for China to implement the "Rotterdam Convention". The "Regulations" is also an important tool for China to implement the "Stockholm Convention". While developing and revising "The Catalogue of Toxic Chemicals Strictly Restricted from Import and Export in China", both the lists of controlled chemicals from the "Rotterdam Convention" and the "Stockholm Convention" haven been used as reference. In addition, as required by the "Rotterdam Convention", MOA has supplemented the list of pesticides into "The Catalogue of Import and Export Management Pesticides of the People's Republic of China", based on which the

pesticide import and export installations must apply to the MOA for the issuance of "Pesticide Import/Export Registration and management Pass Notice".

In order to implement the "Stockholm Convention", in 2009, China's MEP (Ministry of Environmental Protection), NDRC (National Development and Reform Commission), MIIT (Ministry of Industry and Information Technology), MOHURD (Ministry of Housing and Urban-Rural Development), MOA (Ministry of Agriculture), MOC (Ministry of Commerce), NHFPC (National Health and Family Planning Commission), GAC (General Administration of Customs), AQSIQ (General Administration of Quality Supervision, Inspection and Quarantine) and SAWS (State Administration of Work Safety) jointly promulgated the "Joint Announcement to ban the Production, Operation, Use, Import and Export of DDT, Heptachlor, Mirex and HCBs", in which it is required that "In order to implement the 'Stockholm Convention on Persistent Organic Pollutants', the production, operation, use, import and export of DDT, heptachlor, mirex and HCBs must be banned (except for the use of DDT for emergent control of disease vectors, or the production and use of intermediate DDT in a sealed system in limited space)". The "Joint Announcement" has completely banned the production, operation, use, import and export of the above 4 types of pesticide POPs, which are listed among the first batch of banned POPs by the "Convention" and currently existing in China (except for the production and use of DDT for acceptable usage). In order to implement the "Stockholm Convention" for the reduction and control of dioxins release, in 2010, MEP, MOFA, NDRC, MOST, MIIT, MOHURD, MOC and AQSIQ jointly published the "Guideline Concerning Strengthening Dioxins Pollution Prevention and Control", in which the basic principles, main goals and key areas for dioxins control in China have been defined, a series of dioxins pollution prevention and control policies such as industry structure optimization, backward productivity elimination, environmental access stringency and cleaner production review have been developed, the technical requirements for dioxins pollution prevention and control have been made for key industries, and a long-term management mechanism for establishing and improving dioxins pollution prevention and control plan has been established.

3.2.8 Designated Lists of Regulatory Chemicals

This Section is a summary of the management catalogues published by relevant Ministries of the Chinese Government for implementing the abovementioned chemicals management systems, mainly including: The Catalogue of Existing Chemical substances in China, The Catalogue of Hazardous Chemicals, The Catalogue of Generally Toxic Substances, The Catalogue of Highly Toxic Substances, The Catalogue of Extremely Toxic Chemicals, The Catalogue of Hazardous Chemicals under Key Regulation, The Catalogue of High Pollution and High Environmental Risk Products, The Catalogue of Toxic Chemicals Strictly Restricted from the Import and Export, The Name List of Dangerous Goods, etc., as shown in Table 3.3.

Table 3.3 Designated Lists of Regulatory Chemicals Published by China

Name of Regulatory Lists	Number of Chemicals	Scope of Application
The Catalogue of Existing Chemical Substances in China (2013)	45612	For identification of new chemical substances in new substance registration and management
The Catalogue of Hazardous Chemicals (2002)	appx.3800	For comprehensive safety management of hazardous chemicals
The Catalogue of Generally Toxic Substances (2002)	206	For management of occupational health and safety in workplace
The Catalogue of Highly Toxic Substances (2003)	54	For management of occupational health and safety in workplace
The Catalogue of Extremely Toxic Chemicals (2002)	335	For management of extremely toxic chemicals' use, purchasing and transport permits
The Catalogue of Toxic Chemicals Strictly Restricted from Import and Export in China (2012)	158	For import and export management of regulatory chemicals listed in "Rotterdam Convention" and "Stockholm Convention"
The Catalogue of Key Regulatory Hazardous Chemicals (2013)	74	For the management of hazardous chemicals' safe production
The Name List of Dangerous Goods (GB12268-2012)	3495	For management of dangerous goods' transportation. Based on "The Catalogue of Dangerous Goods" annexed to "UN Recommendations in relation to the Transport of Dangerous Goods --- Model Regulations" (16th rev.)

3.3 Coverage of the Chemical Life Cycle Stages by Existing Legal Instruments

China's existing legal instruments for chemicals management basically cover all stages of chemical's life cycle, including particular the sound management of hazardous chemicals' all-stage life cycle, as shown in Table 3.5. In regard to the management of general industrial chemicals and general daily consumer chemicals (excluding cosmetics), except for the production link, the existing legal instruments for management of other links are ambiguous and inadequate. As to the 12 types of POPs regulated as the first batch in the "Stockholm Convention", an all-stage management system has been established by the existing legal instruments.

Table 3.5 Overview of China's Existing Legal Instruments to Manage Chemicals by Life Cycle Stage

Category of Chemical	Import	Production/ Generation	Storage	Transport	Operation/ Marketing	Use/ Handling	Disposal

Pesticides	X	X	X	X	X	X	X
Fertilizers		X					
Industrial Chemicals		X					
Hazardous Chemicals	X	X	X	X	X	X	X
Petroleum Products	X	X	X	X	X	X	X
Consumer Chemicals		X					
Discarded and Hazardous Chemicals	X	X	X	X	X	X	X
POPs (first batch in "Stockholm Convention")	X	X	X	X	X	X	X

Note: "X" means adequate provisions have been made in existing legal instruments for the designated stage.

3.4 Key Administrative Procedures for Control of Chemicals

China has been implementing a series of key chemicals management instruments, including the registration, evaluation, licensing, classification, labeling and applicable standards, mainly for hazardous chemicals, pesticides, new chemical substances and designated toxic chemicals that may cause adverse impacts on health and environment.

3.4.1 Registration of Chemicals

- Hazardous chemicals safety management registration: In order to strengthen the safety management of hazardous chemicals, prevent chemical incidents and to provide technology and information support for emergency rescue, according to the "Regulations on the Safety Management of Hazardous Chemicals", SAWS promulgated the "Measures for the Administration of Registration of Hazardous Chemicals", according to which the hazardous chemicals registration system shall be used for producers and importers of hazardous chemicals listed in "The Catalogue of Hazardous Chemicals". The registration of hazardous chemicals shall be conducted based on the principles of "enterprise apply first, two-level review, unified issuance, and level-to-level management". "The Catalogue of Hazardous Chemicals" was finalized and jointly released by SAWS and other 9 Ministries such as MPS, MEP, MOH, AQSIQ and MOT. The contents for hazardous chemicals registration mainly include classification and labeling, physico-chemical properties, main usage, hazard properties, specifications for storage, use and transport, and emergency response measures, etc. SAWS is responsible for the national supervision on hazardous chemicals' registration in China. The Administrations of Work Safety of the People's Government above County level are responsible for conducting supervision on the registration of hazardous chemicals within its administrative area.

- Pesticides and fertilizers management registration: Based on the "Regulations on Pesticide Administration", the "Measures for Implementing the 'Regulations on Pesticide Administration' " as well as the "Data Requirement on Pesticide Registration", MOA is responsible for the Management of pesticides registration. The production (including the primary pesticides production, pesticide formulation preparation and packaging) of pesticides and the import of pesticides must be registered first. The production and marketing of pesticides must not be started until having been issued with a Pesticide Registration Certificate by MOA. In addition, MOA has promulgated the "Measures for the Administration of Registration of Fertilizers", the implementation of which is for strengthening the management of fertilizers and protecting the ecological environment, as well as safeguarding human and animals' safety and facilitating agricultural production.

- New chemical substances environmental management registration system: In order to control environmental risks caused by new chemical substances, safeguard human health, and to protect the ecological environment, the "Measures for Environmental Management of New Chemical Substances" requires the notification and registration system for new chemical substances. Producers or importers of new chemical substances must submit notification previous to the production or import for getting the New Chemical Substance Environmental Management Registration Certificate.

- Toxic chemicals import and export environmental management registration: According to the "Provisions on Import and Export Environmenal Management of Toxic Chemicals", MEP is responsible for conducting the registration and has established the Chemicals registration Center of MEP. The scope of toxic chemicals for import and export environmental management registration are those listed in "The Catalogue of Toxic Chemicals Strictly Restricted from Import and Export in China", including the controlled chemicals listed in the "Rotterdam Convention" and the "Stockholm Convention".

- Hazardous chemicals environmental management registration: Based on the "Regulations on the Safety Management of Hazardous Chemicals", MEP has promulgated the "Measures for Environmental Management Registration of Hazardous Chemicals" for conducting environmental management registration of hazardous chemicals. The "Regulations" is applicable to the following activities conducted in the territory of China mainland: production of hazardous chemicals, use of hazardous chemicals for production, as well as import and export of hazardous chemicals. According to the "Regulations", producers and users of hazardous chemicals must register at the Environmental Protection Department about the information of chemicals environmental risks and get a Chemicals environmental management Certificate, risk assessment must be conducted for key environmental management chemicals, and enterprises must disclose the data on release, transfer and monitoring of hazardous chemicals.

3.4.2 Chemicals Risk Assessment

The system of chemicals risk assessment is one of the key links in China's administrative system for control of certain hazardous chemicals' environmental and health risks, mainly including pesticides risk assessment, new chemical substance risk assessment and risk assessment of hazardous chemicals under key environmental management.

- Pesticide risk assessment: According to the "Regulations on Pesticide Administration", the developers, producers or foreign companies selling pesticides to China, in accordance with pesticide registration requirements established by the agriculture administrative department of the State Council, must provide information on such pesticide product's chemistry, toxicology, efficacy, residues, environmental impact and labeling, as well as certain samples. Pesticide Registration Evaluation Committee shall conduct evaluation on the pesticide product's chemistry, toxicology, efficacy, residue and environmental impact, based on which the qualified pesticides shall be issued with a Pesticide Registration Certificate by MOA.
- New chemical substance risk assessment: According to the "Measures for Environmental Management of New Chemical Substances", the system of new chemical substance notification and registration shall be implemented, at the same time, a risk assessment report shall be submitted, of which the contents include: new chemical substance's hazard assessment, exposure prediction and assessment, risk characterization, and risk control measures, etc.
- Risk assessment of hazardous chemicals under key environmental management: According to the "Measures for Environmental Management Registration of Hazardous Chemicals", enterprises manufacturing or using hazardous chemicals under key environmental management must conduct environmental risk assessment on key environmental management hazardous chemicals and delegate a competent agency for preparing the environmental risk assessment report, which shall be submitted upon application for environmental management registration of hazardous chemical production and use. Meanwhile, according to the requirements put forward in the environmental risk assessment report, enterprises must conduct self investigation on its environmental risks so as to solve the discovered problems in time, and a self investigation record shoudbe kept. The risk assessment report shall be made by using the "Guide for Preparation of Environmental Risk Assessment Report of Key Environmental Management Hazaroud Chemicals" published and circulated by MEP.

3.4.3 Chemical Production, Operation, Use, Transport, Import and Export Authorization/Approval

- Hazardous chemicals production/operation, transportat and use licensing: According to the "Regulations on the Safety Management of Hazardous Chemicals", previous to the production, the chemical production enterprise must apply to the Work Safety Administration for a hazardous chemicals safety production license according to "Regulations on Safety

Production Licensing". Enterprises manufacturing the hazardous chemicals listed in the catalogue of industrial products subjected to safety production licensing must apply to the Administration of Quality Supervision, Inspection and Quarantine for the issuance of industrial product production license according to the "Measures for the Implementation of the Regulation of the People's Republic of China on the Administration of Production License for Industrial Products". Meanwhile, the operation (including the storage) of hazardous chemicals is subject to licensing system. Any enterprise or individual must not conduct hazardous chemicals operation without a permit. Chemical enterprises using hazardous chemicals for production with a certain volume of consumption shoud apply for the hazardous chemicals safety use license. Those engaged in road or water transport of hazardous chemicals must apply for the corresponding transport license respectively according to the provisions of applicable laws and administrative regulations.

- New chemical substance production and import registration licensing: According to the "Measures for Environmental Management of New Chemical Substances", producers or importers of new chemical substances must submit previous to the production or import a notification to MEP for getting a New Chemical Substance Environmental Management Registrtion Certificate. Production, import and disposition of new chemicals without a Certificate must be banned. New chemical substances without a Certificate or notification record must not be used for scientific research.

- Toxic chemical import and export registration licensing: According to the "Provisions on Import and Export Environmenal Management of Toxic Chemicals", for incustrial chemicals or agricultural chemicals listed in the "The Catalogue of Toxic Chemicals Strictly Restricted from Import and Export in China", each time previous to the export to China from a foreign business or its agent, or the import or export from China, the exporters or importers must apply to the Environmental Administration for the toxic chemical import and export environmental management registration. For toxic chemicals whose import and export has been approved, a "Chemical Import(Export) Environmental Management Registration Certificate" and a "Toxic Chemical Import(Export) Environmenal Management Pass Notice" shall be issued.

- Pesticide production, operation, import and export licensing: According to the "Regulations on Pesticide Administration", the pesticide production licensing system is implemented in China. Depending on the different levels of technical standards applicable to the pesticide production, the pesticide manufacturers must apply to the Local/National Administration of Quality Supervision, Inspection and Quarantine or the Local/National Development and Reform Commission for a Pesticide Production License or Permit. For operation of pesticides classified as hazardous chemicals, the operator must apply for a business license according to relevant regulations on hazardous chemicals. All importer and exporters of pesticides (including the primary pesticide and the pesticide formulation) must apply to the Agricultural Administration for a "Pesticide Import(Export) Registration and Management Pass Notice",

based on which the Customs shall sign off the import or export certificate.

- Toxic chemical workplace occupational safety licensing: According to the "Regulations on Labor Protection in Workplaces Where Toxic Substances Are Used", entities and installations using the chemicals listed in "The Catalogue of Generally Toxic Substances" and "The Catalogue of Highly Toxic Substances" released by NHFPC (National Health and Family Planning Commission) must obtain the Occupational Hygiene Safety License from the SAWS previous to its use of toxic substances.
- Cosmetic production and new material use licensing: According to the "Regulations Concerning the Hygiene Supervision over Cosmetics", the hygiene licensing system shall be implemented for conducting hygienic supervision on cosmetic manufacturers, to which the Cosmetic Manufacturer Hygiene Certificate shall be approved and issued by Provincial Administration of Health or that of an Autonomous Region or a Direct-controled Municipality. The use of new materials for manufacturing cosmetics must be approved by the State Council's Administrtion of Health.

3.4.4 Chemicals GHS Classification, Labeling and MSDS

For implementation of "Globally Harmonized System of Classification and Labeling of Chemicals" (GHS), China has established a inter-ministerial joint conference system for implementing GHS, led by MIIT (Ministry of Industry and Information Technology) and joined by MOFA (Ministry of Foreign Affairs), NDRC (National Development and Reform Commission), MOF (Ministry of Finance), MEP (Ministry of Environmental Protection), MOT (Ministry of Transport), MOR (Ministry of Railways), MOA (Ministry of Agriculture), NHFPC (National Health and Family Planning Commission), GAC (General Administration of Customs), SAIC (State Administration of Industry and Commerce), AQSIQ (General Administration of Quality Supervision, Inspection and Quarantine) and SAWS (State Administration of Work Safety), etc. The following documents have been published by AQSIQ and SAC (the Standardization Administration of China) based on GHS: "Specifications for GHS-based Chemical Labels" (GB/T22234-2008), "General Rules for Chemical Classification and Hazard Communication of Chemicals" (GB13690-2009), and "General Rules for Preparation of Precautionary Label for Industrial Chemicals" (GB15258-2009), which respectively specify the labels (signs, warnings, hazard instructions) to be used based on the chemical substance's GHS hazard identification and level, GHS classification and hazard communication of chemicals applicable to chemical production sites and consumer chemicals, as well as the terms, definitions, contents, preparation and use instructions for chemical's safety data sheet (SDS), in particular the 26 GHS-based standards for identification and labeling of chemical hazards. According to the "Public Announcement Concerning the Issues Relating to the Inspection and Regulation of the Import and Export of Hazardous Chemicals and Packaging" ([2012] 30) promulgated by AQSIQ, the GHS labeling of import and export hazardous chemicals is subject to inspections.

3.4.5 Chemicals Public Health Supervision Standard

The "National Standard for Food Safety --- Maximum Limit for Pesticide Residues in Food" (GB 2763-2012), jointly promulgated by NHFPC (National Health and Family Planning Commission) and MOA (Ministry of Agriculture) with the aim to guarantee food safety and protect public health, provides 2293 limits for residue of 322 types of pesticides applicable to 10 groups of agricultural products. The "National Standard for Food Safety --- Standard for Use of Food Additives" (GB 2760-2011), promulgated by NHFPC, specifies the use scope and maximum allowed usage or residues of 2314 types of food additives under 23 categories applicable to 16 groups of food. With reference to EU cosmetic directives, NHFPC formulated the "Hygienic Standard for Cosmetics" (2007), to which attached is a list of 1208 banned substances, 73 restricted substances and 240 types or more restricted additives such as restricted preservatives, colorants and UV absorbers.

3.4.6 Prevention and Control of and Standard for Chemicals Environmental Pollution Control

According to the "Cleaner Production Promotion Law of the People's Republic of China", the "Cleaner Production Audit" as well as relevant announcements made by MEP, in order to prevent and control the release of hazardous chemicals, mandatory cleaner production auditing is required for enterprises using toxic and hazardous materials for production or releasing toxic and hazardous substances during production. At the same time, the control of toxic chemical pollutants is also required in China's air, water and soil pollution control laws respectively, to which the corresponding release from pollution installations and environmental quality standards provide certain limits for release of various types of chemicals, for example, the "Integrated Emission Standard of Air Pollutants" (GB16297－1996) provides the maximum limits for release of approximately 30 types of chemical pollutants such as organic compounds and heavy metals, the "Integrated Wastewater Discharge Standard" (GB8978-96) has listed the limits for release of 10 types of heavy metals and 39 types of organic chemical pollutants, and the "Environmental Quality Standard for Surface Water" (GB 3838-2002) specified the limits for release of 10 types of heavy metals and 68 types of organic chemical pollutants. Furthermore, according to the "Measures for Environmental Management Registration of Hazardous Chemicals", producers and users of hazardous chemicals under key environmental management shall release the report on release, transfer and monitoring of hazardous chemicals produced or used.

3.4.7 Prevention of Chemicals Incidents and Management of Emergency Response

As the contracting party to the "ILO Convention (No.174) Concerning the Prevention of Major Industrial Incidents", China implements the major hazard installation management system and hazardous chemical incident emergency response planning system. As required by the "Convention", China has formulated the "Identification of Hazard Installations" (GB 18218-2000) and revised into the "Identification of Hazard Installations for Hazardous Chemicals" (GB18218-2009), in which the definition of hazard installation has been given; and the promulgation of the "Production Safety Law of the People's Republic of China", the "Emergency Response Law of the People's Republic of China" and the "Regulations on the Sound Management of Hazardous Chemicals" put forward a series of

requirements for major hazard installations, such as registration, notification and construction site selection.

At the same time, it is stipulated in the "Regulations on the Sound Management of Hazardous Chemicals" that hazardous chemical enterprises must develop its own emergency rescue plan and be equipped with rescue team and necessary rescue devices and equipments, as well as conducting regular drill. The hazardous chemical emergency rescue plan must be submitted to the chemicals safety supervision department of the Local Municipal People's Government for keeping a record.

3.4.8 Other Major Regulatory Requirements or Regulations for Chemicals Mangement

Besides the abovementioned key regulatory measures for chemicals management, China is also implementing strengthened management of environmental impact assessment for hazardous chemical construction projects, which should include environmental risk assessment. In particular regard to the trend of chemical industry's park-oriented development, Chinese Government has formulated environmental protection requirements for chemical industry parks, and the corresponding work sound management measures are being established.

3.5 Legal Instruments for Related Activities which Impact on Chemicals Management

The existing legal instruments in various sectors such as economical industry, environmental protection, safety production, occupational health and public health, might have impact on chemicals management in China, Table 3.6 is a summary of these legal instruments and relevant impact.

Table 3.6 Other Relevant Legal Instruments Which Impact on Chemicals Management

Coverage	Name of Legal Instrument and Effective Date	Impact on Chemicals Management
Economical Industry	"Circular Economy Promotion Law of the People's Republic of China" (2009.1)	Proposed chemicals industry structure adjustment (catalogue of products to be eliminated, restricted or encouraged), and pollution prevention and control policies on chemical production, use, recycling and disposal
	"Cleaner Production Promotion Law of the People's Republic of China" (2003.1)	Proposed cleaner production policies, such as replacement of highly toxic and hazardous raw materials by non-toxic, harmless materials or raw materials of low toxicity, low hazard by enterprises in technical reform
Environmental Protection	"Environmental Protection Law of the People's Republic of China" (1989)	Production, storage, transport, marketing and use of toxic chemicals and goods containing radioactive substances must comply with the relevant regulations

		of the State, so as to prevent environment pollution
	"Environmental Impact Assessment Law of the People's Republic of China" (2003.9)	Risk assessment and pollution prevention for construction projects of chemical industry
	"Law of the People's Republic of China on the Prevention and Control of Air Pollution" (2000.9)	Control of air pollution caused by chemical pollutants emission
	"Law of the People's Republic of China on the Prevention and Control of Water Pollution" (2008.6)	Control of water pollution caused by chemical pollutants discharge
	"Law of the People's Republic of China on the Prevention and Control of Solid Waste Pollution" (2004.12)	Environmental management of hazardous chemical waste
Occupational Safety	"Safety Production Law of the People's Republic of China" (2002.11)	Prevention of occupational safety risks during production, storage and transport of hazardous chemicals, prevention of chemical Leaking incidents and emergency response
	"Law of the People's Republic of China on the Prevention and Treatment of Occupational Diseases" (2002.5)	Control of occupational safety and health risks during use of hazardous chemicals
Public Health	"Food Safety Law of the People's Republic of China" (2009.6)	Public health risk control of food additives
	"Law of the People's Republic of China on Quality and Safety of Agricultural Products" (2006.11)	Public health risk control of pesticides
Public Security	"Emergency Response Law of the People's Republic of China" (2007.8)	Surveys, registration, risk assessment and safety management of major hazard installations related to hazardous chemicals

3.6 Non-regulatory Mechanisms for Managing Chemicals

3.6.1 Relevant Industry Development and Environmental Protection Planning

Chinese Government has established the mechanisms of economic development and environmental protection planning based on the five-year cycles, some of which include the specialized plan closely related to chemicals management, such as the "12th Five-Year Plan for Safety Production" promulgated by the State Council, the "12th Five-Year Plan for Development of Petrochemical and Chemical Industries" developed by MIIT and the "12th Five-Year Plan for Prevention and Control of Chemicals environmental Risks" released by MEP, all of which have

proposed a series of policies, measures and initiatives for chemical industry layout optimization, industry structure adjustment as well as prevention and control of chemicals environmental risks, to which the fund, technology and management support from central and Local Governments and enterprises have been ensured, therefore, it has become an important non-regulatory mechanism in China's chemicals management, and it will greatly promote the environmentally sound management of chemicals in China.

3.6.2 Voluntary Actions by Business Sector

In China, the non-regulatory management of chemicals is mainly the voluntary actions by the chemical industry, such as the promotion of "Environment, Health and Safety" (EHS) and "Responsible Care" (RC), to be described in Chapter 5.

Chinese Government has adopted various economic stimuli for environment protection, such as pollutant emission trading, green credit banking, etc., however, there is a lack of economic tools dedicated to chemicals management.

3.7 Assessment

China has established different levels of management regulations and standards focusing on various types of chemicals such as hazardous chemicals, toxic chemical substances, precursor chemicals, pesticides, fertilizers, cosmetics, food additives, new chemical substances, etc., basically having built a relatively complete legislation on chemicals management system coving the three main areas: industrial chemicals, agricultural chemicals and consumer chemicals. In recent years, with the revision of the "Regulations on the Safety Management of Hazardous Chemicals" and the promulgation of new regulations and rules such as "Measures for Environmental Management Registration of Hazardous Chemicals (Provisional)", China's chemicals management law system is becoming increasingly complete. The existing main problems include: 1) Current chemicals management regulations are focused on new chemicals and hazardous chemicals with specific hazards and designated scope of existing chemicals, widely used, potentially harmful industrial chemicals and consumer chemicals are not covered, a comprehensive risk regulation of existing chemicals in the market has not been formed; 2) Current environmental management of chemicals management regulations remains a low level, corresponding system of administrative institutions is not perfect, and the supervision capacity is not sufficient, which have restricted the full and effective implementation of chemicals environmental management system; 3) Priorities of the chemical risk regulation policies and systems are not fully developed and implemented, which makes it difficult to adapt in a timely manner to international chemicals management, hardly meeting the growing domestic demand for prevention and control of environmental and health risks related to chemicals; 4) Chemicals management still relies mainly on the legal and administrative instruments, relevant economic instruments and non-regulatory instruments such as enterprises' voluntary actions are insufficient. Priorities and key actions in improving China's legal instruments and non-regulatory mechanisms for chemicals management are shown in Table 3.7.

Table 3.7 Priorities and Possible Actions: Legal Instruments and Non-Regulatory Mechanisms for Chemicals Management

Priority Issues	Level of Existing Capacity	Capacity Gaps and Needs	Possible Actions	Concerned Actors
Collection and evaluation of information on existing chemicals' environmental and health risks, and risk management	Low	Lacking of fundamental laws	To establish and complete the existing chemicals environmental risk regulations	Departments of environment protection, macroeconomic management, industry, management, hygiene, legal authorities, etc,
Risk management of prior or highly concerned chemicals	Low	Lacking of priority risk management targets, policies and systems	To set up national identification standard and list of prior and highly concerned chemicals, research and explicitly propose corresponding risk management policies, mechanisms and measures	Departments of environment protection, macroeconomic management, industry,management, etc,
Implementation capacity of chemicals environmental management systems	Medium	Low level of regulations, incomplete administrative organs, and insufficient capacity	To strengthen the construction of chemicals environmental management institutions, conduct research and gradually improve the legislation level of the existing chemicals environmental management systems	Departments of environment protection, legal authorities, etc.
Non-regulatory mechanisms for chemicals management	Medium	Inadequate scope of voluntary chemicals management actions by industry, insufficient use of economic instruments	To encourage and promote in chemical industry the voluntary chemicals risk management actions such as "Responsible Care", actively study and establish economic instruments for chemicals management	chemical industry associations, enterprises, departments of environment protection, industry management, finance, macroeconomic management etc.

Chapter 4: Ministries, Agencies and Other Governmental Institutions Managing Chemicals

4.1 Responsibilities of Different Ministries, Agencies and Other Governmental Institutions

In China, the Ministries involved in chemicals management mainly include: MEP (Ministry of Environmental Protection), NHFPC (National Health and Family Planning Commission), MOA (Ministry of Agriculture), SAWS (State Administration of Work Safety), MOC (Ministry of Commerce), MIIT (Ministry of Industry and Information Technology), AQSIQ (General Administration of Quality Supervision, Inspection and Quarantine), MOT (Ministry of Transport), MPS (Ministry of Public Security), GAC (General Administration of Customs), MOFA (Ministry of Foreign Affairs), NDRC (National Development and Reform Commission), MOST (Ministry of Science and Technology), SAIC (State Administration of Industry and Commerce), etc. Table 4.1 is a list of the relevant Ministries and their respective responsibilities.

Table 4.1 Ministerial Authorities and Mandates

No.	Ministries	Import	Export	Production	Storage	Transport	Operation /Marketing	Use	Disposal
1	MEP	X	X	X				X	X
2	NHFPC							X	
3	CFDA			X			X	X	
4	MOA	X	X	X	X		X	X	
5	SAWS	X		X	X	X	X	X	
6	MOC	X	X						
7	MIIT			X	X			X	
8	AQSIQ	X	X	X				X	
9	MOT				X	X			
10	MPS					X	X	X	
11	GAC	X	X						
12	MOFA								
13	NDRC								
14	MOST								
15	SAIC						X		

Note: The management of chemicals by MPS is mainly focused on extremely toxic chemicals and precursor chemicals.

4.2 Description of Ministerial Authorities and Mandates

In China, according to national laws and regulations, relevant Ministries conduct management on the production, use, operation, transport, import, export and disposal of chemicals within their respective scope of responsibilities.

4.2.1 MEP (Ministry of Environmental Protection)

MEP is responsible for the comprehensive environmental management of chemicals, including: establish and improve the basic environmental protection systems related to chemicals, formulate and supervise the implementation of chemicals environmental management plans, policies, laws, regulations, rules, standards, codes and catalogues; organize environmental hazard identification and risk assessment of chemicals, organize the tracking of environmental risk assessment of chemicals, select and publish key controlled chemicals list; organize the formulation and publication of national environmental criteria, environmental protection standards, technical specifications and technical policies for pollution prevention and control; supervise the work of chemicals import and export registration and new chemical substance registration; conduct supervision and inspection on production, marketing, use, import and export of ozone-depleting substances, environmental management of ozone-depleting substances' import and export; supervise disposal of waste chemicals; conduct on-duty investigation on chemicals environmental pollution incidents and ecological damage events and conduct on-site environmental monitoring of chemical emergency response. (负责化学品相关环境监测和信息发布，制定化学品环境监测制度和规范，组织实施污染源监督性监测。)这句话未翻！

MEP's responsibilities also include: organize the compilation of the catalogue of high-pollution and high -risk products, techniques and installations, the catalogue of environment-friendly products, techniques and installations promoted by the State, as well as participating in the compilation of the catalogue of productivities, techniques and products to be restricted or eliminated by the State; participate in the negotiations and implementation of international chemicals environmental conventions; organize the chemical-related bilateral and multilateral environmental cooperation activities, etc.

4.2.2 NHFPC (National Health and Family Planning Commission)

NHFPC is responsible for the health emergency response related to chemical incidents, including: formulate relevant emergency response plans and policy instruments, instruct the prevention and control of public health incidents as well as the response actions, such as organizing and coordinating the medical rescue of personnel injured from hazardous chemical incidents and releasing information on public health emergency response and follow-up; manage the work of chemical toxicity identification; organize the formulation of safety standard for food additives and the activities related to food additives or illegal food additives such as food safety monitoring, risk assessment and early warning, etc.

4.2.3 CFDA (China Food and Drug Administration)

CFDA's responsibilities include: draft laws and regulations on management of food (including food additives and health food, same as below), drugs (including herbal medicines and ethic medicines, same as below), medical devices and cosmetics, develop Ministerial Rules and to draft policies and plans; develop a major food/drug events direct reporting system and organizing the implementation and inspection; establish a unified food safety information disclosure system and announce major food safety information; participate in the formulation and implementation of food safety risk monitoring plans and food safety standard; organize the formulation and publication of drug and medical device standards such as "Chinese Pharmacopeia" and organize the establishment and implementation of classification-based management system; formulate and supervise the implementation of quality management regulations on the development, production, operation and use of drugs and medical devices; organize and supervise the registration of drugs and medical devices; conduct inspections on cosmetic products and review the hygienic quality and use safety of new raw materials before approving the use of such new materials; establish the inspection system for supervising food, drug, medical device and cosmetic safety and organize the investigation on major illegal behaviors; organize and instruct the emergency response to food and drug safety incidents as well as the investigation and treatment of such incidents.

4.2.4 MOA (Ministry of Agriculture)

MOA is in charge of the management of agricultural chemicals such as pesticides, fertilizers and veterinary drugs, its responsibilities include: organize the drafting of laws, regulations and supporting rules related to pesticide management; organize and supervise the registration of pesticides; 组织开展已登记农药的有效性、安全性及使用环境监测管理与评价跟踪监测与评价 organize the environmental monitoring and evaluation of registered pesticides' efficacy, safety and use conditions; supervise the operation and use of pesticides; formulate reasonable pesticide use standards and pesticide residue limits for agricultural products; compile the catalogue of pesticides for which import and export registration is necessary; participate the negotiations and implementation of international pesticide conventions; conduct registration and supervision of fertilizers, draft fertilizer registration specifications, and relevant industry standards and organize the implementation of such standards; conduct test and label review for fertilizer registration; organize the review of fertilizer registration and conduct supervision on the efficacy and safety of registered fertilizers.

MOA is also responsible for: the supervision of the development, production, operation, import, export and use of veterinary drugs; the review and approval of the registration of new veterinary drugs as well as veterinary drugs applied by foreign enterprises; the national quality monitoring of veterinary drugs and the investigation and treatment of illegal cases; the formulation and implementation of national standards for veterinary drugs, veterinary drug residue limits and the residue test methods; the development of regulations on veterinary drug use safety and the supervision of implementation; the management of veterinary drugs, veterinary drug residue's standard samples and reference samples, as well as production-use veterinary drug's bacteria (virus);

the accreditation of veterinary drug related testing agencies and safety assessment agencies; the management of national veterinary drug residue reference laboratories and national veterinary drug safety assessment laboratories; the monitoring and control of veterinary drug residues and the test of veterinary drug residues.

4.2.5 SAWS (State Administration of Work Safety)

SAWS is in charge of the comprehensive safety supervision of hazardous chemicals, including: organize the compilation, announcement and adjustment of the catalogue of hazardous chemicals; inspect the safety conditions of newly built, rebuilt or extended construction of hazardous chemical production and storage installations (including the use of long-distance pipeline for transporting hazardous chemicals, same as below); approve and issue the hazardous chemicals safety production license, safety use license and operation permits and conduct the registration of hazardous chemicals; supervise and monitor the enterprises' safety production of chemicals and hazardous chemicals, take charge of the management of relevant safety production and hazardous chemicals' market access, organize the investigation and treatment of production/operation entities unqualified for safety production; instruct the supervision of the production and operation of non-drug precursor chemicals; instruct and supervise the standardization of chemical safety; legally participate in the investigation and emergency rescue of extraordinarily serious incidents; conduct safety monitoring on the major chemical hazard installations.

In addition, SAWS is also responsible for: the legal inspection of occupational hygiene conditions in chemical-related workplaces; the investigation of occupational hazard incidents and illegal behaviors; the issuance occupational hygienic safety license; organizing and supervision of chemical-related occupational safety training; the guidance of occupational hazard notification; participating in the emergency rescue of occupational hazard incidents.

4.2.6 MOC (Ministry of Commerce)

MOC is responsible for the management of chemicals trade, including: the development of strategies and policies for domestic and foreign trade of chemicals as well as international economic cooperation; the drafting of laws, regulations and Ministerial Rules on chemical-related domestic and foreign trade, foreign investment, outbound assistance, outbound investment and foreign economic cooperation; organizing the management of chemical-related production materials and products; the compilation of goods import and export management measures and the catalogue of import and export management goods; organizing the aggregate planning of import and export of major industrial products, raw materials and major agricultural products and the implementation of such plan; the review and approval of precursor chemicals' import and export.

4.2.7 MIIT (Ministry of Industry and Information Technology)

MIIT's responsibilities include: propose and organize the implementation of petrochemical and chemical industries' development plans, industry policies, directional plans, administrative regulations, Ministerial Rules, standards, technical specifications, access conditions and structure adjustment plans;

organize the management of petrochemical and chemical industries' fixed asset investment projects; develop the industry planning and layout for hazardous chemicals' production and storage and regulate the management of chemical parks; review and approve the pesticide production enterprises and conduct the issuance (renewal) of pesticide production license, review and approve the administrative protection of agricultural chemicals and the construction of chromium compound production installations; organize the implementation of GHS system as well as the formulation and implementation of policies, administrative regulations, Ministerial Rules and catalogues promoting sound management of chemicals; organize and coordinate the national implementation of the "Convention on the Prohibition of Chemical Weapons"; participate the compilation of the "Catalogue of Hazardous Chemicals" and the "Catalogue of Hazardous Chemicals Banned from Inland Water Transport"; instruct the strengthening of industry safety production management and participate in the investigation and treatment of major and extraordinarily serious safety production incidents; develop and organize the implementation of policies promoting industrial sectors' energy saving, resources comprehensive use and cleaner production.

4.2.8 AQSIQ (General Administration of Quality Supervision, Inspection and Quarantine)

AQSIQ is responsible for: the development of regulations, systems and plans concerning the import and export chemical quality safety supervision and participating in the formulation of relevant technical specifications and test standards; the inspection and supervision of import and export hazardous chemicals and packaging, the inspection of entry-exit permit for import and export licensed chemicals; organizing the analysis of import and export chemicals' quality safety and conduct supervision on the early warning and prompt reactions; organizing the investigation and follow-up of major problems and major quality safety incident products detected during import and export chemical inspection, organizing the combat against infringement and counterfeiting in the field of chemical import and export; the business guidance and supervision of import and export chemical classification, identification and evaluation laboratories, organizing the training and qualification test of import and export chemical and packaging inspectors; participating in import and export chemical related foreign exchange and cooperation activities as well as the international conferences concerning the transportation of chemical products and dangerous goods; approval and issuance of industrial products production license for manufacturers of hazardous chemicals and encasement/containers as well as monitoring of the product quality; the formulation of procedures for supervising chemical-related product quality safety; the national random inspection of chemical-related product quality safety; the management of industrial products production license, the mandatory inspection of product quality safety and the risk monitoring.

4.2.9 MOT (Ministry of Transport)

MOT is in charge of the monitoring of the transportation of dangerous goods, hazardous chemicals included, its responsibilities include: the planning and coordinating of dangerous goods (including hazardous chemicals) transport system and the planning of the comprehensive transport system; the market supervision of the land and water chemical transport; the licensing of hazardous

chemicals' land and water transport and the sound management of transport vehicles, the monitoring of hazardous chemicals' water transport safety and the accreditation of the drivers, crew members, loading/unloading managers, escorts, reporters and onsite container loading examiners. In addition, the subordinate railway authorities are responsible for the sound management of hazardous chemicals' railway transport, the qualification approval of hazardous chemicals' railway transport carriers and shippers as well as the sound management of transport vehicles; Civil Aviation Authority is responsible for the supervision of air transport of hazardous chemicals, including the sound management of hazardous chemicals' air transport and airliners as well as the transport vehicles.

4.2.10 MPS (Ministry of Public Security)

MPS is responsible for the management of extremely toxic chemicals and precursor chemicals, including: public security management of hazardous chemicals; approval and issuance of extremely toxic chemical purchasing license and extremely toxic chemical road transport pass; sound management of road transport of hazardous chemical transport vehicles; management of precursor chemicals' purchase and transport.

4.2.11 GAC (General Administration of Customs)

GAC is in charge of chemical entry and exit management, including: research and formulate various customs rules for regulating goods import and export and organize the implementation of such rules, participate in the compilation, adjustment and announcement of "The List of Import and Export Controlled Ozone-Depleting Substances in China" and "The Catalogue of Toxic Chemicals Strictly Restricted from Import and Export in China", as well as monitoring the import and export of such chemicals; compile the statistics on import and export trading of chemicals and integrate and release the statistical information.

4.2.12 MOFA (Ministry of Foreign Affairs)

MOFA is the organ responsible for organizing and coordinating all relevant Ministries and commissions to take part in the negotiations on international conventions or international conferences and conduct relevant international cooperation, for handling the national affairs relating to bilateral or multilateral agreements and conducting corresponding international cooperation, as well as participating in the implementation of relevant international conventions.

4.2.13 NDRC (National Development and Reform Commission)

NDRC is responsible for: conducting comprehensive analysis on significant strategies concerning the harmonious development between the economic society and resources, chemicals and environment so as to facilitate sustainable development; organizing the development and coordinating the implementation of plans, policy instruments, laws and regulations concerning the comprehensive use of chemicals and the development of circular economy; proposing policy recommendations for macrocontrol of relevant industries, compiling the guidance directory for adjustment of industrial structure, organizing the development of plans and policies facilitating the development of chemical industry and the promotion of cleaner production and the formulation of

relevant standards; maintaining the overall balance of goods by taking macrocontrol measures, as well as adjusting the overall quantity planning based on the economic performance.

4.2.14 MOST (Ministry of Science and Technology)

MOST is responsible for the development of chemical-related scientific research projects and technologies, including: organizing the development of various types of chemical-related national scientific research programs, the planning and coordinating of chemical-related basic research, cutting-edge technology research, major public interest technology research, key technology research and generic technology research.

4.2.15 SAIC (State Administration of Industry and Commerce)

SAIC is mandated to instruct the Industry and Commerce Administrations at various levels to approve and issue chemical production, storage, operation and transport business license according to the permits issued by relevant departments respectively, legally investigate and prohibit non-license business operation, especially the legal investigation and prohibition of illegal purchase of hazardous chemicals by hazardous chemical operators.

4.2.16 Local and National Agencies for Special Purpose

In China, the management mechanism adopted by the chemical-related Administrations is a parallel mechanism of vertical management and territorial management. Take MEP and SAWS for instance. The Center of Solid Waste and Chemical Management Technology (MEPSCC) is a subordinate of the Ministry of Environmental Protection for providing technical support in the area of chemicals environmental management. The Center's responsibilities include the toxic chemical import and export environmental management registration and new chemical substance environmental management registration, GLP chemical test lab appraisal and assessment, toxicity identification and hazard assessment, as well as other relevant technical support such as training and consultation service. In addition, the territorial management system is adopted by Environmental Administrations below Provincial level, and each Province has designated an agency for conducting chemicals environmental management.

The Chemicals Registration Center of SAWS is an agency directly under the State Administration of Work Safety for providing comprehensive technical support in monitoring of hazardous chemical safety. The Center's responsibilities include the hazardous chemicals registration, chemical hazard category identification, chemical emergency rescue, hazardous chemical enterprises' safety production standardization, drafting and revising chemicals sound management regulations and standards, as well as chemicals sound management, major hazard installations monitoring, emergency rescue, occupational hazard prevention and control, and the relevant assessment, technology development, training and consultation, etc. In addition, SAWS has set up safety monitoring sub-stations in each Province (direct-controlled Municipality/Autonomous Region), and each sub-station has established an office designated for chemicals sound management.

4.3 Assessment

China attaches great importance to chemicals management and capacity building, currently a central-to-local synergy between all relevant management departments has been established, each department's functions have been defined to ensure the implementation of the existing system. However, as a developing country, China's chemicals management coordination needs to be strengthened between various governmental institutions, mainly in the following aspects: chemicals management information sharing, harmonization between management policies and actions; meanwhile, local grass-roots departments lack of specialized management agencies and professionals, knowledge on chemical risks and the capacity of risk identification and risk monitoring is not sufficient. Priorities and possible actions to be taken for strengthening China's chemicals management departments and their institutional capacities are shown in Table 4.2.

Table 4.2 Priorities and Possible Actions: Ministries, Agencies and other Governmental Institutions Managing Chemicals

Priority Issues	Level of Existing Capacity	Capacity Gaps and Needs	Possible Actions	Concerned Actors
Construction of chemicals management institutional system (including managerial personnel)	Low	the increasing demand for chemicals management can't be met due to Insufficient institutional construction of chemicals management from central to local	Strengthen the central-to-local institutional construction of chemicals management, recruit more personnel	Various sectors relating to chemicals management, from central to local
Professionals and technical support for management	Low	Lacking of chemicals management professionals, in sufficient institutions able of providing technical support	Strengthen the construction of professional teams and technical support institutions	Central and Local Environmental Administrations that are related to chemicals management

Chapter 5: Relevant Activities of Industry, Public Interest Groups, Professional Bodies, and the Research Sector

5.1 Chemicals Management-related Industry Associations

China's chemicals management involves a variety of industry associations and covers a number of key areas contributing large magnitude of chemical production, use and release, such as chemical production, textile printing and dyeing, paper and pulp making, electronic appliances and metallurgy, mainly including: China Petroleum and Chemical Industry Federation (CPCIF) and its affiliated associations, China National Light Industry Council (CNLIC) and its affiliated associations, (China National Textile and Apparel Council (CNTAC), China Iron and Steel Association (CISA), and China Non-Ferrous Metals Industry Association (CNIA), etc.

5.1.1 China Petroleum and Chemical Industry Federation (CPCIF) and its affiliated Associations

China Petroleum and Chemical Industry Federation (CPCIF) is a nation-wide comprehensive social medium with 300 member organs serving the petrochemical industry with certain management functions. Currently CPCIF has 41 specialized members, mainly including: China Crop Protection Industry Association (CCPIA), China Chlor-Alkali Industry Association (CCAIA), China Association of Fluorine and Silicone Industry (CAFSI), China National Coatings Industry Association (CNCIA), China Dyestuff Industry Association (CDA) and China Paper Chemicals Industry Association (CPCIA), etc., basically representing China's chemical production by covering 70% of the industry, such as pesticide, fertilizer, chlor-alkali, soda, dyestuff, coatings, r rubber, adhesives, fluorine and silicone material, polyurethane, synthetic rubber, synthetic resin, inorganic salts, calcium carbide, industrial gases, chemical reagents, etc.,

The functions of CPCIF include: conduct investigations and propose recommendations and suggestions concerning the industry development and legislation, participate in the formulation and implementation of laws and regulations, macrocontrol and industrial/environmental policies, industry development plans, industry access conditions, pollutants release standards and cleaner production standards; audit the chemical production permits and industry statistics as authorized, grasp domestic and foreign countries' industry development dynamics, collect, analyze and release industry information, and facilitate the industry's informatization construction; assist organizing the industry's research on key and generic technologies and major technical equipments, facilitate the dissemination and application of scientific and technological achievements; participate in the preliminary demonstration of the industry's major construction projects' advanced nature, economic value, practicability and environmental and health impacts, as well as the consultation of project planning; assist the governmental institutions in conducting industry standardization, facilitating

the industry's quality management, resources' comprehensive use, environmental protection and safety production, as well as in implementing chemical-related international conventions or protocols. In addition to promoting the concept of "Responsible Care" and "Environment, Health and Safety" (EHS), CPCIF has also been participating in the formulation and dissemination of a number of national standards concerning "Globally Harmonized System of Classification and Labeling of Chemicals" (GHS), "UN Recommendations in relation to the Transport of Dangerous Goods, Model Regulations" (TDG) and EU Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), etc.

5.1.2 China National Light Industry Council (CNLIC) and its affiliated Associations

China National Light Industry Council (CNLIC) is national and comprehensive intermediate organization with management functions serving the public interest, it has 69 affiliate associations which are closely related to chemicals use and management, including: China Household Electrical Appliances Association (CHEAA), China Daily Use Chemical Industry Association (CDUCIA), China Association of Surfactant Soap and Detergent Industries (CASSDI), China Association of Fragrance Flavor and Cosmetic Industries (CAFFCI), China Plastics Processing Industry Association (CPPIA), China Association of Lighting Industry (CALI) and China Battery Industry Association (CBIA).

CNLIC and its affiliate associations' functions are: conduct light industry survey and provide the Government with recommendations and suggestions concerning economic policies and legislation; organize the industry statistics, the collection, analysis, research and release of industry information, the statistical investigations and the establishment of e-business information network; participate in the development of industry plans, conduct preliminary demonstration and examination of the industry's investment development, major technology reform and technology introduction projects; strengthen the industry's self-restriction principles and behaviors, foster the specialized market and maintain equal competition; provide consultation for intellectual property protection, anti-doping, anti-subsidiary, anti-unfair competition and the fight against smuggling; organize the nomination of major scientific research projects, the appraisal and dissemination of scientific and technological achievements; participate in the formulation and revision of national standards and industry standards, organize and conduct supervision on the implementation of the standards; report the industry situation and enterprises' appeal, protect the industry and enterprises' legal rights and interest.

The affiliate associations of CNLIC, such as CHEAA, have been actively participating in the national implementation of chemical-related international conventions, including the implementation of "Montreal Protocol".

5.1.3 China Pharmaceutical Industry Association (CPIA)

China Pharmaceutical Industry Association (CPIA) was founded in 1988 by enterprises and entrepreneurs, its members are mainly from various types of economic facilities such as (chemical) drug-producing key enterprises (groups), Provincial and municipal medical associations, medical research and design institutes and universities. The principles of CPIA are: serve the enterprise, serve the industry, serve the government and serve the society. The 304 member entities are able to

contribute 60% of the total chemical and pharmaceutical industry's main business income and 55% of the total profit. Currently CPIA has 11 branches: one sub-association and ten committees. CPIA is responsible to provide beneficial policy recommendations to China's pharmaceutical industry; provide its member entities with valuable information on domestic and abroad economy, technology and policies through various means and forms and provide consultation services; organize technology and economic communication and promote green production, energy saving and pollution reduction; actively conduct the construction of chemical and pharmaceutical industry's integrity system, brand reputation and integration of informatization and industrialization, continuously organize the pharmaceutical enterprises' credit evaluation, recommend the industry's outstanding enterprises and excellent product brands, so as to evaluate the level of the integration of informatization and industrialization. Based on the extensive international communications and exchange activities, CPIA has successively signed bilateral cooperation Memorandum of Understandingwith the pharmaceutical associations from Korea, Japan, India, EU and Canada.

5.1.4 China National Textile and Apparel Council (CNTAC)

China National Textile and Apparel Council (CNTAC) is a national, a non-profit social intermediary organization by legal associations of the textile industry and other legal entities, currently including 22 professional associations and over 10 research and management agencies for providing professional services.

The main functions of CNTAS are: formulate the industry regulations and regulate the industry's behaviors by establishing the self-regulation mechanism for protecting the industry's interest; conduct survey on domestic and abroad textile industry's development trend, participate in or provide consultation for the textile industry's development strategies, industry policies, technical advancement, market development and opening and reform, provide the Government with relevant information and recommendations; provide the enterprises with relevant information and consultation services; coordinate the economic and technical relationship between different sectors, facilitate the industry structure adjustment and enterprises' restructuring, and promote the horizontal economic collaboration and cooperation.

In order to address the implementation of EU directives concerning the use of textile products, CNTAC has been adopting the proactive measures such as the "White List" and paying attention to the international and national regulatory policies concerning the hazardous chemicals contained in textile such as PFOS and NPE, its prompt release of alerts and suggestions to the industry enterprises has been useful for facilitating the industry's sustainable development.

5.1.5 China Non-Ferrous Metals Industry Association (CNIA)

China Non-Ferrous Metals Industry Association (CNIA) is a national non-profit social organization formed by non-ferrous metals industry's enterprises, institutions, social groups and relevant entities for realizing the common aspiration. China Iron and Steel Association (CISA) is a national organization of the iron and steel industry. As the two key actors in China's dioxins release,

CNIA and CISA have been actively participating in the implementation of the "Stockholm Convention", including cooperating with the Environmental Administrations by conducting the industry survey of dioxins research, formulating the industry's technical standards for control of dioxins release, conducting the industry's demonstration projects of dioxins release control, as well as developing the industry's dioxins control plan, etc.

5.2 China's Chemicals Management Organizations and Institutions

China's professional organizations and institutions related to chemicals management mainly involve the areas of environmental protection, health, pesticide and safety, which are to be elaborated as follows.

5.2.1 Solid Waste and Chemicals Management Technology Center of MEP (MEPSCC)

The Solid Waste and Chemicals Management Technology Center of MEP[4] is a subordinate of the Ministry of Environmental Protection providing technical support for chemicals environmental management, mainly responsible for: conduct research on policies, regulations, strategies, plans, standards and technical specifications for chemical risks control and pollution control; conduct relevant investigations, analysis and test, technical training, scientific research and international cooperation; assist the MEP in conducting chemicals management onsite investigations and daily monitoring, conduct technical review for relevant administrative examination and approval and provide technical guidance and services to the local chemicals environmental management institutions; provide technical support for contaminated sites environmental management and heavy metal pollution control; conduct chemicals management related information analysis and provide technical services, awareness training and social consultation. The Center is MEP's main technical support institution in conducting toxic chemical import and export registration and new chemical substance notification and registration.

5.2.2 Expert Committee for Chemical Substances Evaluation on Environmental Management

The Committee was established by MEP and composed by experts from chemistry, chemical industry, physic-chemistry, health, ecological toxicology, safety and environmental protection, its tasks mainly include: conduct new chemical substance chemicals management examination, conduct comprehensive review of toxic chemical import and export registration, and provide consultation and technical support for chemicals environmental management.

5.2.3 Chinese Center for Disease Control and Prevention (CDC)

Chinese Center for Disease Control and Prevention (CDC) is the public interest entity set up by the Government for conducting national disease prevention and control and providing public health technology management and services. Based on its main functions such as technology management

[4] The former Chemicals registration Center of MEP, renamed as of June 2013, with partial adjustment and supplementation of the original chemicals management function, such as newly added solid waste environmental management.

and technical support, CDC is responsible for: develop various types of diseases' prevention and control plan; conduct scientific research on public health business management and application in the fields of product safety, radioactive health, environmental health, women and children's health, etc., provide technical guidance, training and quality control in national disease prevention and control and public health services. So it plays an important role in the construction of national disease prevention, emergency response and public health information capacity. CDC's branches include the National Institute of Occupational Health and Poison Control and the Institute for Environmental Health and Related Product Safety, in which the former has been qualified as level 1 chemical toxicity identification entity and level-1 construction project occupational hazard assessment entity, also attached by Occupational Health Standard Committee of National Health and Family Planning Commission (NHFPC), Industrial Hygiene and Occupational Disease Committee of Chinese Preventive Medicine Association (CPMA), Professional Committee of Industrial Toxicology of Chinese Society of Toxicology (CST), Occupational Health Professional Committee of China Occupational Safety and Health Association (COSHA).

5.2.4 National Pesticide Registration Review Committee

The National Pesticide Registration Review Committee is composed by pesticide management experts and pesticide technology specialists from chemistry, forestry, chemical industry, health, environmental protection, food industry and the "National Supply and Marketing Cooperative General Agency", its responsibilities include: conduct assessment on pesticides' chemical, toxicological, efficacy, residue and environmental impacts for review of pesticide registration application; conduct post-registration monitoring and assessment; carry out the specific tasks of the National Pesticide Registration Review Committee Secretariat, the National Pesticide Residue Standard Committee Secretariat and the Codex Committee on Pesticide Residues (CCPR) Secretariat.

5.2.5 Institute for the Control of Agrochemicals, MOA (ICAMA)

The Institute for the Control of Agrochemicals (ICA) is the direct affiliate of the Ministry of Agriculture (MOA) responsible for the specific job of national pesticide registration and management, including: pesticide registration and management, pesticide quality test, pesticide residue test, pesticide residue monitoring, pesticide market supervision, pesticide information exchange, as well as foreign cooperation and services, etc.

5.2.6 National Registration Center of Chemicals, SAWS

The National Registration Center of Chemicals (NRCC) is an institution directly under the State Administration of Work Safety (SAWS) that provides comprehensive technical support for hazardous chemicals safety supervision. NRCC's responsibilities include: hazardous chemicals registration, chemical hazard category identification, chemical emergency response and rescue, hazardous chemical enterprises' safety production standardization, formulation and revision of chemicals sound management regulations and standards, the subject research on chemicals sound management, major hazard installations monitoring, emergency rescue and occupational hazard prevention and control, as

well as the relevant assessment, technology development, training and consultation, etc.

5.2.7 China Chemicals Safety Association (CCSA)

China Chemicals Safety Association (CCSA) was formerly the China Chemical Safety and Hygiene Technology Association (CCSHTA) founded in 1993 and renamed in 2005, currently serving the State Administration of Work Safety. CCSA members are mainly from chemical production enterprises owned by the Central Government, local large-scale chemical production key enterprises, chemical industry institutes and safety production scientific research institutes, etc. CCSA is mainly responsible for providing services to the industry, the enterprises and the Government by playing the role of bridge as a social group, disseminating the laws and regulations on hazardous chemicals safety production among the members and in the industry, organizing the experience exchange between different enterprises, conducting various forms of training and seminars, providing sound management technology consultation services to the enterprises, at the same time actively promoting the dissemination and application of internationally advanced technologies concerning chemicals safety production. In addition, CCSA is mandated to report to the relevant departments the existing issues and problems relating to the implementation of relevant policies, provide the governmental departments the recommendations in relation to chemicals safety supervision and management, and provide professional opinions to the Government in drafting the chemicals safety regulations, rules and technical standards.

5.2.8 China Association of Work Safety (CAWS)

China Association of Work Safety (CAWS) was founded in January 2008 as a professional organization under the State Administration of Work Safety (SAWS). CAWS is comprised by 6 professional committees: coal mine safety, metal/non-metal mine safety, metallurgy safety, labor protection, hazardous chemicals safety and fireworks and firecrackers safety. The Hazardous Chemicals Safety Professional Committee is specialized in hazardous chemicals safety activities, and as consigned by the governmental department, its obligations include: participate in the formulation and revision of chemicals safety regulations, rules and standards; conduct research and investigations for providing the governmental department with recommendations in relation to chemicals safety supervision and management; organize safety production experience exchanges and provide sound management and technology consultation, promote chemicals safety production related new technologies, new processes, new materials to facilitate the progress of safety production technologies; organize safety training and seminars.

5.2.9 China Occupational Safety and Health Association (COSHA)

China Occupational Safety and Health Association (COSHA) was established in1983 with the name of China Society of Labor Protection Science and Technology. COSHA's functions mainly include: provide consultation and recommendations for national occupational safety, health and safety production as well as the development of relevant science and technology; disseminate new achievements, new technologies and new products for facilitating the relevant industry development;

conduct investigations on important issues related to occupational safety, health and safety production for providing the industry and enterprises with consultation and recommendations; conduct international exchange and cooperation of occupational safety, health and safety production, compile, publish and circulate books and periodicals concerning occupational safety, health and safety production; organize the scientific research on occupational safety, health and safety production as well as the training and education activities; organize and engage in the assessment of occupational safety, health and safety production as well as the risk assessment, technical standards evaluation and scientific appraisal, etc.

5.3 China's Chemicals Management Related Scientific Research Groups

5.3.1 Universities

Table 5.1 shows some of Chinese universities engaged in the subject research on chemicals management, which are playing an important role in China's chemicals management related basic scientific research and chemical risks management decision making related technology support research.

Table 5.1 Examples of Universities/Institutes Related to Chemicals Management

Names of Universities	Main Tasks
Peking University	Long-term engagement with the basic research on chemicals environmental problems and chemicals environmental management such as ODS, POPs and EDCs, one of the earliest dioxins laboratories established in China. Initiated the drafting of "China's National Plan for Implementing the 'Montreal Protocol on Substances that Deplete Ozone Layer' " and "China's National Plan for Implementing the 'Stockholm Convention on Persistent Organic Pollutants' " and compiled the "12th Five-Year Plan for Chemicals environmental Risks Prevention and Control" as assigned by MEP, having provided significant policy support for national implementation of international conventions and chemicals environmental management.
Tsinghua University	Having established the "Basel Convention" and "Stockholm Convention" Asia-Pacific Coordination Center. Dedicated to the basic research on Dioxins/POPs as well as POPs alternative technologies, host of national POPs forum and POPs professional website.
Nankai University	Dedicated to advanced research on POPs, EDCs and personal care products.
Zhejiang University	Having established the dioxins lab and conducted research on dioxins treatment technology, advanced capacity in testing of chemical products and pesticides' ecological toxicology.
China Agricultural University	Focusing on pesticide research, such as advanced research on pollution and risks caused by NP and EDC substances.
Ocean University of	Having conducted basic research on POPs and EDC substances.

China	

Besides the universities listed above, Beijing Institute of Technology (BIT) and Beijing University of Chemical Technology (BUCT) have been conducting productive research in chemical products development, green chemistry and chemicals life cycle stages. Some medical universities are conducting research on chemical toxicology. In addition, a number of agricultural universities have been conducting dedicated research on pesticides' toxicology, residue and environmental hazard, such as Northwest Agriculture & Forestry University, Nanjing Agricultural University and Huazhong Agricultural University.

5.3.2 Research institutes

Table 5.2 is a list of China's chemical related research institutes, most of which are specialized institutes affiliated to Chinese Academy of Sciences or environment, health and hazardous chemicals sound management system.

Table 5.2 Examples of Research institutes Related to Chemicals Management

Research Institutes	Main Tasks
Chinese Academy of Sciences	Chinese Academy of Sciences is China's highest academy of science and technology and the comprehensive natural science and high technology research and development center, its two branches Research Center for Eco-Environment Sciences and Guangzhou Institute of Geochemistry have been conducting China's key projects of POPs-related basic scientific research and technology development, as well as the basic scientific research on environmental chemistry and environmental risks related to toxic chemicals such as POPs, EDCs and heavy metals.
Chinese Research Academy of Environmental Sciences (CRAES)	As a non-profit and social-interest national environmental protection research institute affiliated to MEP China, it has established a State Key Laboratory of environmental criteria and risks control, as well as a Chemicals Ecological Effects and Risk Assessment Key Laboratory that belongs to MEP. It has been conducting basic research on environmental risk assessment as well as the basic application research, including the mechanisms of chemicals environmental ecological effects, environmental toxicology, environmental safety assessment technologies and theories.
Other environmental research institutes directly under MEP	Mainly including the National Research Center for Environmental Analysis and Measurement, Nanjing Institute of Environmental Sciences and South China Institute of Environmental Sciences. The National Research Center is responsible for cooperating with MEP in addressing the key and comprehensive problems in the field of environmental analysis and measurement, it has established a national environmental protection dioxins pollution control Key Laboratories, which has conducted a lot research on POPs and EDCs environmental surveillance; Nanjing Institute has been engaged in the research on ecological preservation and agricultural environment for a

	long time, including the research on toxic and hazardous chemicals ecological effects and pollution control, the assessment of pesticides and chemicals environmental safety, etc.; South China Institute is capable of conducting surveillance and analysis on environmental trace pollutants such as POPs and EDCs
China Center for Disease Control and Prevention (CDC) and affiliates	Mainly including National Institute of Occupational Health and Poison Control and the Institute for Environmental Health and Related Product Safety. The former is engaged in the research on occupational health, occupational medicine, poison control, industrial toxicology and occupational health management, etc., also attached by a number of affiliates such as the Occupational Health Standard Committee of National Health and Family Planning Commission (NHFPC); the latter is a national professional agency for environment and health related products safety as well as the national technology center for guiding the business related to environment and health products safety, specifically, it is the national test and arbitrary entity conducting measurement and safety assessment on health relation products such as cosmetics, products involving drinking water, sanitized products, electromagnetic radiation products, building materials, paints, air purifying products.
Chinese Academy of Inspection and Quarantine (CAIQ)	Its main tasks are the research on the inspection, quarantine and application, as well as the relevant basic research and high-tech and soft science research, it has a solid capacity in scientific and technological research such as the hygienic quarantine and analytical measurement of chemicals, cosmetics, mechanical and electrical products, consumer goods safety and food safety. It has 11 State Key laboratories, in addition to a number of laboratories having authoritative capability in measuring the criteria, dioxins, nanomaterials and chemical products, as well as the Institute of Chemicals Safety, SAIQ and the Research Center for Import-Export Chemicals Safety, AQSIQ.
China Academy of Safety Science and Technology (CASST)	Its subsidiary, the Institute of Hazardous Chemicals Safety Technology, is mainly responsible for conducting hazardous chemicals incidents prevention and safety analysis, surveillance technology research, the drafting of hazardous chemicals safety plan, emergency response plan and the relevant safety technology standards, as well as the construction of the hazardous chemicals information management system.
Main scientific research institutes of the China's chemical industry	Mainly including Shenyang Research Institute of Chemical Industry, Zhejiang Research Institute of Chemical Industry and Beijing Research Institute of Chemical Industry. Shenyang Institute is the GLP certified safety assessment institution engaged in the research and development of refined chemicals such as pesticides, dyestuff, intermediary products and chemical auxiliaries as well as the production of high-tech products; Zhejiang Institute is the only national technical research center of ODS alternative project in China, mainly engaged in the technology innovation and development in the fields of fluorochemical industry, new pesticides, new materials and technical services; Beijing Institute has established the National Engineering Research Center for Polyolefin, the National Engineering Research Center for Rubber/Plastics New Material Synthesis, and the National Polymer Materials and Products Quality Surveillance and Inspection Center, which have a comparatively strong capacity in conducting basic and professional research on organic synthesis, polymerization, plastic processing and synthetic rubber.

5.3.3 Private Laboratories

With the gradual development of chemicals management, the number and scale of professional service companies and private laboratories engaged in chemicals management in China have been increasing, mainly in providing professional consultation and technical services to chemical enterprises and relevant industries, such as legal consultation, chemical registration and third-party chemical test, etc.

5.4 Social Interest Organizations

The public interest groups participating in chemicals management are mainly concentrated in the area of environmental protection. In recent years, with the growing attention from the social public, Chinese public interest groups from the field of consumers protection and environmental protection are paying more and more attention to chemicals health and environmental problems and increasingly starting to participate in the chemicals management activities to play a role on publicity and social surveillance, which has significantly facilitated the government and enterprises' chemicals environmental management actions.

5.4.1 Consumers Protection Organizations

In China, there are consumer's rights and interest protection organizations in both central and local levels, mainly including China Consumers Association (CCA) and each Province's consumers association, which are actively supervising the legal and reasonable use of chemicals contained in various types of food, drugs, cosmetics and textiles in the market, as well as investigating and disclosing the illegal use of chemicals (such as food additives and pesticide residues) in consumer goods, or making sure the legal and reasonable use of hazardous chemicals in cosmetics and textiles.

5.4.2 Environmental Organizations

In China, the environmental organizations include both the large and authoritative organizations keeping close tough with the Chinese Government such as China Environmental Protection Foundation (CEPF) and All-China Environment Federation (ACEF), as well as the spontaneously formed civil groups such as Beijing Global Village Environmental Education Center, "Friends of Nature" and Public Environmental Research Center. Dedicated to the improvement of the public's knowledge of chemicals "safety, health and environment" problems and ability to act, China's environmental organizations have successively initiated a series of chemical EHS projects focused on metal pollution and POPs; at the same time, they have taken effective actions in urging information disclose by the toxic chemicals release enterprises as well as in appealing public supervision and promoting green consumption.

Meanwhile, some international environmental protection NGOs such as the International POPs Elimination Network (IPEN) and Greenpeace have been paying attention to China's chemicals management problems by releasing the relevant survey report and hosting seminars, which has also

played an incentive to the exchange of information on chemicals management and the improvement of public awareness.

5.5 Expertise Available Outside of Government

The chemical-related expertise available outside of Chinese Government is summarized in Table 5.3

Table 5.3 Summary of Expertise Available from NGOs Outside of Government

Field of Expertise	Research Institutes	Universities, incl. University Hospitals	Industry	Environmental /Consumer Groups	Professional Organizations
Data Collection	X	X	X	X	X
Testing of Chemicals	X	X	X		X
Risk Assessment	X	X	X		X
Risk Communication	X	X	X	X	X
Risk Reduction	X	X	X	X	X
Policy Analysis	X	X	X	X	X
Classification and Labeling	X	X	X		X
Training and Education	X	X	X	X	X
Accreditation					X
Research on Alternatives	X	X	X		
Monitoring	X	X	X		
Health Surveillance	X	X	X	X	X
Environmental Surveillance	X	X	X	X	X
Enforcement	X	X	X	X	X
Information to Workers	X		X	X	X
Information to Specific Professional Groups	X	X	X	X	X
Information to Public	X	X	X	X	X
Diagnoses and	X	X	X		X

Treatment of Poisoning					
Other (specify)					

5.6 Assessment

China has established a comparatively systematic and multi-channel network of social organizations related to chemicals management, which have been playing different levels of functions by conducting relevant activities in respective areas, including industry associations, professional groups, research institutes and public interest groups. The chemical industry associations have been actively pushing forward the EHS development of China's chemical industry and promoting the dissemination of the concept and principle of "Responsible Care", which has greatly facilitated the industry's gradual realization of cleaner production. In the areas of occupational safety, public health and environmental protection that are related to chemicals management, China has established a comparatively systematic organizational mechanism, correspondingly a large number of scientific research institutes with certain research and development capacity have been established in chemicals (incl. dioxins) monitoring, risk assessment and risk control, all of which have formed a national network of technology support for chemicals management. Since the beginning of the 21st century, Chinese Government has significantly increased the investment in the basic scientific research and technology development projects related to chemicals environmental and health risks caused by POPs, heavy metals and EDCs, most of which have been listed as the "State Key Basic Research and Development Programme" (973 Programme), the National High Technology Research and Development Programme (863 Programme), the National Science and Technology Support Programme and the National Environmental Protection and Public interest Special Programme, which has significantly improved the national level of basic research and decision-makings support on chemicals management. In addition, professional monitoring institutions, technical support services as well as environmental public interest organizations have been paying more attention to chemicals management. Their supply of technology consultation and services, their participation in enterprises' chemicals management and public supervision, have become a useful supplementary to the national chemicals management.

However, due to the limitation of China's current stage of economic development and environmental protection, China's industry associations, professional groups and other social institutions have been inadequate in facilitating the national chemicals management and the realization of 2020 international strategic targets for chemicals management, mainly including: the leading role of the chemical industry's associations in practicing "Responsible Care" (RC) and promoting green chemicals needs to be enhanced, the system integration, resources sharing and harmonious cooperation between professional organizations need to be strengthened, the scientific research groups' basic research and technology development capacity related to chemicals health and environmental risk assessment and risk control need to be reinforced, and the professionalism of and effective participation by social welfare environmental organizations in chemicals management needs to be

intensified. In summary, academic and scientific research institutes' capacity in facilitating the industry's chemicals management is still insufficient, and the priority issues need to be addressed in the future, which are listed in Table 5.4.

Table 5.4 Priority Issues and Possible Actions: Relevant Activities of Industry, Public Interest Groups, Professional Bodies and the Research Sector

Priority Issues	Level of Existing Capacity	Capacity Gaps and Needs	Possible Actions	Concerned Actors
To enhance the industry's leading role in practicing "Responsible Care" and promoting green chemicals	Low	Insufficient capacity and strength of the industry in conducting chemicals management, inadequate leading role of the industry	Enhance the industry's policy incentives and industry training for sound management of chemicals, industry associations should intensify the promotion of "Responsible Care" and green chemical practice	MIIT, MEP, chemical industry, etc.
To strengthen the resources sharing and harmonious cooperation between professional groups in chemicals management	Medium	Insufficient configuration and sharing of systematic resources between various professional institutions, insufficient coordination and cooperation	Promote macrostructure, resources sharing and harmonious cooperation between major professional organizations, establish reasonable mechanism of resources sharing and harmonious cooperation	MEP, MOH, MOS, MIIT, MOA, AQSIQ and affiliate professional institutions
To intensify the systematic and preemptive research and development of chemicals health and environmental risks and control by scientific research institutes	Medium	Decentralized operation of existing research projects, indistinct objectives and applicability, and lack of prospective	Conduct national-level strategic planning of chemical risk and control sciences and technologies, conduct systematic design and relevant research	MOST, MOE, MEP, MOH and affiliate research institutes; Chinese Academy of Sciences and affiliated research institutes; major research universities
To improve the professional and	Low	Low degree of attention to chemicals research by	Provide chemicals management expertise	Environmental NGOs

effective participation of chemicals management by environmental NGOs		environmental NGOs and insufficient acquirement of professional knowledge	and skill training for environmental NGOs, stimulate its active role in national chemicals management	

Chapter 6: Interministerial Commissions and Coordinating Mechanisms

6.1 Overview of Interministerial Commissions and Coordinating Mechanisms

At present, China has established the coordinating mechanisms for chemicals management, such as Hazardous Chemicals Safety Production Supervision Interministerial Joint Conference, State Ozone Layer Protection Leading Group, National Coordination Group for Stockholm Convention Implementation, GHS Implementation Interministerial Joint Conference and Dangerous Goods Transport Coordinating System, etc., which has provided a basis for conducting effective management of chemicals and strengthening the coordination and cooperation between different Ministries, as shown in Table 6.1 and described in detail in Section 6.2.

Table 6.1 Overview of Interministerial Commissions and Coordinating Mechanisms

Name of Mechanism	Responsibilities	Secretariat	Members	Legislative Mandate / Objective	Effective-ness
Hazardous Chemicals Safety Production Supervision Interministerial Joint Conference	To propose relevant policy recommendations based on national safety production of hazardous chemicals; supervise the implementation of regulations and policies on hazardous chemicals safety production; coordinate the addressing of major problems related to hazardous chemicals safety supervision.	SAWS	SAWS, NDRC, MOE (Ministry of Education), MOST, MIIT, MPS, MOS (Ministry of Supervision), MOF (Ministry of Finance), MOHRSS (Ministry of Human Resources and Social Security), MEP, MOHURD, MOT, MOR, MOA, MOH, SASAC (State Assets Supervision and Administration Commission), SAIC, AQSIQ, State Council Legislative Affairs Office, ACFTU (All-China Federation of Trade Unions) and NCAA (National Civil Aviation Administration)	In accordance with: "State Council's Reply to the Establishment of the System of Hazardous Chemicals Safety Production Supervision Interministerial Joint Conference" (GuoHan〔2007〕36); "Letter from the State Council General Office Concerning the Adjustment of the Member Entities and Members of Hazardous Chemicals Safety Production Supervision Interministerial Joint Conference" (GuoBan Han〔2009〕53)	High

State Ozone Layer Protection Leading Group	To implement the "Vienna Convention" and "Montreal Protocol", organize the implementation of "China's National Plan for Gradual Elimination of Ozone-Depleting Substances", review various implementation plans and propose recommendations for decision making.	MEP	MEP, MOFA, NDRC, MOF, MOST, MPS, MIIT, MOA, GAC, CFDA, SGA (State Grain Administration) and STMA (State Tobacco Monopoly Administration)	In accordance with: "China's National Plan for Gradual Elimination of Ozone-Depleting Substances"	High
National Coordination Group for Stockholm Convention Implementation	To review and implement the national policies on POPs management and control, coordinate the major matters concerning the national management of POPs and "Stockholm Convention" implementation.	MEP	MEP, MOFA, MIIT, NDRC, MOST, MOF, MOHURD, MOC, MOA, NHFPC, AQSIQ, SAWS, GAC and SERC (State Electricity Regulatory Commission)	In accordance with: "The National Implementation Plan of the People's Republic of China for Implementing the 'Stockholm Convention on Persistent Organic Pollutants' "	High
GHS Implementation Interministerial Joint Conference	To develop national plan and relevant policies for implementing GHS system, coordinate the addressing of major problems in GHS implementation, propose recommendations for making and adjusting laws and regulations concerning GHS implementation, appraise the annual progress of GHS implementation, review the GHS implementation work report, and fulfill other tasks assigned by the State Council.	MIIT	MIIT, MOFA, NDRC, MOF, MEP, MOT, MOR, MOA, NHFPC, GAC, SAIC, AQSIQ and SAWS	In accordance with: "The State Council's Requirement for Implementing the GHS Implementation Interministerial Responsibilities and Joint Conference System"	Normal
Dangerous Goods Transport	As one of the formal members of the United Nations Committee of Experts on the Transport	NDRC	MIIT, MOT, AQSIQ, SRA(State Railway Administration), NCAA	In accordance with: Requirement for its member countries to implement the	Normal

Coordinating System	of Dangerous Goods, attend twice a year the conference of the United Nations Committee of Experts on the Transport of Dangerous Goods, participate in the discussion on the proposals by its member countries and take part in decision-making.		and CRC (China Railway Corporation)	responsibilities by the United Nations Committee of Experts on the Transport of Dangerous Goods	

6.2 Description of Interministerial Commissions and Coordinating Mechanisms

6.2.1 Hazardous Chemicals Safety Production Supervision Interministerial Joint Conference

In June 2007, China's State Council approved the establishment of the system of "Hazardous Chemicals Safety Production Supervision Interministerial Joint Conference", which is a mechanism under the guidance of the State Council and led by SAWS, with its members from 21 Ministries and commissions such as MEP and MOA (see Table 6.1) fulfilling their responsibilities respectively. In principle, the conference is held once in a half year, in addition to unscheduled meetings to be held as necessary or requested by the member entities.

This mechanism is used for analyzing the national situation of hazardous chemicals safety production and proposing policy recommendations; supervising the "Safety Production Law" and the "Regulations on the Safety Management of Hazardous Chemicals" as well as the State Council's guidelines and policies concerning hazardous chemicals safety production; researching and guiding the work of hazardous chemicals safety supervision, coordinating and addressing the major problems related to hazardous chemicals safety supervision.

6.2.2 State Ozone Layer Protection Leading Group

In 1991, China approved the establishment of the State Ozone Layer Protection Leading Group, an interministerial coordinating body of the Chinese Government. The group is led by MEP and composed by 18 member entities such as MOFA (Ministry of Foreign Affairs), NDRC (National Development and Reform Commission) and MOA (Ministry of Agriculture), each working according to their assigned responsibilities.

The Leading Group is responsible for implementing the "Vienna Convention" and "Montreal Protocol" and organizing the implementation of "China's National Plan for Gradual Elimination of Ozone-Depleting Substances", as well as reviewing the implementation plans and proposing recommendations for decision making. The Project Management Office of "Montreal Protocol" multilateral fund is an administrative organ composed by the personnel from the Department of Pollution Prevention and Control (DPPC) and the Foreign Economic Cooperation Office (FECO) of

MEP, responsible for the selection, preparation and application of multilateral fund projects, as well as the unified coordination, management and supervision of the projects implementation.

6.2.3 National Coordination Group for Stockholm Convention Implementation

In order to ensure the effective implementation of the "Stockholm Convention", the State Council approved the establishment of "National Coordination Group for Stockholm Convention Implementation" ("NCG"), which is composed by 14 Ministries and commissions: MEP as the leader, members including MOFA (Ministry of Foreign Affairs), NDRC (National Development and Reform Commission), MIIT (Ministry of Industry and Information Technology), MOST (Ministry of Science and Technology), MOF (Ministry of Finance), MOHURD (Ministry of Housing and Urban-Rural Development), MOA (Ministry of Agriculture), MOC (Ministry of Commerce), NHFPC (National Health and Family Planning Commission), GAC (General Administration of Customs), AQSIQ (General Administration of Quality Supervision, Inspection and Quarantine), SAWS (State Administration of Work Safety) and SERC (State Electricity Regulatory Commission).

The NCG's responsibilities include: review and implement the national guidelines and policies concerning POPs management and control, coordination the major matters related to national POPs management and Convention implementation, review and approve the annual work plan for Convention implementation, inspect the implementation of the annual work plan and the implementation of the National Implementation Plan (NIP), approve the establishment of an expert committee and its members, in addition, the NCG members are responsible to develop and organize the implementation of the annual work plan. The NCG holds the coordinators meeting once a year and the liaisons meeting twice a year. The NCG has established the NCG Office for handling the daily affairs relating to Convention implementation and providing technical support, which is composed by the Department of Pollution Prevention and Control, the Department of International Cooperation and the Foreign Economic Cooperation Office of MEP; in addition, a National Coordination Group Expert Committee has been established for providing decision-making support to national implementation actions, the experts are from relevant Ministries, industries and scientific research institutes.

6.2.4 GHS Implementation Interministerial Joint Conference

In 2012, the GHS Implementation Interministerial Joint Conference system was established for fulfilling China's commitment to UN for implementing GHS system and for strengthening the interministerial cooperation. The IJC has 13 member entities, including MOFA, NDRC, MEP, MOA and SAWS, etc., as well as the leading entity MIIT. The IJC Office responsible for the routine work and it's attached to the Department of Raw Material Industry of MIIT. The Joint Conference is held irregularly, hosted by the convener or by another member as authorized by the convener.

The IJC is responsible to develop the national plan for GHS implementation and relevant policies, coordinate the addressing of major problems in GHS implementation, propose recommendations for making and adjusting laws and regulations concerning GHS implementation, evaluate the annual progress of GHS implementation, and review the work report of GHS implementation.

6.2.5 United Nations Committee of Experts on the Transport of Dangerous Goods

The "United Nations Committee of Experts on the Transport of Dangerous Goods" (TDG) is a task force established in 1953 by United Nations Economic and Social Council (ECOSOC) for conducting research on the international safety transport of dangerous goods. In May 1988, China was accepted as a formal member of TDG Experts Committee as approved by ECOSOC, and as of December 1988, China has been attending the TDG meetings twice a year for a consecutive 25 years, as organized by NDRC (National Development and Reform Commission) and participated by MIIT (Ministry of Industry and Information Technology), MOT (Ministry of Transport) and AQSIQ (General Administration of Quality Supervision, Inspection and Quarantine), etc. In order to fully play its role as the member country of the United Nations Committee of Experts on the Transport of Dangerous Goods, China has been actively fulfilling its responsibilities and participating in the proposal discussion, which is beneficial to the protection of China's rights and interest in international trade and dangerous goods transport and the gradual improvement of China's management system of dangerous goods transport, as well as China's research on the problems relating to dangerous goods transport.

6.3 Description of Mechanisms for Obtaining Input from Nongovernmental Organizations

In China, all experts and scholars from the universities, enterprises, industries, scientific research institutes and academic groups have access to participating in chemical-related professional coordinating committees related and thus providing technical support for chemical-related information sharing, reports appraisal, plans development, as well as the implementation of relevant national plans and policies.

6.4 Assessment

Chinese Government has successively approved the establishment of a number of interministerial joint conference and coordinating mechanisms related to chemicals management and Convention implementation, which has played a positive role in conducting effective management of chemicals. Under these mechanisms, all member entities have been communicating and coordinating various opinions according to their respective responsibilities and the agreed principles, so as to facilitate the fulfillment of chemicals management tasks. However, China's chemicals management has been involved by various coordinating mechanisms with various targets, therefore, in order to integrate with the globally systematic development of chemicals management and meet the strategic goals for international chemicals management, it is necessary to consolidate the systematic integration and the unification of national chemicals management policies, strategies and actions. The priorities and actions for China's construction of chemicals management coordinating mechanisms are described in Table 6.2.

Table 6.2 Priorities and Possible Actions: Interministerial Commissions and Coordinating Mechanisms

Priority Issues	Level of Existing Capacity	Capacity Gaps and Needs	Possible Actions	Concerned Actors
To integrate and establish the national level chemicals management interministerial coordinating mechanisms	Medium	Decentralized coordinating mechanisms, lacking of national and macro level coordination and unification of policies and management actions	Integrate the existing coordinating mechanisms and establish the national chemicals management interministerial coordinating mechanisms, coordinate the policies and management actions in various areas such as chemicals safety, environment and health	State Council and all relevant Ministries

Chapter 7: Information Management, Access and Use

7.1 Overall Availability of Data for National Chemicals Management

The production, import, export, transport, storage, operation(2000 年版用的 distribution), use and disposal of chemicals involve various types of information and data, some are from statistical data, some from research data, some from industries and enterprises, and some are international data, all of which constitute the basic information and data for chemicals management.

According to "Regulations on Pesticide Control", the pesticides registration system and production licensing system are being implemented in China, through which the data related to chemical products' chemical and toxicological properties, residues, environmental impacts and labeling shall be obtained. The packaging of pesticides must be attached with a label or use instructions indicating the toxicity and sign, warnings and poisoning rescue steps, etc. In order to ensure the agricultural products' safety from the source, MOA has published the list of pesticides strictly banned by the State and the list of highly toxic pesticides not allowed to be used on vegetables, fruit trees, tea trees and herbal medicine plants.

According to the "Regulations on the Sound Management of Hazardous Chemicals", China is implementing the registration system for hazardous chemicals, whose production, use, import, export, operation and transport is subject to licensing system. The implementation of registration and licensing systems can help get the information and data related to hazardous chemicals classification and labeling, physico-chemical properties, usage, hazard characteristics, safety requirements for storage, use and transport, emergency response measures, as well as production and operation statistics, etc. A safety data sheet must be packed with the hazardous chemicals and a safety label matching the hazardous chemicals inside must be pasted on or tied to the package.

According to the "Measures for Environmental Management of New Chemical Substances", China enforces pre-production and pre-import notification and registration system on new chemical substances that are going to enter the market, through which the data related to new chemical substances' physico-chemical properties, health and environment shall be obtained for conducting hazard identification, hazard assessment, exposure prediction and risk control.

According to "Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Wastes" and "Measures for the Prevention and Control of Environment Pollution by Hazardous Chemical Wastes", China enforces notification and registration system on industrial solid wastes and hazardous wastes, including discarded and hazardous chemicals, through which the data related to the types, generation, destination, storage and disposal of the solid wastes shall be obtained. In addition, the entities generating discarded and hazardous chemicals are required to provide information including the chemical safety data sheet.

According to the "Emergency Response Law of the People's Republic of China", the "Regulations on the Sound Management of Hazardous Chemicals" and the "National Plan for Emergency Response", all governments and enterprises should formulate a hazardous chemicals emergency response plan, in which the provisions on hazardous chemicals emergency preparation, early warning and response shall be included.

According to the "Law of the People's Republic of China on Prevention and Treatment of Occupational Diseases", China enforces occupational disease risk project notification system and construction project occupational disease risk pre-evaluation system, the employers/construction entities must report relevant information to the Administration of Work Safety, meanwhile, the employers must conduct regular inspection and evaluation on the occupational disease risk factors in the workplace and disclose such information to the Administration and the labors.

According to the "Law of the People's Republic of China on Environmental Protection" and the "Measures for the Administration of the Charging Rates for Pollutant Discharge Fees", the pollutant dischargers must provide the Environmental Administrations with data on the types and quantities of the discharged pollutants. According to the "Regulations on the Sound Management of Hazardous Chemicals" and the "Measures for Environmental Management Registration of Hazardous Chemicals", producers and users of hazardous chemicals under key environmental management must report to the Environmental Administrations the relevant information on the environmental release of hazardous chemicals under key environmental management.

The administrative departments have got certain information on chemicals through the implementation of regulations, however, the existing data cannot fully meet the demand for chemicals management, such as the list of chemicals release, the chemical's regional impact assessment, the measures for reducing chemical risks, etc., the relevant data still need to be collected by relevant departments with dedicated activities and large resources input. Table 7.1 is an overview of the existing data on chemicals management in China.

Table 7.1 Sufficiency (in Quality and Quantity) of Available Information

Data Needed for/to:	Pesticides (Agricultural, Public Health and Consumer Use)	Industrial Chemicals	Chemical Wastes
Priority Setting	X	X	X
Assess Chemicals Impact under Local Conditions	X		
Risk Assessment (Environment / Health)	X		
Classification / Labeling	X	X	X

Data Needed for/to:	Pesticides (Agricultural, Public Health and Consumer Use)	Industrial Chemicals	Chemical Wastes
Registration	X	X	X
Licensing	X	X	X
Permitting	X	X	X
Risk Reduction Decisions	X		
Incident Preparedness / Response	X	X	X
Poisoning Control	X	X	X
Emissions Inventories			
Inspections & Audits (Environment / Health)	X	X	X
Information to workers	X	X	X
Information to the Public			

7.2 Sources of National Data and their Access and Format

China's statistical system is a comparatively complete system, in which various data are under possession and management by different Ministries according to their respective responsibilities. The national data are collected and disseminated in the forms of documents, publications and computer data, the governmental departments and the public may obtain these data through consulting, purchasing the publications or accessing to the computer network.

Statistical data include the statistics on production and those on import/export. The production statistics are reported by all production entities as required and the National Bureau of Statistics (NBS) is responsible for collecting, integrating and analyzing. The import/export data are real data reported to the Customs by the importers/exporters, the Local Customs' Statistical Departments shall integrate the data monthly and then report to the General Administration of Customs (GAC) for unified management.

According to the "Emergency Response Law of the People's Republic of China" and "National Emergency Response Plan", the industrial incidents and transport incidents must be reported to the relevant departments, who will collect and integrate the data and report to the State Administration of Work Safety (SAWS) and the competent Ministries.

According to the "Law on the Prevention and Control of Environmental Pollution by Hazardous Chemical Wastes", the Ministry of Environmental Protection is responsible for the management of data on discarded and hazardous chemicals.

According to the "Regulations on Pesticide Control", the Institute for the Control of Agrochemicals of the Ministry of Agriculture (ICAMA) is responsible for collecting the registration data of pesticides, the Ministry of Agriculture is responsible for integrating and maintaining the data.

According to the "Measures for the Administration of Registration of Hazardous Chemicals", as a subsidiary of SAWS, the Chemicals Registration Center of each Province is responsible for the registration of hazardous chemicals and reporting to the State Administration of Work Safety.

According to the "Measures for Environmental Management of New Chemical Substances", MEP is responsible for the compilation, adjustment and release of "The Catalogue of Existing Chemical Substances in China" as well as the pre-production and pre-import registration of new chemical substances, all data on new chemical substances shall be possessed and maintained by MEP.

According to the "Measures for Environmental Management Registration of Hazardous Chemicals", the Local Environmental Administrations are responsible for specific environmental management registration of hazardous chemicals and report the register to MEP. As to the register of hazardous chemicals import and export, the Center of Solid Waste and Chemical Management Technology (MEPSCC) shall review first and then report to MEP.

Chinese Government implements the procedure of prior informed consent (PIC) in a serious manner, for which MEP is in charge of the exchange of data on import and export chemicals, the Institute for the Control of Agrochemicals of the Ministry of Agriculture (ICAMA) is in charge of the exchange of data on import and export pesticides. Table 7.2 shows the source of and access to the national data.

Table 7.2 Sources of National Data and their Access and Format

Type of Data	Location(s)	Data Source	Who has Access	How to Gain Access	Format
Production Statistics	NBS	Statistical Agencies	Governmental Departments, the Public	Consulting, published materials, computer network	Documents, computer data
Import Statistics	GAC	Customs at various levels	Governmental Departments, the Public	Consulting, published materials, computer network	Documents, computer data
Export Statistics	GAC	Customs at various levels	Governmental Departments, the Public	Consulting, published materials, computer network	Documents, computer data
Industrial Incident Reports	SAWS, MIIT, etc.	all relevant Ministries	Governmental Departments, the Public	Consulting, computer network	Documents, computer data

Type of Data	Location(s)	Data Source	Who has Access	How to Gain Access	Format
Transport Incident Reports	SAWS, MOT, etc.	all relevant Ministries	Governmental Departments, the Public	Consulting, computer network	Documents, computer data
Occupational Health Data (agricultural)	SAWS, MOA, NHFPC	Health Administrations at various levels	Governmental Departments, the Public	Consulting, computer network	Documents, computer data
Occupational Health Data (industrial)	NHFPC	Health Administrations at various levels	Governmental Departments, the Public	Consulting, computer network	Documents, computer data
Poisoning Statistics	NHFPC	Health Administrations at various levels	Governmental Departments, the Public	Consulting, computer network	Documents, computer data
Hazardous Waste Data	MEP	Environmental Administrations/Bureaus	Governmental Departments, the Public	Consulting, computer network	Documents, computer data
Register of Pesticides	MOA	Institutes for the Control of Agrochemicals	Governmental Departments, the Public	Consulting, published materials, computer network	Documents, computer data
Register of Hazardous Chemicals	SAWS	Provincial Hazardous Chemicals Registration Offices (Center)	Governmental Institutions	Consulting, computer network	Documents, computer data
Register of New Chemical Substances	MEP	Center of Solid Waste and Chemical Management Technology (MEPSCC)	Governmental Institutions	Consulting, computer network	Computer data
Environmental Management Register of Hazardous Chemicals	MEP	Environmental Administrations at various levels	Governmental Departments, the Public	Consulting, computer network	Computer data
Register of Imports	MEP, MOA, MOC	Administrations at various levels	Governmental Institutions	Consulting, computer network	Documents, computer data
Register of Producers	MEP, SAWS	Administrations at various levels	Governmental Institutions	Consulting, computer network	Documents, computer data
PIC Decisions	MEP, MOA	MEP, ICAMA	Governmental Departments, the Public	Consulting, computer network	Documents, computer data

7.3 Procedures for Collecting and Disseminating National/Local Data

In China, according to the applicable laws and regulations as well as Ministerial duties, the chemicals management departments are responsible for collecting and disseminating local and national data related to chemicals management. For different data on various types of chemicals, the same forms, whether paper document or electronic data, are required to be submitted by relevant enterprises or Local Administrations, which shall be integrated and analyzed by relevant Ministries. In particular, some data on chemicals management must be reported to the government according to laws and regulations, such as register of hazardous chemicals, register of hazardous chemicals imports/exports, industrial incident reports, occupational health data, etc.

According to regulations, the national/local data on chemicals management must be disclosed, any citizens, legal persons or entities may apply for the access to such information. The relevant Administration shall review the information before disclosing and report to the relevant competent department or a same-level secret-guarding department the information whose disclosure cannot be decided after its review. The Government must not disclose any information related to trade secrets, however, it may disclose the information whose disclosure has been consented by the right holder or if the non-disclosure of such information may cause major impact on the public interest as determined by the Administration.

7.4 Availability of International Literature and Databases

In China, most international literature and databases related to chemicals management are collected, translated and compiled by relevant governmental departments, teaching and research institutes as well as other relevant institutions. All open literature and data may be accessed to via the internet, the public have the right to obtain such literature. The international chemical literature and databases are accessible through internet, some of which have been translated and compiled by domestic institutions and research institutes and may be used directly by the public, some of which are not in Chinese so certain command of foreign language is necessary. Table 7.3 is a list of the availability of the international literature, and Table 7.4 is a list of the availability of the international databases.

Table 7.3 Availability of International Literature

Literature	Location(s)	Who has Access	In What Form	Language	How to Gain Access
Strategic Approach to International Chemicals Management (SAICM) Information Clearinghouse	http://www.saicm.org/index.php?menuid=36&pageid=251	Public	Computer data	Arabic, Chinese, English, French, Russian, Spanish	Consulting, computer network
Environmental Health Criteria Documents	http://www.who.int/ipcs/publications/ehc/en/index.html	Public	Computer data	English	Consulting, computer

Literature	Location(s)	Who has Access	In What Form	Language	How to Gain Access
(WHO/IPCS)					network
Concise International Chemical Assessment Documents (WHO/IPCS)	http://www.who.int/ipcs/publications/cicad/en/index.html	Public	Computer data	English	Consulting, computer network
International Chemical Safety Cards (WHO and ILO)	http://www.inchem.org/pages/icsc.html http://www.brici.ac.cn/icsc	Public	Computer data	English, Chinese	Consulting, computer network
Decision Guidance Documents for PIC Chemicals (FAO/UNEP)	http://www.pic.int/TheConvention/Chemicals/AnnexIIIChemicals/tabid/1132/language/en-US/Default.aspx	Public	Computer data	Arabic, Chinese, English, French, Russian, Spanish	Consulting, computer network
FAO/WHO Pesticides Safety Data Sheets	http://www.who.int/ipcs/publications/pds/en/index.html	Public	Computer data	English	Consulting, computer network
Documents from the FAO/WHO Join Meeting on Pesticide Residues	http://www.who.int/ipcs/publications/jmpr/en/	Public	Computer data	English	Consulting, computer network
Documents from the FAO/WHO Joint Expert Committee on Food Additives	http://www.who.int/ipcs/publications/jecfa/en/index.html	Public	Computer data	English	Consulting, computer network
Globally Harmonized System of Classification and Labeling of Chemicals (GHS)	http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html	Public	Computer data	Arabic, Chinese, English, French, Russian, Spanish	Consulting, computer network
OECD Guidelines for the Testing of Chemicals	http://www.oecd.org/document/40/0,3343,en_2649_34377_37051368_1_1_1_1,00.html	Public	Computer data	English, French	Consulting, computer network
Good Laboratory Practice Principles (OECD)	http://www.oecd.org/document/63/0,3343,en_2649_34381_2346175_1_1_1_1,00.html	Public	Computer data	English, French, Spanish, German	Consulting, computer network
Good Manufacturing	http://www.who.int/medicine	Public	Computer	English	Consulting,

Literature	Location(s)	Who has Access	In What Form	Language	How to Gain Access
Practice Principles (WHO)	s/areas/quality_safety/quality_assurance/production/en/index.html		data		computer network
EU Risk Assessment Reports	http://esis.jrc.ec.europa.eu/index.php?PGM=ora	Public	Computer data	English	Consulting, computer network
Canadian Priority Substance Assessment Reports	http://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=3E5A065C-1	Public	Computer data	English, French	Consulting, computer network
American Priority Chemicals Assessment Reports	http://iaspub.epa.gov/oppthpv/mpv_hpv_prioritizations.index_html	Public	Computer data	English	Consulting, computer network
High-yield Chemicals Selection Information Data set	http://www.chem.unep.ch/irptc/sids/OECDSIDS/sidspub.html	Public	Computer data	English	Consulting, computer network
Australian Priority Existing Chemicals Assessment Reports	http://www.nicnas.gov.au/chemical-information/pec-assessments	Public	Computer data	English	Consulting, computer network
PubMed	http://www.ncbi.nlm.nih.gov/pubmed/	Public	Computer data	English	Consulting, computer network

Table 7.4 Availability of International Databases

Database	Location(s)	Who Has Access	Language	How to Gain Access
International Occupational Health Information Center (ILO CIS)	http://www.ilocis.org/	Public	English	Consulting, computer network
WHO/IPCS INCHEM	http://www.inchem.org/	Public	English	Consulting, computer network
WHO/IPCS Human Health Risk Assessment Toolkit: Chemical Hazards	http://www.who.int/ipcs/methods/harmonization/areas/ra_toolkit/en/	Public	English	Consulting, computer network
Chemicals Abstract Services Database (CAS)	http://www.cas.org/	Public	English	Consulting, computer network
Hazardous Substances	http://www.toxnet.nlm.nih.gov/cg	Public	English	Consulting,

Database	Location(s)	Who Has Access	Language	How to Gain Access
Database	i-bin/sis/htmlgen?HSDB			computer network
EU Registered Substances Database	http://echa.europa.eu/web/guest/information-on-chemicals/registered-substances	Public	English	Consulting, computer network
Japanese Chemical Risk Information Platform	http://www.safe.nite.go.jp/english/db.html	Public	English, Japanese	Consulting, computer network

7.5 National Information Exchange Systems and IT Capacity

In China, the coverage of e-administration among governmental departments at or above Provincial level has reached 70%. All Ministries in charge of chemicals management and relevant institutions have basically realized the information-based business operation, specialized websites have been established universally for serving the chemicals management.

Chinese Government has established a number of chemicals management information exchange platforms to facilitate the interministerial and interorganizational information exchange and sharing both nationally and internationally, at the same time providing the public with the access to relevant information. For example, the Center of Solid Waste and Chemical Management Technology under the Ministry of Environmental Protection has been engaged in the publicity of international conventions such as the "Rotterdam Convention", it has organized the compilation of "The Table of Information on Toxic Chemicals Severely Restricted on Import and Export", which shall be used as a reference by Environmental Administrations at various levels, toxic chemical producers and users as well as the social public. The Chemical Registration Center of the State Administration of Work Safety has established a "domestic and abroad chemicals sound management dynamics column" and a "chemical incident infonet" for releasing regularly to the public the "Chemicals Safety and Emergency Rescue News Report" and the "Global Chemical Incidents Report and Investigation". The "National Coordination Group for Stockholm Convention Implementation" led by MEP has established a "China POPs Convention Implementation Actions" website, which is functioning both as the focal point for conducting external communications and the platform for releasing the information on China's implementation progress and conducting education and training activities. The Basel Convention Asia-Pacific Coordinating Center, under the management by MEP, is responsible for conducting external communications as well as information collection, assessment and release through the website.

In China, the governmental institutions involved in chemicals management, such as MEP and SAWS, as well as relevant scientific research institutes, have established a large number of chemical-related databases. For example, MEP has established the database of "The Catalogue of Existing Chemicals in China"; SAWS has established the "China Chemicals Safety Network" for providing the consultation of hazardous chemicals register, chemical hazard testing reports, emergency response

instruction cards (ERI Cards), the catalogue of chemicals, etc.; MEP's Environmental Emergency and Incident Investigation Center has established the "Environmental Emergency Response Information Database", in which the methods for emergency protection and disposal of commonly used chemicals have been provided; Chinese Center for Disease Control and Prevention (CDC) has established a poison control network; the Environmental Protection Research Institute and the Computing Center of Beijing Research Institute of Chemical Industry (BRICI), Sinopec has jointly developed the international chemical safety cards (ICSC) network inquiry system. However, the databases of the relevant Administrations are mostly used internally only, the communication and sharing with other Ministries or the disclosure to the public is seldom, which has resulted in the unsmooth exchange of chemical information and data.

The internet technological capability of China's governmental institutions and research institutes participating in chemicals management has been steadily improving. E-administration has been realized in all governmental institutions at or above Provincial level and research institutes, the internet or intranet has ensured the smooth flow of electronic data, the infrastructure construction has preliminarily met the need of each Ministry for facilitating chemicals management. All governmental institutions above County level have established a government website in which the public may access to the information related to chemicals management.

7.6 Assessment

In China, the management of chemicals is a coordinating job for various Ministries, which are respectively responsible for the collection, integration and use of data on chemicals management. China has established a comparatively complete statistical system, chemical data have been collected by all relevant departments and integrated and maintained by relevant Ministries. In order to conduct a more effective management of chemicals, all relevant Ministries have jointly proposed a number of catalogues, such as "The Catalogue of Hazardous Chemicals", "The Catalogue of Toxic Chemicals Severely Restricted on Import and Export in China", "National Hazardous Waste Inventory", etc., which have been developed based on the international experience on chemicals management and China's national situation and subject to adjustment according to the production, transport, storage, operation, use and disposal of chemicals as well as the assessment results. Chemical-related Administrations have established a number of websites and databases for disclosing and releasing the relevant information and data. The citizens may contact the relevant departments via telephone calls, regular mails or electronic mails for consulting any concerned matters, as well as applying for access to information whose disclose needs to be applied for. All websites and databases are being improved continuously.

However, the information basis for chemicals management is still weak. Some data are still missing, such as the statistics on chemicals production and use, the data on pollutants release and transfer, the information related to chemicals environmental and health risks, etc. All concerned parties have found effective ways to obtain chemical information, but the information communication has not been satisfactory, the data obtained cannot meet the need for details. Some international literature has

not been fully utilized for lack of translation or compilation. The priorities and actions for China's chemical information management, access and use are listed in Table 7.5.

Table 7.5 Priorities and Possible Actions: Information Management, Access and Use

Priority Issues	Level of Existing Capacity	Capacity Gaps and Needs	Possible Actions	Concerned Actors
To collect information on chemicals production and use	Low	Base numbers of chemicals production and use are inaccurate	Conduct survey on chemicals production and use	MEP, MIIT, SAWS, relevant industry associations, NBS
To conduct pollutants release and transfer registration	Low	Technological capability and fund resources need to be strengthened, the scientific system of PRTR is necessary considering China's national situation	Establish the system of pollutants release and transfer registration	MEP
To establish and improve the national chemicals management information system	Low	Effective information communication and sharing is missing in the existing chemicals management databases, the information on chemicals management is not systematic, comprehensive and sufficient	Establish a systematic information exchange and sharing mechanism based on the existing chemicals management information, integrate the existing chemicals management information resources, gradually establish and improve a national chemicals management information system	MEP and all relevant Ministries
To strengthen information disclosure and communication, improve the public's abilities to chemical information	Medium	The public cannot obtain enough information related to various chemicals because of insufficient disclosure of chemical information on websites	Expand the public's access to various chemical information, strengthen chemical-related publicity and services	All relevant Ministries

Chapter 8: Technical Infrastructure Related to Chemicals Management

8.1 Overview of Laboratory Capacity Related to Chemicals Management

In China, chemical research involves a lot of research institutes that belong to various Ministries or sectors such as environmental protection, agriculture, health, safety production and quality supervision and inspection, which have formed a laboratory system including State Key Laboratories, Ministerial Key Laboratories, Local Key Laboratories, scientific research laboratories and enterprise laboratories. All surveillance and testing laboratories must be certified or ratified by Certification and Accreditation Administration of the People's Republic of China (CNCA).

MEP's subsidiary institutions include Chinese Research Academy of Environmental Sciences (CRAES), China National Environmental Monitoring Center (CNEMC), China Japan Friendship Environmental Protection Center, (MEP Nanjing Institute of Environmental Sciences and MEP South China Institute of Environmental Sciences, etc., in addition to a number of local institutes of environmental sciences and monitoring centers such as Shenyang Institute of Environmental Sciences. These institutions are engaged in chemicals or chemical pollutants related analysis and test, toxicity identification and hazard assessment, ecological effects and risk assessment, environmental monitoring and innocuous disposal, as well as pesticides environmental risk assessment, some of them have established specialized laboratories for conducting monitoring and research of chemicals or toxic chemical pollutants.

MOA's subsidiary institutions include the Institute for the Control of Agrochemicals (ICAMA), the Institute of Quality Standard and Testing Technology for Agro-products of CAAS (IQSTAP), China Institute of Veterinary Drug Control, as well as the institutes for the Control of Agrochemicals at Provincial and municipal levels, mainly engaged in the research on field efficacy trials, quality test and residue test.

SAWS has the following subsidiaries: Work Safety Inspection Technology Center of China Academy of Safety Science and Technology (CASST), the Chemical Registration Center of the State Administration of Work Safety (SAWS), as well as Work Safety Inspection Institution of each Province and Municipality for sound management of chemicals, some of which have established specialized laboratories for conducting chemical category identification, chemicals and reaction process thermal safety assessment as well as hazardous chemicals production and use hazard assessment, such as hazardous chemicals safety inspection laboratories, chemicals safety control State Key Laboratories, etc.

AQSIQ's subsidiaries include the Institute of Chemicals Safety of Chinese Academy of Inspection and Quarantine (CAIQ) and the Entry-Exit Inspection and Quarantine Bureau of each

Province and Municipality, some of which have established specialized laboratories for conducting identification, assessment and inspection of products related to chemical import and export, such as Chemical Classification, Identification and Assessment Key Laboratories, Dangerous Goods Inspection Key Laboratories, etc.

NHFPC's subsidiaries include the Institute for Environmental Health and Related Product Safety, the National Institute of Occupational Health and Poison Control and the National Institute of Nutrition and Food Safety, all belong to the Chinese Center for Disease Control and Prevention (CDC), as well as the Disease Prevention and Control Center and Occupational Disease Prevention and Treatment Institution of each Province and Municipality, some of which have established specialized chemical analysis laboratories and toxicology laboratories for conducting toxicological research on chemicals, pesticides and cosmetics as well as the testing of chemical pollutants and chemical residues, etc. These institutions are engaged in the research on occupational epidemiology, environmental epidemiology and poison control.

Among the 1,000 or more universities in China, many have been providing technical support to chemicals management. Besides the relevant teaching tasks, the universities also conduct various research, such as chemicals analysis and test, hazard toxicology, risk assessment, emergency response, treatment and disposal, risk regulation as well as policies and strategies related to chemicals.

Table 8.1 Overview of Laboratory Infrastructure for Regulatory Chemical Analysis (Examples)

Name/Description of Laboratory	Location	Equipment/Analytical Capabilities Available	Certified GLP	Purpose
Bioassay and Safety Assessment Laboratory / Shanghai Academy of Public Measurement	Shanghai	Gas chromatography high resolution magnetic mass spectrometry tandem mass spectrometry, gas chromatography-tandem mass spectrometry, two-dimensional linear ion trap LC-MS, 6890 gas chromatography, high performance liquid chromatography-mass spectrometry, ultra high-performance liquid chromatography	Yes (MEP)	Mainly including: trace organic toxicant quantitative- effect detection; health risk associated ecosystem risk prevention; molecular toxicology technology and database; environmental microbial safety assessment; REACH-associated chemicals registration, inspection and relevant national standards formulation; fast, high-flux biological detection technology R&D
Safety Evaluation Center, Shenyang Research Institute of Chemical Industry	Shenyang	Gas chromatography-mass spectrometry, blood Analyzer, blood gas analyzer, blood coagulation analyzer, biochemistry analyzer, urinary	Yes (MEP)	To conduct safety assessment of toxicology of pharmaceuticals, pesticides, chemicals (single and repeated dose toxicity, reproductive toxicity, genotoxicity, carcinogenicity,

		formed elements analyzer, urine analyzer, Elisa, flow cytometry		topical toxicity, immunogenicity, safety pharmacology, toxicokinetics) as well as residues, environmental behavior, environmental ecology and physico-chemical properties, so as to become a national safety assessment and inspection agency for testing of drugs, pesticides and chemicals.
MEP-approved Kay Laboratory for Environmental Evaluation and Pollution Control under Nanjing Institute of Environmental Sciences	Nanjing	Unspecified	Yes (MEP)	To conduct pesticides environmental behavior study, ecological effects and toxicology research; pesticide environmental evaluation system and technology study; pesticide pollution control technology study and global pesticides environmental problems research.
Shanghai Research Institute of Chemical Industry Testing Center	Shanghai	Unspecified	Yes (MOA)	Mainly including: identification of chemicals land, air and sea transport conditions, cargo safety data sheets (MSDS/SDS) preparation, chemicals physico-chemical properties test, fertilizer and soil conditioner standardization and detection method research, fertilizer product quality test.
Toxic Goods and Drug Research Institute under the Academy of Military Medical Sciences of the Chinese PLA	Beijing	Unspecified	Yes (MOA)	Mainly responsible for the study on medical protection against chemical injury as well as the R&D of relevant drugs.
Key Laboratory for Chemicals Category Identification and Assessment (Wuhan)	Wuhan	Liquid chromatography-tandem mass spectrometry, gas chromatography-tandem mass spectrometer, gas chromatograph-mass spectrometer	No (AQSIQ)	To conduct chemical detection, identification and evaluation.
Key Laboratory for Chemicals Category Identification and Assessment (Qingdao)	Qingdao	Gas chromatography-tandem mass spectrometry, UV-visible & near-infrared spectrometers and other chemical components analyzers, laser particle size analyzers, surface tensiometer	No (AQSIQ)	According to “UN Recommendations in relation to the Transport of Dangerous Goods” (RTDG), to conduct hazard classification for transport and packaging of dangerous goods (chemicals); according to UN GHS system, identify the physical hazards of

		and other chemicals physico-chemical properties detector		chemicals; according to REACH regulations, inspect the physic-chemical properties of chemicals.
Key Laboratory for Dangerous Goods Testing	Tianjin	Unspecified	No (AQSIQ)	Hazardous chemicals, hazard characterization (MSDS), paints, adhesives, grass, bamboo and wood and furniture coatings, food packaging and containers, lighters, fireworks; volatile organic compounds, benzene, toluene, xylene, o-phthalic acid esters, free formaldehyde, total lead, soluble lead, arsenic, cadmium, lead, chromium, mercury, flame retardants, pentachlorophenol, azo, evaporation residues, primary aromatic amines, bisphenol A, caprolactam, vinyl chloride, child-resistant (CR) test, as well as safety, health and environmental protection performance inspections.
State Key Laboratory for Chemicals Safety Control	Qingdao	Laboratory buildings nearly 5000m^2 and 4 platforms: chemicals' hazard characteristics and dangerous technology assessment, comprehensive simulation and visualization of chemical incidents, lightning hazard prevention and control, electrostatic detection and evaluation	No (SAWS)	Laboratory tasks mainly include: (1) Research of hazard properties of chemicals and disaster-causing mechanism: based on chemical characteristics, study the mechanism of chemical incidents, critical conditions, key influencing factors and hazard consequences; (2) Research of chemical incidents and analog technologies: conduct statistical analysis on chemical incidents, summarize the incident rules and development trend, select the typical problems to conduct analogue research and topic study; (3) Research of chemical process safety and prevention and control techniques: mainly conduct research on risk assessment technologies and risk control technologies, so as to formulate a systematic programme of incident prevention and control technologies.
Hazardous Chemicals Safety Testing Laboratory under China Academy of Safety	Beijing	Automatic reaction calorimeter, micro adiabatic reaction calorimeter, accelerating rate calorimeter, heat and pressure simultaneous	No (SAWS)	According to UN GHS system, conduct identification of the physical hazards of chemicals.

Science and Technology		thermogravimetry-differential scanning calorimeter, rapid screening calorimeter		

Table 8.2 Overview of Laboratory Infrastructure for Monitoring and Analysis (Examples)

Name/Description of Laboratory	Location	Equipment/Analytical Capabilities Available	Purpose and Analyzed Chemical Substances
State Key Laboratory of Environmental Criteria and Risk Assessment, CRAES	Beijing	Meteorological chromatography-mass spectrometry apparatus, liquid chromatography-mass spectrometry device, inductively coupled plasma mass spectrometer, scanning electron microscopy, ion chromatography, genetic analysis system, flow cytometry, luminescent bacteria toxicity monitor, microbial identification system, and flow-through small fish breeding system, all of which have been certified by China Certification and Accreditation Administration (CNCA) and recognized as GLP laboratory by MEP.	To conduct basic research such as environmental criteria and risk assessment research, so as to provide technical support to China's formulation of environmental quality standards, major decision making for environmental protection and human health and environmental risk regulation. Having conducted inspection and analysis on heavy metals and ions in environmental samples, volatile or semi-volatile organic substances, as well as the test of chemical substances' biotoxicology and biological degradation, etc.
National Research Center for Environmental Analysis and Measurement (CNEAC)	Beijing	Gas chromatography-mass spectrometry, inductively coupled plasma atomic emission spectrometry, scanning electron microscopy, x-ray fluorescence spectrometry, elemental analyzer, gas chromatography, liquid chromatography, ion chromatography, and atomic absorption spectrophotometer, all of which are fully furnished high-tech instruments.	Measurement of inorganic heavy metals and organic pollutants (pesticide residues, volatile organic compounds, polycyclic aromatic hydrocarbons, polychlorinated biphenyls) in environmental samples (soil, water, waste water, wastes, air); flue gas monitoring, especially detection of waste incineration dioxins; pre-certification analysis and test of environmental labeling products (detergents, adhesives, paints, chemical building materials); detection of indoor environment (formaldehyde, volatile organic compounds, benzenes, inhalable particulates, etc.).
State Key Laboratory of Environmental Chemistry and Ecotoxicology under	Beijing	The Laboratory is equipped with international-level chemical and bioinstruments as well as China's first environmental samples	Mainly including the analysis of persistent toxic substances (PTS) and the research of environmental chemical behavior and ecotoxicological effects.

Environment and Health Research Center, Chinese Academy of Sciences		chamber, in particular, the internationally advanced "Laboratory of Dioxins" has been ranked by UNEP as the "POPs Analysis Demonstration Laboratory" and certified by China Certification and Accreditation Administration (CNCA).	Development goals: (1) to keep a high standpoint in the international community and make innovative achievements in environmental chemistry and toxicology research; (2) to serve the national goal by contributing to the research on persistent toxic chemicals environmental safety, so as to provide scientific evidence for pollution control decision-making; (3) to foster highly qualified talents in the field of environmental chemistry and ecotoxicology research.
State Key Laboratory of Pollution Control and Resources Reuse	Nanjing	Gas chromatography, GC analyzer, microscope, protein electrophoresis, electrophoresis of nucleic acid, protein-nucleic acid transfer and pulsed-field gel electrophoresis, all of which are advanced measurement, and analysis instruments.	To concentrate in the basic research on pollution control and resources reuse, so as to provide theoretical support and leading technologies for China's control of environmental pollution and ecological damage and reasonable use of limited resources, as well as for facilitating the sustainable social and economic development.
Key Laboratory of Environment and Health, MEP	Wuhan	High-performance liquid chromatography, gas chromatography, atomic absorption spectrophotometer, fluorescence microscope, capillary ion electrophoresis, and surface electromyography, etc.	Research of water pollution's impact on health and prevention and control; research of atmospheric pollution and indoor air pollution's impact on health and prevention and control; identification of public nuisance diseases and relevant technologies.
Key Laboratory of Organic Air Pollutants Monitoring and Analysis, MEP	Liaoning	Gas chromatography/mass spectrometry, gas chromatography, high performance liquid chromatography, ion chromatography, atomic absorption analyzer, fluorescence spectrophotometer, and spectrum analyzer, etc.	Research of atmospheric organic pollutants monitoring technology system, full-scale analysis of 157 types of atmospheric organic pollutants existing in the ambient air and exhaust gas (six categories): volatile organic compounds, aldehydes and ketones, PAHs, organochlorine pesticides, phthalate esters, and polychlorinated biphenyls; Automatic monitoring of 77 types of air pollutants (four categories): ozone precursors (ethane, ethylene, propane, propylene, benzene, xylene), total methane and non-methane

			hydrocarbons, malodorous gas such as methyl mercaptan and ethyl mercaptan, and conventional pollutants.
Key Laboratory of Monitoring and Analysis for Organic Pollutants in Surface Water, MEP	Jiangsu	Gas chromatography/mass spectrometer, liquid chromatography, liquid chromatography/mass spectrometry analyzer, gas chromatograph, X-fluorescence spectrometer, accelerated solvent extractor, microwave extractor, nitrogen blower, automatic solid phase extractor, gel permeation chromatography, thermal desorber and autosampler, and automatic purge and trap device, etc.	Research of emerging environmental hormones monitoring technology and environment/health risk assessment: to establish environment/health risk models and propose countermeasures for reducing health risks caused by emerging pollutants; investigation and source analysis of PCFs pollution: to investigate and trace potential sources of PCFs and establish PCFs pollution source investigation and traceability technique.
Key Laboratory for Veterinary Drug Innovation, MOA	Lanzhou	High-performance liquid chromatography, gas chromatography, GC, LC-MS, and Fourier transform infrared spectrometer, all of which are important experiment devices.	R&D of antimicrobial drugs, medicated growth-promoting feed additives, anti-inflammatory drugs, narcotic drugs, inactivaors, antiseptics and antiparasitics, etc.
Laboratory of Environmental Chemistry, Institute for Environmental Health and Related Product Safety, CDC	Beijing	Liquid phase level II mass spectrum, inductance coupled plasma mass spectrum instrument, gas spectrum-mass spectrum, atomic absorption spectrophotometer, gas chromatography, high performance liquid chromatography, atomic fluorescence spectrophotometer, fluorescence spectrophotometer, UV spectrophotometer, Ion chromatography, total organic carbon detector, and capillary electrophoresis, all of which are modern analyzers.	Main tasks: (1) to provide analytical and test data in a prompt, accurate and efficient way by using modern analyzers and advanced test methods, so as to provide scientific evidence for health and safety assessment of health-related products, environmental health monitoring and scientific research, as well as the investigation of incident causes; (2) to study new test methods and exploit new test fields, and to discover the existing problems in environmental health by using new test tools.
Laboratory of Toxicant Inspection and Analysis, National Institute of Occupational Health and Poison Control, CDC	Beijing	Liquid chromatography, atomic absorption spectrometers, gas chromatography, ion chromatography, and fluorescence spectrophotometer, etc.	To detect the hazardous substances in workplace as well as various poisonous substances and pesticides.

Laboratory of Dioxins, Research Center of Persistent Organic Pollutants, Tsinghua University	Beijing	Liquid chromatography, liquid chromatography-mass spectrometry, gas chromatography, gas chromatography-mass spectrometry, ion chromatography, and plasma emission spectrometer, etc.	POPs
Laboratory of Dioxins, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences	Beijing	High resolution mass spectroscopy (HRGC/HRMS) and auxiliary equipments.	Dedicated to the analysis of POPs such as dioxins, polychlorinated biphenyls and polybrominated diphenyl ethers, as well as the research of these pollutants' environmental chemical behaviors and engendering mechanisms.
Laboratory of Dioxins, Center of Analysis and Measurement, Zhejiang University	Hangzhou	Low resolution GC online, three-stage quadruple tandem mass spectrometer, and high resolution mass spectroscopy, all of which are used for dioxin sampling, pre-treatment and analysis/measurement.	POPs such as PCBs, PBBs, PCDD/Fs, PBDEs and PBDD/Fs.

China has been actively conducting chemicals management related construction of laboratory standards system, for example, SAWS, AQSIQ, MOA and MEP have all established chemical analysis and test laboratories, most of which are built in accordance with ISO laboratory system, the rest of which are built according to GLP standards, some of them have been rewarded by OECD as GLP laboratories. Meanwhile, in order to address the technical problems in chemicals management, China has approved a number of state projects to strengthen the experiment capacity of laboratories and research institutes, in addition to the cooperation with international organizations and other countries.

8.2 Other Relevant Areas of Technical Infrastructure

In China, besides the State Key Laboratories, the test and monitoring laboratories established by relevant Ministries and the chemical test laboratories established by the major universities, about 1,000 chemical test agencies have been established by large-scale enterprises and high-tech enterprises.

8.3 Assessment

In recent years, China's chemical analysis and test laboratory infrastructure has been experiencing rapid development, the technical support capability has been improved significantly, MOA (Ministry of Agriculture), MEP (Ministry of Environmental Protection) and CFDA (China Food and Drug Administration) have established GLP system gradually. However, China's GLP laboratories cannot meet the demand of chemicals management in scale and capacity of chemical hazard test, the analysis and test of low concentration and potentially toxic chemicals such as POPs and EDCs needs to be

improved. The priorities and possible actions for improving the technical infrastructure of chemicals management are listed in Table 8.3.

Table 8.3 Priorities and Possible Actions: Technical Infrastructure for Chemicals Management

Priority Issues	Level of Existing Capacity	Capacity Gaps and Needs	Possible Actions	Concerned Actors
Construction of chemical ecotoxicological test laboratories	Medium	The quantity and capability of chemical ecotoxicological test laboratories cannot meet the demand.	Strengthen the construction of chemical ecotoxicological test laboratories.	MEP, etc.
Capacity build of chemicals environmental test and analysis	Low	The number of specialized laboratories for testing and analyzing chemicals in environmental media is insufficient.	Establish key area environmental monitoring stations and build Regional Key Laboratories for conducting chemical test, analysis and assessment.	MEP

Chapter 9: Chemical Emergency Preparedness, Response and Follow-up

9.1 Overview of Chemical Emergency Preparedness, Response and Follow-up

Chinese Government highly values the construction of public emergency response system. China has promulgated a number of laws, regulations and Ministerial Rules such as the "Emergency Response Law of the People's Republic of China" (State President's Decree No. 69). The State Council and the Local People's Governments have preliminarily established the system of emergency plans system and promulgated a series of national emergency plans as well as Ministerial and Local Emergency Plans, such as the "Master State Plan for Rapid Response to Public Emergencies", the "National Plan for Environmental Emergencies" and the "National Plan for Response to Public Health Emergencies". In addition, China has been strengthening the construction of emergency management institutions and the capacity building of emergency support, correspondingly, emergency rescue teams have been organized.

In China, the emergencies are classified into four categories[5]: natural disasters, accidental disaster, public health emergencies, and social security events. At present, China has established an overall emergency management system for handling the four categories of emergencies. In specific, the chemical emergency management has been integrated into the national public emergency management system as a part of the master state plan of disaster management. Within the overall national system of public emergencies management, each relevant Ministry has established a chemical emergency management system according to their respective responsibilities, or has integrated the task of chemical emergency management into the Ministerial system of emergency management. In order to prevent chemical incidents, in 2012, MEP organized a national environmental safety 100-day inspection activity, during which about 890 hidden risks have been discovered among 22,000 chemical enterprises, all of which are major environmental safety risks that need to be addressed.

9.2 Chemical Emergency Planning

9.2.1 Overview of Chemical Emergency Planning

According to the applicable laws and regulations, overall national emergency plan and special emergency plan, the relevant Ministries have respectively developed various plans in relation to chemical emergency response, including the "National Plan for Environmental Emergencies", "Emergency Plan for Hazardous Chemical Accidents and Disasters", "Plan of the Ministry of Health for Health Emergency Response to Poisoning Incidents", "Emergency Plan for Pesticide Use Safety

[5] "Emergency Response Law of the People's Republic of China" (State President's Decree No. 69), "Master State Plan for Rapid Response to Public Emergencies"

Incidents" and "Emergency Plan for Environmental Incidents by Hazardous Chemicals and Chemical Wastes". At the same time, Local Governments and relevant departments, chemical enterprises have also developed corresponding emergency plans for chemical incidents. In order to standardize the development of environmental emergency plans by enterprises and enhance the applicability and practicability, MEP has formulated and published the "Guide for Petrochemical Enterprises in Developing Environmental Emergency Plan".

The following contents are included in various emergency plans: work principles, applicable scope, organizing/command system and duties, early warning and prevention mechanism, emergency response, disclosure of information and news release, post-emergency treatment, insurance measures, testing of emergency plan, management and updating of emergency plan, etc.

9.2.2 Emergency Management System and Administrative Duties

● Emergency Management System

State Council is the highest governing body in the management of chemical emergencies and other public emergencies. Under the leadership of the Premier of the State Council, the Standing Committee of State Council and the national command organ of public emergencies are responsible for the management of chemical emergencies and other public emergencies; if necessary, a Working Group of the State Council shall be designated for guiding the relevant work. The General Office of the State Council has established the State Council Office of Emergency Management, which plays a pivotal role in conducting emergency response, collecting information and coordinating the rescue work.

According to applicable laws and administrative regulations as well as their respective duties, the relevant Departments of the State Council are responsible for the management of chemical emergencies and other public emergencies, including the drafting and implementation of special plans and Ministerial plans for chemical emergencies and enforcing the State Council's relevant decisions.

Local People's Governments at various levels are administrative bodies in charge of the management of chemical emergencies within its own administrative regions, they are responsible for the response to chemical emergencies and other public emergencies occurred in its own administrative regions.

The State Council and all relevant emergency management bodies have established various talent pools, and under practical circumstances, experts will be recruited for providing decision-making recommendations to the emergency management bodies and participating in the response to chemical emergencies and other public emergencies if necessary.

● Administrative Duties

According to applicable laws, administrative regulations and their respective duties, the relevant institutions and Departments of the State Council participate in the development and implementation

of chemical emergency plans.

(1) State Council Office of Emergency Management

The State Council Office of Emergency Management, established by the General Office of the State Council, is responsible for the State Council's daily work of emergency management as well as the general duty to the State Council, it functions as the pivotal in emergency rescue, information collection and comprehensive coordination.

(2) Work Safety

SAWS is responsible for organizing and coordinating the work of safety production emergency rescue, the overall management of national safety production casualty incidents and the statistics and analysis of work safety enforcement, as well as the supervision on the incidents and accountability investigation; as authorized by the State Council, SAWS legally organizes the investigation and settlement of extraordinarily serious incidents and oversees the whole process of incident and accountability investigation. According to the national laws and regulations and based on its own responsibilities, SAWS has formulated the "Emergency Plan for Hazardous Chemical Incidents and Disasters", "Guideline for Developing the Emergency Rescue Plan for Hazardous Chemical Incidents"

(3) Environment

MEP's responsibilities include the investigation of environmental pollution incidents such as hazardous chemical pollution incidents and ecological damage incidents, the on-site environmental monitoring and the unified release of information on environmental pollution caused by the incidents.

As required by national laws and regulations, MEP has promulgated the "Measures for Information Report of Environmental Emergencies", "Provisional Measures for Management of Environmental Emergency Plans" and "Emergency Plan for Environmental Incidents by Hazardous Chemicals and Chemical Wastes".

(4) Public Security

The Fire Department of the Ministry of Public Security (MPS) is responsible for the supervision on fire protection, fire prevention and fire rescue; organizing and guiding the work of emergency rescue by relevant departments of MPS; organizing and guiding the education of fire safety and the mobilization and training of social firefighting forces. In China, the firefighting forces of public security and armed police are important force in hazardous chemical emergency rescue.

(5) Health

NHFPC is responsible for health emergency response, including the development of health emergency plans and policy measures, the monitoring and early warning of public health emergencies and risk assessment, the supervision on the prevention and control of public health incidents and emergency response, as well as the release of information on public health emergency response.

According to the national laws and regulations and based on its responsibilities, the former

Ministry of Health (MOH) promulgated the "Plan of the Ministry of Health for Food Safety Incidents (For Trial Implementation)", "Plan of the Ministry of Health for Health Emergency Response to Poisoning Incidents", etc.

(6) Transport

According to the "Emergency Plan for Hazardous Chemical Accidents and Disasters", in case of hazardous chemical accidents, MOT shall provide transportation support to ensure the timely allocation and transport of personnel, equipments and materials needed for emergency rescue.

(7) Agriculture

According to the "Emergency Plan for Pesticide Use Safety Accidents", MOA is responsible for handling the pesticide use incidents in China, the Local Agricultural Administrations at various levels shall establish the emergency response leadership for guiding the investigation of pesticide use incidents within its administrative region as well as an administrative office for implementing the emergency plan.

(8) Meteorological service

Meteorological institutions are responsible for providing meteorological data and technology needed for the decision making of chemical emergency response as well as the rescue actions.

9.2.3 Implementation of Emergency Plans

In order to effectively respond to various types of incidents, China has established the emergency management system with the principles of "unified leadership, overall coordination, classification management, hierarchical responsibilities and territorial administration", correspondingly, emergency rescue teams have been built, emergency rescue devices and materials have been equipped, various emergency plans have been developed, including the regulations on the whole process of emergency response: alert, response, ending and post-incident treatment.

For instance, in case of hazardous chemical production incident, the key person in charge of the entity where the incident took place must immediately organize rescue actions according to the entity's hazardous chemical emergency plan and report to the Local Work Safety Administration as well as Environment, Public Security and Health Administrations, at the same time, the Local Government shall act according to the procedure of hierarchical response and initiate the corresponding emergency plan based on the level of such hazardous chemical incident, as well as initiating the environmental emergency plan if the incident has caused environmental pollution.

According to the "Emergency Plan for Hazardous Chemical Accidents and Disasters", in case of hazardous chemical incident classified as "extraordinarily serious hazardous chemical incident"[6],

[6] Applicable scope of the "Emergency Plan for Hazardous Chemical Accidents and Disasters": extraordinarily serious hazardous chemical incidents, incidents to which the emergency response is beyond the capacity of the Provincial (Autonomous Region, direct-controlled municipal) People's Government, trans-Province and/or trans-sector incidents, as well as incidents to be handled by SAWS

under the unified leadership by Work Safety Commission of the State Council, SAWS is the body responsible for the unified guidance and coordination of the emergency response and rescue work, which shall be implemented by the National Work Place Emergency Management Center. The Local People's Government shall organize and build the onsite emergency response and rescue headquarters to give overall commanding orders, and the commander in chief shall be acted by the principal from the Local People's Government. The Headquarters shall direct all rescue teams and personnel to conduct emergency rescue, at the same time organizing the Local Work Safety, Environment, Public Security, Health and Transport Administrations to conduct rescue based on the hazardous chemical emergency plan and their respective responsibilities. In specific, Work Safety Administration is responsible for the overall organizing, directing and coordinating of hazardous chemical emergency response and rescue actions; Environmental Administration is responsible for onsite environmental monitoring; public security is responsible for security control and management, including keeping orders at the scene and evacuating the public in time; Health Administration is responsible for providing medical and health support in emergency response, including on the spot medical rescue and follow-up treatment; Transport Administration is responsible for providing transportation means to ensure the timely allocation and transport of personnel, equipments and materials.

After the onsite situation is under control, the environment is up to relevant standard and all secondary and derivative risks have been eliminated, upon the confirmation and approval by the onsite emergency response Headquarters, the onsite emergency response is finished and the rescue teams may withdraw from the site.

After the emergency response actions, the Local Government shall organize the implementation of post-incident measures based on the damage caused by the incident, including the government's compensation, the medical facilities' treatment and the insurance companies' payment. According to the level of incident, the Government shall conduct accountability investigation and summary analysis, as well as conducting monitoring and assessment on the environmental pollution and ecological damage caused by the hazardous chemical incident, based on which environmental pollution treatment and ecological restoration measures shall be adopted.

On the other hand, in case of environmental pollution caused by chemical incident, all relevant entities, Governments at various levels and relevant departments shall initiate the relevant environmental emergency plan to address environmental pollution caused by chemical incident.

9.2.4 Overview of Emergency Preparedness

In regard to the management of chemical incident risk sources, China has established the hazardous chemical registration system, based on which the enterprises are required to provide information on hazardous chemicals' hazard characteristics and GHS classification and labeling, so as to provide technical and information support to the sound management of hazardous chemicals as well as the prevention of and response to hazardous chemical incidents. In addition, China has established

at its discretion.

the hazardous chemical major risk source identification, assessment and registration system, in which it is required to conduct monitoring and data analysis on major sources of hazardous chemical risks, including the monitoring and analysis of information about other disasters and incidents that might cause chemical incidents. [7]

In regard to the management of chemical transport routes, China's applicable laws and regulations have provided special provisions on transport of hazardous chemicals, i.e., the routes for hazardous chemical transport vehicles must be approved by public security department first.

In regard to the insurance of emergency response information, China's relevant Ministries have established relevant institutions for providing around the clock service of consultation in relation to chemical incidents. At the same time, the State has established the hazardous chemical incident response communication network and information transfer network, which is maintained regularly to ensure the communication of emergency response.

In regard to the insurance of emergency rescue teams and equipments, Chinese Government and relevant high risk industry enterprises have been continuously strengthening the construction of emergency rescue teams and established the hazardous chemical incident rescue bases, thus forming a system of emergency rescue teams by integrating the national (regional) mainstay and grass-roots forces. All rescue teams have been equipped with various rescue vehicles and personal protection, rescue, detection and communication devices, some Provinces (Autonomous Regions and direct-control Municipalities) have built the storehouse of work safety emergency-use materials and equipments. [8]

In regard to chemical poisoning control, according to the relevant emergency plans and standards as well as the local conditions, the Local Health Administrations at various levels have established the basic reserve of antidotes and other first-aid drugs and devices, basic protective supplies, as well s basic onsite detection equipments and devices.

In regard to the training of hazardous chemical incident rescue, according to the "Emergency Plan for Hazadous Chemical Accidents and Disasters", the hazardous chemical emergency rescue teams must undertake the profession training, including: basic knowledge on hazardous chemicals, emergency disposal of hazardous chemicals, hazardous chemical emergency protection and equipments, emergency disposal of typical hazardous chemicals, and so on. [9]

In regard to the professional training of poisoning incident health emergency response, the training shall include: overview of poisoning incident health emergency response and relevant

7 "Regulations on the Sound Management of Hazardous Chemicals" (State Council Decree No. 591), "Notice on Regulating the Work of Major Hazard Source Supervision and Management" (SAWS [2005]125)

8 "The 12th Five-Year Plan for Work Safety Emergency Management" (SAWS 〔2011〕186)

9 "Outline for Hazardous Chemical Emergency Rescue Training (Trial)" (National Work Place Emergency Management Center, November 2011)

fundamental theories, basis methods and skills of poisoning incident health emergency response, onsite handling skills of poisoning incident health emergency response, etc., of which the emphasis includes the relevant theories, methods and skills as well as practical use.

In regard to environmental emergency response capacity, China has been strengthening the construction of environmental emergency response teams and equipments, all Local Environmental Administrations have been equipped with different levels of environmental emergency commanding system, environmental emergency response transport system, environmental emergency protection equipments and environmental emergency monitoring equipments, etc. In addition, in order to provide more effective guidance to environmental departments in addressing chemicals environmental incidents, MEP has formulated the "Environmental Emergency Response Manual", in which a list of high environmental risk chemicals frequently associated with environmental incidents in China in recent years has been provided, as well as a systematic description of the physic-chemical properties, environmental standards, toxicological data, emergency response measures, main usage and incident information.

9.3 Chemical Incident Response

The typical chemical incidents happened in China in recent years are listed in Table 9.1.

Table 9.1 Examples of Chemical Incidents in China

No.	Name of Incident	Date of Incident	Location	Type of Incident	Chemicals Involved	D: Number of Deaths I: Number of Injuries E: Number of Evacuated	Environmental Contamination or Damage
1	Biphenyl Unit of Jilin Petrochemical Company, "11·13" Explosion and Songhuajiang River Pollution[10]	2005.11.13	Jilin City, Jilin Province	Industrial Accident	Benzene, Aniline, Nitrobenzene	D: 8 I: 60 E: no data	Water pollution
2	"7.16" Dalian Oil Pipeline Explosion and Fire Incident[11]	2010.07.16	Dalian, Liaoning	Industrial Accident	Crude Oil	D: 1 missing, 1 death in firefighting I: 1 minor injury, 1 major injury during firefighting E: no data	Ocean pollution
3	Jiangsu Nanjing	2010.07.20	Nanjing,	Industrial	Propene	D: 13	No

10 State Council Acts Upon Jilin Petrochemical Explosion Accident and Songhuajiang River Pollution Incident (http://www.gov.cn/jrzg/2006-11/24/content_452610.htm)

11 "Notice of the Office of the Work Safety Commission of the State Council Concerning the Investigation Results of China National Petroleum Corporation's Dalian Affiliate "7・16" Oil Pipeline Explosion and other Three Incidents" (WSC Office〔2011〕44)

	Underground Propene Pipeline Explosion and Fire Incident[12]		Jiangsu	Accident		I: 120 inpatients (14 major injuries) E: no data	environmental pollution
4	Shanxi Antai Group "3·29" Serious Poisoning and Death Incident[13]	2011.03.29	Jinzhong, Shanxi	Industrial Accident	Carbon Monoxide	D: 10 I: 7 E: no data	No information
5	Phenol Tank Leaking and Xin'anjiang River Pollution Incident[14]	2011.06.04	Jiande, Zhejiang	Road Transport Accident	Phenol	D: 1 I: no data E: no data	Water pollution
6	Guangxi Longjiang River Cadmium Pollution Incident[15]	2012.01.15	Longjiang River, Guangxi	Illegal Pollutants Discharge	Cadmium	D: 0 I: 0 E: no data	Water pollution
7	Hebei Ke'er Chemical Co., Ltd "2•28" Serious Explosion Accident[16]	2012.02.28	Shijiazhuang, Hebei	Industrial Accident	Ammonium Nitrate, Guanidine Nitrate	D: 25 deaths, 4 missing I: 46 E: no data	no data
8	Korean Ship Phenol Leaking and Zhenjiang Tap Water "Peculiar Smell" Incident[17]	2012.02.02-03	Zhenjiang, Jiangsu	Water Transport Incident	Phenol	D: 0 I: 0 E: no data	Water pollution
9	Lu'an Group Tianji Coal Chemical	2012.12.31	Changzhi, Shanxi	Industrial Accident	Aniline	D: 0 I: 0	Water pollution

12 "Notice of the Office of the Work Safety Commission of the State Council Concerning the Situation of Jiangsu Nanjing "7 • 28" Underground Propene Pipeline Explosion and Fire Incident" (WSC Office〔2010〕16)

13 "Notice of the State Administration of Work Safety Concerning the Situation of Shanxi Antai Group Co., Ltd "3•29" Serious Poisoning and Death Incident " (SAWS-II〔2011〕47)

14 "Notice of Hangzhou Municipal Government Concerning the Investigation Progress of Jiande HangXinJing Highway Phenol Tank Leaking Incident" (http://www.hangzhou.gov.cn/main/wjgg/zxwj/zxwj/T356359.shtml)

15 "Persons Responsible for Longjiang River Cadmium Pollution Incident Have been Punished" (http://www.gxzf.gov.cn/zjgx/jrgx/201202/t20120206_408581.htm)

16 "Notice of the State Administration of Work Safety Concerning the Situation of Hebei Ke'er Chemical Co., Ltd "2•28" Serious Explosion Accident " (SAWS-III〔2012〕31)

17 "Notice on Jiangsu Province Environmental Protection System's Appropriate Addressing of Korean Ship Phenol Leaking and Zhenjiang Tap Water "Peculiar Smell" Incident" (HuanBanHan [2012] 382)

	"12·31" Aniline Leaking and Zhuozhang River Pollution Incident[18]					E: no data	
10	"11•22" Sinopec Donghuang Oil Pipeline Leaking and Explosion Extraordinarily Serious Incident[19]	2013.11.22	Qingdao, Shandong	Industrial Accident	Crude Oil	D: 55 deaths, 9 missing I: 136 E: no data	Ocean pollution

In recent years, China has greatly enhanced the chemical incident prevention and emergency management system, however, there are still some gaps: the chemical enterprises' weak awareness of main responsibility and environmental protection; incomplete system of chemical incident compensation and punishment; insufficient support of chemical incident prevention and emergency response technologies.

9.4 Chemical Incident Follow-up and Evaluation

9.4.1 Investigation of Chemical Incident and Accountability

China has established a comparatively complete system of chemical incident investigation, treatment and accountability investigation. According to "Work Safety Law" (State President Decree No. 70), the investigation and treatment of accidents must be conducted based on facts and the respect for science, the cause, nature and responsibilities must be found out in time and without ambiguity, so as to summarize the lessons and propose rectification measures, in addition to the opinions on how to treat the responsible persons. In the "Regulations on the Reporting, Investigation and Disposition of Work Safety Accidents" (State Council Decree No. 493) and the "Provisions of the State Council on Investigation for Administrative Responsibility for Extraordinarily Serious Safety Accidents" (State Council Decree No. 302)", specific provisions on the reporting, investigation and disposition of accidents as well as the legal responsibilities of each concerned party have been provided.

9.4.2 Statistics of Chemical Incidents

All relevant Administrations have established chemical incident statistical system based on their respective responsibilities, for instance, in regard to the statistics of hazardous chemical incidents, SAWS has formulated the "Work Safety Incident Statistics Report System", based on which statistics on various types of work safety incidents shall be conducted, including hazardous chemical incidents.

18 "Shanxi Announcement of the Investigation Results of Changzhi Aniline Leaking Incident" (http://sx.people.com.cn/n/2013/0220/c189132-18188072.html)

19 "Work Safety Committee of the State Council Deploys the Special Screening Inspection and Rectification of Oil and Gas Operation Pipelines" (http://www.chinasafety.gov.cn/newpage/Contents/Channel_20262/2013/1218/228024/content_228024.htm)

Statistical contents mainly include the profile of the entity, the deaths and injuries, number of acute industrial poisoning, cause of accident, direct economic loss, etc.; in regard to the statistics of chemical-induced environmental incidents, according to the "Measures for the Reporting of Information on Environmental Incidents", the Environmental Administrations of the People's Governments above County level must establish the environmental incident information files and according to relevant regulations, report monthly, quarterly, semi-annually and annually to the upper level Environmental Administrations of the People's Government the statistics of environmental incidents occurred in its own administrative region, the upper level Environmental Administration of the People's Government shall regularly announce the reports and statistics.

9.4.3 Compensation to Injuries

In China, special regulations have been made concerning the aid and compensation to be made to injuries from chemical incidents. In the "Regulation on Work-Related Injury Insurances" (State Council Decree No. 586), detailed provisions on medical treatment and economic compensation to be made to the injured workers have been provided. According to the "Regulations on the Sound Management of Hazardous Chemicals", in case of hazardous chemical incidents that have caused personal injuries or property loss, the entity where the incident took place must bear the liability for compensation according to law. According to the "Preliminary Plan of the State for Emergency Response to Work Safety Incidents", after the occurrence of work safety incident or disaster, the insurance agencies shall conduct the acceptance of insurance for rescue personnel and the claim of insurance for injuries in a prompt manner.

9.4.4 Clean-up and Restoration after an Incident

Concerning the environmental pollution caused by hazardous chemicals or dangerous goods incidents, China has formulated applicable regulations, in which corresponding environmental pollution treatment and ecological restoration measures are required. For example, according to the "Regulations on the Sound Management of Hazardous Chemicals" (State Council Decree No. 591), in case of hazardous chemical incident, the Local People's Government and relevant departments shall adopt closing, isolating, washing and sterilizing measures promptly for addressing the actual and possible damage to human bodies, animals and plants, soil, water and atmosphere; monitoring and assessment shall be conducted on environmental pollution and ecological damage caused by the hazardous chemical incident, in addition to corresponding environmental pollution treatment and ecological restoration measures. In order to standardize the assessment of environmental pollution and damage caused by hazardous chemical incidents, MEP has promulgated the "Regulations on the Procedure of Pollution and Damage Assessment in the Emergency Disposition Stage of Environmental Incidents"

9.5 Assessment

In recent years, China has been continuously strengthening the construction of chemical emergency management system, mechanisms and legal instruments, the task of chemical emergency

response has been integrated into the national emergency management system. However, there are still a number of problems, the professional level of emergency rescue should be improved, the existing chemicals environmental risk early-warning and emergency response platform is not complete yet, the capacity for chemical-induced environmental pollution assessment and restoration is comparatively weak. The priorities and possible actions for preparedness of chemical incidents as well as emergency response and follow-up are listed in Table 9.2.

Table 9.2 Priorities and Possible Actions: Chemical Emergency Preparedness, Response and Follow-up

Priority Issues	Level of Existing Capacity	Capacity Gaps and Needs	Possible Actions	Concerned Actors
To strengthen the construction of professional support to chemical emergency rescue	Medium	The allocation of rescue teams cannot meet the demand of economic and social development.	Establish the national (regional) hazardous chemical emergency rescue teams and some Central Enterprises' emergency rescue teams as well as the mainstay hazardous chemical emergency rescue teams, establish and enhance the high-risk industry enterprises' emergency rescue teams, so as to improve the rescue system and form a regional force of emergency rescue.	SAWS
To improve the professional level of environmental emergency response	Medium	The number of emergency rescue professionals is insufficient.	Strengthen the training of emergency response professionals and teams construction.	MEP and relevant Ministries
To complete the platform of hazardous chemical incident early-warning and emergency response	Medium	The local platform of hazardous chemical incident early-warning and emergency response is not complete.	Establish the regional system of hazardous chemical emergency joint preparedness and joint control, establish a coordinating and quick-response working mechanism.	National and Local Emergency Response Administrations
To enhance the technical capacity of chemical-induced environmental pollution assessment and restoration	Low	The capacity of environmental pollution assessment and restoration technology is	Conduct research and development of hazardous chemicals environmental pollution assessment and restoration technologies.	MEP

		comparatively insufficient.		

Chapter 10: Awareness/Understanding of Workers and the Public, and Training and Education of Target Groups and Professionals

10.1 Workers, the Public, Administrators and the Media's Access to Chemical Information

10.1.1 Workers' Access to Chemical Information

As the signing party to "ILO Convention 170", China has formulated the "Regulations on Safe Use of Chemicals in Workplace" for implementing the Convention, in which it stipulates that hazardous chemical producers must prepare emergency response instruction card (ERI Card) stating the hazard characteristics, personal protection instructions and onsite rescue skills, which shall be put on prominent positions in hazardous chemical production site or workplace for alerting the hazards and aiding the rescue work.

It is specified in the "Regulations on the Sound Management of Hazardous Chemicals" that hazardous chemical producers must prepare a chemical safety data sheet corresponding to the hazardous chemicals produced and paste on or hang inside the packaging (including the outer packaging), in addition, the relevant Ministry has promulgated the "General rules for preparation of chemicalsafety data sheet(CSDS)" (GB16483-2000).

Moreover, China has promulgated the GHS-associated "General Rule for Classification and Hazard Communication of Chemicals" (GB13690-2009) for regulating the labeling of chemical products and consumer chemicals. Besides the abovementioned chemical information disclosure and labeling mechanisms, on-the-job training and education is also an important mechanism for workers to obtain information on chemical hazards.

10.1.2 The Public, Administrators and the Media's Access to Chemical Information

In China, the public, administrators and the media's access to chemical information is various. Firstly, China has promulgated "The Inventory of Existing Chemical Substances in China", "The Catalogue of Hazardous Chemicals" and "The Catalogue of Toxic Chemicals Strictly Restricted or banned from Import and Export in China"; secondly, the major relevant ministries have respectively established hazardous chemical register management information system, pesticide register management information system, poison control information system and the international chemical safety cards (ICSC) network inquiry system, which is available to all sectors of the society for searching chemical-associated information; thirdly, all major relevant ministries have established the governmental information disclosing network, which is a platform for disclosing information about chemicals management and providing relevant consultation, for example, MEP regularly releases the

new chemical substance environmental management register and the toxic chemical import/export environmental management register; MOH has established a poisoning rescue base providing nation-wide services; fourthly, China has established some special websites dedicated to the implementation of "Montreal Protocol", "Stockholm Convention" and other major international chemicals management conventions, in which the information on Convention-associated progress, laws and regulations, as well as the control technologies is provided, such websites include "Ozone Action in China", "POPs Action in China" and others.

In addition to the above-mentioned fixed mechanisms, the education and training activities conducted by chemicals management-associated departments is also an effective access to knowledge on chemicals management by all sectors of the society. For example, in each year's "International Ozone Day" (September 16) and POPs Convention Enforcement Anniversary (November 11), various forms of publicity activities will be held, especially those focused on the media reporters.

10.2 Training and Education of Target Groups and Professionals

In regard to student education, China's MEP and MOE have jointly initiated the nation-wide "Green Campus" movement. In recent years, the knowledge on chemical risks such as POPs and "Stockholm Convention" has been integrated into the textbook compiled for primary and middle school teachers and students as well as the training courses. Many colleges and technical schools in China have been offering chemical environment and health-associated specialties and chemicals management courses, such as environmental sciences, environmental engineering, sound management, safety engineering, etc.

In regard to the training of administrators, China's major chemical-related administrations have been providing training programs for state and local administrators, including laws and regulations, enforcement procedures, management technologies, international cooperation and convention implementation, etc. For example, MEP has been providing new chemical substance regulation training courses, chemicals environmental management registration training courses as well as "Stockholm Convention" and "Rotterdam Convention" implementation and enforcement training courses, MIIT has been organizing GHS system training courses, and so on. In addition, the widely held chemicals management international cooperation seminars have been providing China's chemicals administrators with valuable training opportunities, such as the annually held China-Japan-Korea Chemicals Management Policy Tripartite Dialogues, EU-China Chemical Policy Dialogues, etc.

10.3 Training and Education of Practitioners

In regard to hazardous chemicals, according to the "Regulations on the Sound Management of Hazardous Chemicals", hazardous chemical enterprises must provide safety education, legal education and on-the-job technical training for the practitioners, who must accept relevant education and training and pass the examinations before starting the job. According to the "Provisions on Safety Training of Production and Operation Entities" (SAWS, 2005), hazardous chemical production and operation entities must provide at least 72 hours of pre-job training for the practitioners. China's enterprises

provide basic three-level safety education for new staff and workers, including the plant level safety education, workshop level safety education and post (unit/shift) safety education. In addition, occupational health education and chemical safety education shall be provided correspondingly. All of these training activities shall help the workers understand the chemical hazards and improve their safety awareness, so as to prevent deaths and injuries and alleviate occupational hazard.

In regard to agrochemicals, the Institute for the Control of Agrochemicals under the Ministry of Agriculture (ICAMA) has been providing pesticide safety use training activities, each province has been providing pesticide safety use technology training, discarded pesticide packaging disposal technology training, highly toxic pesticide alert training, as well as low-toxicity biopesticide demonstration activities for the promotion of pesticide application technologies and risk reduction, so as to improve the pesticide operators and users' competence, instruct the farmers to reasonably purchase and use pesticides, thus safeguarding the agricultural production safety and agricultural products' quality. On the other hand, agrochemical production and operation entities shall be provided with pesticide regulation training and highly-toxic pesticide restriction training.

In regard to public health, the Local Health Administrations at various levels have been annually providing poisoning emergency related training courses for medical and health professionals, for example, CDC has been hosting Chemical Health Risk Assessment Technology Seminars, Health Emergency Academic Forums, Poisoning Incident Health Emergency Seminars.

In regard to incident and emergency response, China has been regularly organizing a great number of professional training activities for chemical emergency disposition and onsite rescue, including the response to emergency rescue, the management of emergency resources, the emergency follow-up of hazardous chemical leaking, the summary and assessment of emergency response work, as well as international exchange such as Sino-British Chemical Emergency Disposition Training & Exchange, so as to improve the professional competence of the relevant personnel.

In regard to environmental protection, in recent years, MEP has been actively organizing national chemicals environmental management training activities for environmental institutions at various levels and relevant enterprises in China, mainly including the training of toxic chemicals import and export registration, new chemical substances notification and registration, hazardous chemicals environmental management registration, etc., at the same time disseminating the basic knowledge about chemicals environmental risks and prevention and control, as a result, the nation-wide environmental institutions at various levels and chemical enterprises have greatly enhanced the chemicals environmental management awareness and capability.

In the field of chemical test and assessment, in recent years, China has been providing "Chemical Test Good Laboratory Practice Management Methods" training courses, pesticide GLP training courses, new chemical substance ecotoxicological test technology training courses, GLP and chemical safety technical standard training courses, new chemical substance testing institution GLP training courses, aquatic laboratory animal training courses, highly toxic pesticide test technology training courses, etc., as a result, the chemical testing institutions and relevant entities' understanding of

relevant laws, regulations and standards have been enhanced, the technical and management level of the relevant laboratories has been improved.

10.4 Assessment

In recent years, due to the strengthening of occupational sound management and through a series of publicity, education and training activities, the understanding of chemical safety issues by workers, the public and administrators has been improved, the target groups and professionals' occupational protection knowledge and management capability has been enhanced, however, there are still some existing gaps: the publicity needs to be intensified, the variety and scope of chemical teaching courses are limited, the training of chemical risk identification and management capability for administrators needs to be strengthened, the small and micro chemical businesses are not providing training activities for chemical handling workers.

Table 10.1 Priorities and Possible Actions: Awareness/Understanding of Workers and the Public; and Training and Education of Target Groups and Professionals

Priority Issues	Level of Existing Capacity	Summary of Capacity Gaps and Needs	Possible Actions	Concerned Actors
To further improve the level of chemicals management information disclosing and services	Medium	The existing level of chemicals management information collection and services needs to be improved.	Construct the platform of chemical hazard and risk information exchange and services	Major chemical-related administrations under governments at various levels
To strengthen the system of school education for chemicals management	Low	The national popularity rate of chemical risk and management basic education is low, the students' relevant knowledge is lacking.	Primary and middle schools shall open chemical risk basic courses, universities shall open chemical risk assessment and management specialties, so as to improve the popularity rate of relevant courses.	Education, Environment, Health and Agriculture Administrations
To enhance the training of chemicals management expertise for	Low	Administrators' insufficient understanding of chemical risk information and challenge in making reasonable and effective	Provide systematic and continuous training of chemicals management expertise.	Major chemical-related administrations under

administrators at various levels		management decisions due to lack of professional knowledge on chemicals management.		governments at various levels
To strengthen the training of chemicals management for workers of small and micro chemical businesses	Low	Lack of chemicals management training for workers of small and micro chemical businesses.	Provide chemicals management training for workers of small and micro chemical businesses in a popular way	Chemical industry, Work Safety, Environment, Health and Agriculture Administrations, major chemical industry associations

Chapter 11: International Linkages

11.1 Cooperation and Involvement with International Organizations, Bodies and Agreements

As the permanent member of the United Nations, China has been actively participating in the international chemicals management activities organized by World Health Organization (WHO), United Nations Environment Programme (UNEP), International Register of Potentially Toxic Chemicals, Food and Agriculture Organization of the United Nations (FAO), International Programme on Chemical Safety (IPCS), United Nations Industrial Development Organization (UNIDO) and International Labor Office (ILO), particularly the active participation in various international conventions, protocols or standards associated with chemicals management. Table 11.1 is a list of chemicals management-associated international organizations and programmes participated by China, Table 11.2 is a list of international chemicals management conventions, protocols or standards.

Table 11.1 Membership in International Organizations, Programmes and Bodies

International Organization/ Programme/Body	National Focal Point (Ministry)	Other Ministries Involved	Related National Activities
UNEP	MEP		"Montreal Protocol" implementation, "Stockholm Convention" implementation, "Rotterdam Convention" implementation, "Basel Convention" implementation, "Mercury Control Convention" implementation
UNEP/UNIDO, National Cleaner Production Centers	MEP		Formulation of cleaner production-associated policies and management measures, supply of technical guidance for local cleaner production centers, cooperation with foreign governments or international organizations in cleaner production and associated fields
WHO	NHFPC		Participation in assessment of pest-control DDT alterative technology and health hazard
FAO	MOA	NHFPC	Conducting pesticide residue test and formulation of relevant regulations

UNIDO	MOC	MEP, MIIT	"Montreal Protocol" and "Stockholm Convention" implementation-associated international cooperation programmes
ILO	MOHRSS (Ministry of Human Resources and Social Security)	SAWS, NHFPC	Conducting occupational safety and health-associated international cooperation activities
UNDP (United Nations Development Programme)	MOC	MEP	"Montreal Protocol" and "Stockholm Convention" implementation-associated international cooperation programmes
World Bank	MOF	MEP, MOA, NHFPC	"Montreal Protocol" and "Stockholm Convention" implementation-associated international cooperation programmes

Table 11.2 Participation in International Conventions/Agreements/Procedures Related to Chemicals Management

International Agreements	Primary Responsible Agency	Relevant National Implementation Activities
SAICM	MOFA, MEP	Formulation of "National Plan" and "Preliminary Plan for National Implementation of SAICM"
Stockholm Convention	MEP	Development of "National Plan for POPs Convention Implementation"; compilation of "Implementation Performance Assessment Report"; various types of implementation activities
Rotterdam Convention	MEP, MOA	Strict implementation of "Rotterdam Convention", formulation and implementation of regulations on PIC international trade of hazardous chemicals and pesticides as well as management directory
Basel Convention	MEP	Strict implementation of "Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal"; formulation and implementation of laws on control of transboundary movements of hazardous wastes; implementation of PIC procedure and strict approval and control of hazardous waste export
Montreal Protocol	MEP	Formulation and implementation of "China National Plan for Gradual Elimination of Ozone-Depleting Substances" and promulgation of "Regulations on Ozone Layer Protection", organizing all sectors to participate in ODS elimination activities
International Health Regulations (IHR)	NHFPC	Revision of relevant laws for fitting into IHR, establishment of the communication and coordination mechanism between relevant ministries, formulation and implementation of detailed rules and regulations and providing relevant training activities
ILO Convention 170	SAWS	Formulation of "Regulations on Safe Use of Chemicals in

		Workplace" and "General rules for preparation of chemicalsafety data sheet(CSDS)"
ILO Convention 174	SAWS	Formulation of "Regulations on Management of Major Risk Sources" and "Standards for Identification of Major Risk Sources" (GB18218-2009)
GHS (Globally Harmonized System of Classification and Labeling of Chemicals)	MIIT, AQSIQ	Establishment of GHS Interministerial Joint Conference system, promulgation of GHS-associated national standards, organizing GHS promotion activities
"Recommendations on the Transport of Dangerous Goods, Model Regulations " (TDG)	NDRC	Fulfillment of the duties as a member of the Committee of Experts on the Transport of Dangerous Goods (TDG) for facilitating the gradual improvement of China's management system of dangerous goods transport

11.2 Participation in Relevant Development and Technical Assistance Projects

As the largest developing country, China has been actively participating in the chemicals management-associated international development and technical assistance projects, especially in implementing "Montreal Protocol" and "Stockholm Convention", which are dedicated to the supply of fund and technical assistance for developing countries.

In regard to the implementation of "Montreal Protocol", China has been participating as recipient in a number of international cooperation projects involving about ten sectors related to the elimination of ozone-depleting substances, as a result, China has accumulated about US$0.9bn international aid and realized the elimination of 100,000 tons of ODS production and 110,000 tons of ODS consumption, accounting for 50% of the total quantity produced and consumed by all developing countries. In regard to the implementation of "Stockholm Convention", Chinese Government has obtained development and technical assistance from a number of international organizations such as Global Environment Facility (GEF), World Bank (WB), United Nations Development Programme (UNDP) and United Nations Industrial Development Organization (UNIDO) as well as some foreign partners such as Italy, Norway, Canada, America and Switzerland, promulgated "National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants ", successfully finished the elimination of the existing four types of pesticide POPs, in addition to the effective launching of PCBs disposition and dioxin pollution reduction activities in key regions and key

sectors. Table 11.3 is a list of the international development and technical assistance projects jointly conducted by China and international organizations for the implementation of POPs Convention.

In addition, China has been making efforts in participating as a donor in international development and technical assistance projects. China has been donating annually to the technical fund under "Basel Convention", including providing financial support to the Beijing-based "Basel Convention" Training and Technology Transfer Center to facilitate the training and communication activities for developing countries; and in regard to "Minamata Convention on Mercury", China has made certain donations through UNEP for strengthening the developing countries' preliminary preparation and capacity building needed for Convention implementation.

In addition to the cooperation with international organizations and developed countries, in recent years, China has been strengthening the South-South cooperation with developing countries in the field of environmental protection. In 2009, "China-ASEAN strategy on International Environmental Cooperation (2009~2015)" was approved by China and ASEAN countries, in which 6 priority cooperation areas have been defined: environmentally sound technology, environmental labeling and cleaner production; environmental products and services; public awareness and environmental education; biodiversity protection; environmental management capacity building; and global environmental issues. In March 2010, MEP officially established the "China-ASEAN Environmental Protection Cooperation Center", which shall, in implementing the Strategy, actively explore the new pattern of "China-ASEAN environmental protection cooperation" that is in accordance with the demand of China and ASEAN countries and beneficial to regional environmental protection and harmonious economic development.

Table 11.3 Participation as Recipient in POPs-Implementation International Development and Technical Assistance Projects in Recent Years

Name of Project	International/Bilateral Donor Agency Involved	Duration	Relevant Activities
China's Long-Term Capacity Building for the Implementation of Stockholm Convention	GEF, UNIDO	2007-2014	Implementation institution's capacity building, policies and regulations formulation, fundraising capacity, technology development, as well as a number of demonstration areas' implementation capacity building activities
China's Full Fund Project for DDT and Dicofol-Associated Production Control and Integrated Pest Management	GEF, UNDP	2008-2012	Realization of DDT and dicofol-associated minimum environmental emission production and limited-space closed-system production, introduction and demonstrative promotion of IPM technology

Technology			
China Medical Wastes' Sustainable Environmental Management	GEF, UNIDO	2008-2013.3	Medical waste management and supervision capacity building, medical facilities' BEP demonstration of medical waste management, establishment of medical facilities' medical waste management and training system
China Pesticide POPs and Other POPs Wastes' Environmentally Sound Management and Disposition Project	GEF, UNIDO	2009-2014	Safety disposition of pesticide POPs waste and dioxin fly ash, construction of POPs environmentally sound disposition facilities, improvement of POPs environmentally sound management policies and technical standards as well as the implementation capability

11.3 Assessment

In various areas in relation to chemicals management, China has been actively and widely conducting international exchange and cooperation, through which a close relationship with various international organizations has been established, the successful cooperation with EU and America has been maintained, in particular, outstanding achievements have been made in the implementation of international agreements such as "Montreal Protocol" and "Stockholm Convention". In addition, China has been conducting South-South cooperation with developing countries, so as to make significant contributions to regional environmental protection and harmonious economic development.

In general, in order to fulfill the obligation of chemicals management as a part of international environmental protection, China has been actively and extensively conducting international cooperation and introducing advanced management ideas, technologies and funds, based on which not only realized the development of environmental problems by leaps and bounds, but also facilitated the domestic economic restructuring and industry upgrading, as a result, China's environmentally sound management of chemicals and the protection of environment has been improved to a new level.

At present, as a developing country, China is still lagging behind the foreign countries in chemicals management concepts, systems and technologies, it still needs to make a lot of efforts to obtain technical assistance for implementing international conventions on chemicals management, which are the future direction for China to strengthen international cooperation.

The priorities and possible actions for China to conduct international cooperation in chemicals management are shown in Table 11.4.

Table 11.4 Priorities and Possible Actions: International Cooperation in Chemicals

Management

Priority Issues	Level of Existing Capacity	Summary of Capacity Gaps and Needs	Possible Actions	Concerned Actors
To introduce foreign countries' chemicals management concepts, systems and technologies	Medium	The level of chemicals management systems and technologies needs to be improved	Introduce and learn from internationally advanced chemicals management concepts and experience, strengthen the legal system building and technical capacity needed for chemicals management (especially chemicals environmental management)	MEP and other Ministries, main chemical industry associations, chemical production and use entities
To obtain technical assistance for implementing international conventions	Medium	Chemical alternative technology transfer or introduction is insufficient, R&D capacity is inadequate.	Actively facilitate the technical assistance for international convention implementation, try to improve the level of technology R&D.	MEP, SAIC, MOFA, other relevant Ministries, main chemical industry associations, chemical production and use entities

Chapter 12: Resources Available and Needed for Chemicals Management

12.1 Resources Available in Government Ministries/Institutions for Chemicals Management

In China, the management of chemicals involves various governmental Ministries such as environment, agriculture, health and work safety. In recent years, China has invested tremendous human and financial resources to strengthen the government Ministries' equipment of chemicals management professionals and finance. Table 12.1 shows the data of existing resources of China's chemicals management institutions/organs. Due to the lack of accurate statistical data on the investment in chemicals management by each Ministry, the data listed in the Table are estimated figures.

Table 12.1 Resources Available in Government Ministries/Institutions

Ministry/Agency Concerned	Specific Responsibilities for which Resources are Allocated	Number of Professional Staff Involved	Type of Expertise Available
Environment	Comprehensive administration of chemicals environmental management	1500	Chemicals environmental management, eco-toxicology, environmental engineering, environmental chemistry, monitoring and analysis, risk assessment, analytical chemistry, applied chemistry, chemical engineering and industry
Health	Chemical incident health emergency response and toxicity identification	2000	Preventive medicine, pharmacy, pharmacology, biochemistry, toxicology, hygienics, analytical chemistry, environmental health, health detection, health monitoring
Agriculture	Agrochemicals (pesticides, veterinary drugs) management	3000	Pesticides, agricultural ecology, biochemistry, agricultural engineering, analytical chemistry, risk assessment, crop protection, agro-food safety
Work Safety	Chemical production sound management, workplace	2500	Occupational health, sound management, emergency response, technology, occupational health and safety

Ministry/Agency Concerned	Specific Responsibilities for which Resources are Allocated	Number of Professional Staff Involved	Type of Expertise Available
	occupational health supervision		
Trade/Commerce	Management of chemicals trade	300	Chemicals management, import and export of chemicals, chemical safety and analysis
Industry	Chemical industry planning and allocation, initiative implementation of GHS system	500	Chemicals industry planning, chemical production, manufacturing, research and development, supervision
Transport	Supervision of dangerous goods (including hazardous chemicals) transport	500	Chemical safety, chemical analysis
Public Security	Public security management of extremely toxic chemicals and precursor chemicals	300	Chemical safety, chemical analysis, extremely toxic chemicals management
Customs	Chemicals import and export management	300	Chemical classification and analysis, chemical inspection technology
Quality Supervision	Chemicals and packaging quality inspection	1500	Chemicals management, chemical safety, chemical analysis and monitoring
Industry and Commerce	Chemicals market supervision and administrative enforcement	150	Chemical safety, chemicals management, chemical analysis and monitoring

12.2 Resources Needed by Government Institutions to Fulfill Responsibilities Related to Chemicals Management

China is facing the gaps in chemical legislation, information management, technical research, infrastructure, chemical emergency response and public awareness improvement, the existing human and financial resources cannot fully meet the demand for chemicals management, so more input is necessary. Table 12.2 gives estimated data on the demand of resources for government institutions to fulfill the responsibilities related to chemicals management.

Table 12.2 Resources Needed by Government Institutions to Fulfill Responsibilities Related to Chemicals Management

Ministry/Agency Concerned	Specific Responsibilities for which Resources are Required	Number of Professional Staff Needed	Training Requirements
Environment	Chemicals environmental risk assessment, regional environmental impact assessment and environmental monitoring, chemical pollutant release and transfer registration, etc.	5000	Chemical regulations, risk assessment and management, chemical product analysis and detection, chemical pollution control, chemical pollutant release and transfer technology, emergency measures, chemical pollution remediation technology, chemicals environmental risk supervision
Health	Chemicals health risk assessment, prevention and control of chemicals public health emergencies, etc.	3000	Chemical regulations, health risk assessment and management, poisoning prevention and control, chemical analysis, toxicology, environmental epidemiology, chemical health risk supervision
Agriculture	Pesticide risk and benefit assessment, pesticide use environmental effects monitoring, veterinary drug quality inspection, etc.	1000	Chemicals regulation, risk assessment and management, pesticide poisoning, chemical analysis, plant protection, pesticide environmental effects and health risks supervision
Work Safety	Chemical emergency response, occupational health protection, hazardous chemical major risk sources supervision, etc.	1000	Production safety, chemical safety, chemical emergency response, chemical analysis, worker health protection, poisoning prevention, chemical safety risk supervision
Industry	Formulation of policies promoting comprehensive use of chemical resources and cleaner production, strengthening of chemical industry management, etc.	1000	Chemical industry planning, chemical safety, chemical alternative research
Transport	Chemical transport market supervision, chemical transport licensing, etc.	1000	Transport safety, hazardous chemicals, chemical analysis, and transportation management
Public Security	Regulating production and operation of extremely toxic chemicals and precursor chemicals, etc.	500	Extremely toxic substance management, flammable or explosive materials management, chemical analysis
Customs	Chemical import and export supervision, etc.	500	Supervision and management, chemical analysis

Ministry/Agency Concerned	Specific Responsibilities for which Resources are Required	Number of Professional Staff Needed	Training Requirements
Quality Supervision	Chemical product quality random inspection, import/export chemicals inspection	1000	Supervision and management, chemical analysis

12.3 Resources Available in Nongovernmental Organizations for Chemicals Management

There are a large number of nongovernmental organizations in China, some of the social groups, foundations or associations have been participating in the chemicals management activities via various forms and ways and they have invested in certain magnitude of human and financial resources. Table 12.3 lists the estimates of partial resources available in these NGOs for China's chemicals management.

Table 12.3 Resources Available in Nongovernmental Organizations (Partial)

Concerned Institutions	Specific Responsibilities	Number of Professional Staff Involved	Type of Expertise Available
China Environmental Protection Foundation (CEPF)	Provide financial aid to activities and projects related to environmental protection, enhance exchanges and cooperation with foreign countries in the field of environmental protection	2-3	Environmental protection
All-China Environment Federation (ACEF)	Provide assistance and help realize the Government's national environmental goals, tasks, participate in bilateral and multilateral environment-related exchanges and cooperation with international NGOs	2-3	Environmental protection
China Petroleum and Chemical Industry Federation (CPCIF) (including 41 associations such as Chlor-Alkali, Polyurethane, etc.)	Communicate with government departments, assist the Government in promoting industry work, promote technological progress and industrial upgrading of petroleum and chemical industries, improve the overall level of petroleum and chemical industry, and conduct domestic and foreign economic and technological exchanges and cooperation	50-60	Chemical processes, chemical safety and cleaner production, CNC technology, environmental chemistry, environmental monitoring, process control

Concerned Institutions	Specific Responsibilities	Number of Professional Staff Involved	Type of Expertise Available
China National Light Industry Council (CNLIC)	Conduct industry investigation and research, propose recommendations in relation to industry economic policies and legislation; organize industry statistics, participate in industry planning; strengthen industry self-regulation and normative behaviors; participate in formulation and revision of national standards and industry standards	30-40	Daily-use chemicals, quality analysis, engineering analysis, process design, process control, safety and environmental protection
China Pharmaceutical Industry Association (CPIA)	Standardize industries, enhance self-regulation, promote construction of industry credit system; reflect the industry's status quo, problems and suggestions, facilitate sound and fast development of pharmaceutical industry	3-5	Chemical processes, drug analysis, drug toxicity, R&D and design, bio-engineering, safety and environmental protection
China National Textile and Apparel Council (CNTAC)	Establish self-regulation mechanisms, integrate and coordinate economic and technological relations inside the textile industry, promote the industry restructuring and industrial upgrading	15-20	Textile engineering, applied chemistry, fashion design, economy and trade, material science, textile chemistry, safety and environmental protection
China Non-Ferrous Metals Industry Association (CNIA)	Establish and improve industry self-regulation mechanisms, standardize industry behaviors, fully play the role of a consultant/assistant to Government, promote the healthy development of non-ferrous metals industry in China	5-6	non-ferrous metals analysis, technical and economic study on non-ferrous metals, non-ferrous metals safety and health

Note: "Numbers of Professional Staff" are estimated figures but not accurate statistical data.

12.4 Resources from Development Assistance Activities

China has been accepting multilateral and bilateral development assistance in chemicals management, the international institutions and organizations actively engaged in providing assistance for China's chemicals management include: Global Environment Facility (GEF), United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP), United Nations

Industrial Development Organization (UNIDO), United Nations Institute for Training and Research (UNITAR), World Bank (WB), etc. In addition, some developed economies (such as America, Germany, Norway, Sweden and Japan) have also been providing technology, talent or fund assistance to China's chemicals management based on bilateral mechanism. Table 12.4 lists some resources available through international development assistance activities for chemicals sound management.

Table 12.4 Resources Available through Development Assistance and Technical Cooperation Activities

Funding Institutions and International Supporting Institutions	Title of Project and its Duration (start and finish dates)	Financial Resources of Project (from Donor and from Local Sources)
GEF UNDP/UNIDO/WB	"Stockholm Convention" Chemical Production Control, Chemical Release Reduction, Contaminated Sites Restoration, Environmentally Sound Disposal April 2008 –	US$42,939,000 Domestic fund: US$121,797,000
GEF UNEP/UNDP/UNIDO	China's Mercury Inventory Survey, Relevant Industry Mercury Pollution Control, In-Product Mercury Content Limit Research 2010 – 2013	US$2,055,000 Domestic fund: US$7,146,260
GEF WB / UNEP / UNDP	China's Ozone-Depleting Substances Phase-Out Project October 1993 – December 2017	US$566,400,000 Domestic fund: unknown
GEF WB	Sichuan Province Wenchuan Earthquake Chemical Contamination Risk Assessment Project July 2008 – October 2009	US$1,000,000 Domestic fund: US$500,000
UNITAR	GHS Implementation Capacity Building and Training Project October 2010 – December 2012	-

12.5 Assessment

In China, environmental and human health safety issues caused by chemical impacts have been emerging, to which the Chinese Government has attached great importance by investing large quantity of human and financial resources in chemicals management related environment, health and agriculture sectors etc., in addition to relevant chemical technology research and management initiatives. However, the available resources in chemicals sound management are not sufficient, China's resources input in chemicals sound management is inadequate, the allocation of human and financial resources in environment and health sectors needs to be enhanced, the overall level of

chemicals management capacity and the technical competence of chemicals management teams need to be improved. The priorities, gaps and possible actions in regard to chemicals management resources available in China are described in Table 12.5.

Table 12.5 Priorities and Possible Actions: Resources Available and Needed for Chemicals Management

Priority Issues	Level of Existing Capacity	Capacity Gaps and Needs	Possible Actions	Concerned Actors
To increase capital investment in chemicals management, expand channels for fundraising	Low	Insufficient fund, singular channel for fundraising	Increase capital investment, formulate incentive policies, promote Chinese Government's cooperation with international institutions and business sectors	Relevant Ministries, Governments at various levels, main industry enterprises
To enhance the professionals' technical competence	Medium	Insufficient technical capacity	Conduct international technology exchange and technical training activities	Management technical support institutions in environment, health and other sectors

Chapter 13: Conclusions and Recommendations

Based on the analyses and assessments concerning the chemicals management situation in China stated in the above each chapter, some general conclusions can be summarized as follows:

- Since China is a major producer and user of chemicals in the world, chemicals management in China is facing serious challenges. Although China has been making positive progress on Chemicals Management in recent years, it remains an arduous task for China to achieve the WSSD-2020 target.

- The chemicals and chemicals-related industries in China have carried a significant weight in the national economy, and sustained a rapid growth. However, due to the insufficient technical level and the lack of innovation capacity in China's chemical industry, a large number of chemical companies with a wide geographic distribution, the lack of comprehensive information and statistic data, the controls of environmental risk and human health risk caused by industrial chemicals and pesticide use has yet to be improved, hazardous chemical waste management and disposal capacity have increasingly improved.

- China has initially built up a relatively complete legal system on chemicals management with Chinese characteristics. However, the existing legislations in force limit the scope of control and have not yet fully covered a wide range of potentially hazardous chemicals. Moreover, the levels of the current laws and regulations on chemicals management are generally low, especially in the aspect of environmental management of chemicals, the efficacy of the relevant laws and regulations is limited. The national institutions system on chemicals management is not perfect so that it is difficult to implement chemicals management sufficiently and effectively. Furthermore, the risk management policies and systems for the priority chemicals in the country have not been well formulated. As a result, it is difficult for China to follow the pace of the international chemicals management. The non-regulatory measures on chemicals management is applied insufficiently.

- Although China has initially established an administrative system on chemicals management with clear department's functions and corresponding responsibilities among all relevant management departments, inter-ministerial information sharing and harmonizing management policies and actions between various governmental institutions regarding

chemicals management coordination need to be strengthened. Meanwhile, China lacks of specialized management agencies and professionals on chemicals management, and the professional supervision capacity is insufficient.

- In terms of chemicals management, China has relatively systematic and extensive social organizations, including industry associations, research institutions, public service organizations, etc. In recent years, China has made significant improvement on basic scientific research and technical competence of chemicals management. However, the "Responsible Care" (RC) action promoted by the chemical industry associations and the green chemistry practices have still not yet played their leading roles. Resource consolidation, information sharing, and cooperation among the specialized management agencies are insufficient. The public service organizations related to environmental protection are not professional and public participation in environmental protection is far from enough.

- Currently China has already built up multiple related coordination mechanisms on chemicals management, which have played an active and effective role in their respective fields. Given the fact that the multiple coordination mechanisms exist in China and their goals are different, it can not satisfy the strategic and systematic requirements on chemicals management nowadays so as to not meet the needs for SAICM implementation.

- China has weak information infrastructure on chemicals management. The statistical data is insufficient, and the relevant information is imperfect. Since the information related to chemicals management is collected and managed by each relevant department based on its responsibility and duty for a particular filed, information exchange and sharing channel is impeded, and the platform or channel for information disclosure and access has not built up inadequate.

- The laboratories for chemical analysis and testing and other lab infrastructure have rapidly developed in China, and the capabilities of technical support have greatly improved. In terms of scale and capacity, however, China's GLP Labs for testing and identifying the chemicals hazard can not meet the demands of chemicals management.

- The publicity concerning the risk of chemicals in China is relatively weak. The variety and scope of specialized courses on chemicals are limited. As a result, the training of

management capability for administrators needs to be strengthened. Meanwhile, the small-scale chemical enterprises are not providing training activities on chemicals management for chemical handling workers.

- China has actively carried out extensive international exchanges and cooperation on chemicals management, and has established close contacts with relevant international organizations. In particular, China has made remarkable achievements on implementing the international conventions concerning chemicals, which has promoted the domestic industry upgrades and sound chemicals management progress to a great extend. However, China still needs to receive more technical assistance to implement the international convenitions on chemicals management

- In China, the general resources input in chemicals management is inadequate. In particular, the allocation of human and financial resources in environment and health sectors is not enough, so that the overall level of chemicals management capacity and technical competence of chemicals management teams need to be improved.

Considering the above-mentioned conclusions based on the current situation assessments concerning the chemicals management in China, and in combination with the global situation and strategic objectives on chemicals management, the future priority actions for China to take so as to improve its chemicals management can be recommended as follows:

i. Developing and Proposing the National Strategy for Chemicals Management

Since China is still a large developing country in a period of industrialization, and currently its main focus is still on solving serious "three wastes" pollution problems, including air pollution, water pollution and frequent hazardous chemical spill accident, which have been basically solved by the developed countries. Moreover, it has been lack of awareness of the potential chemicals' environmental risk and health risks. Chemicals management has not been put on the top agenda of national environment and sustainable development strategies. Due to the lack of national macro-policy and strategic considerations, the development level of chemicals management in China is generally lags behind. In combination with the experience of chemicals management development in developed countries, towards WSSD-2020 strategic objectives for sustainable development of chemicals management as well as national SAICM implementation, studying, formulating and proposing a national strategy for chemicals management shall be the highest priority action to take for the Chinese government.

ii. Enhancing the technological level of national chemicals industry and chemicals application industries

China's chemicals and chemicals application industries play an important role in the national economy, but inadequate industry technology and innovation capacity has become a major source of abusing chemicals and led to widespread chemical-related environmental and health risks. The ultimate goal of WSSD-2020 strategies for sustainable development of chemicals management is to achieve sustainable production and consumption of chemicals in the human society. Therefore, adopting the national macro industry structure adjustment that includes the industry development strategy, taking technological optimization measures, vigorously promoting the "green chemistry" oriented technological innovation and industrial upgrading, and accelerated enhancing the technological level of national chemicals industry and chemicals application industries shall be used as an important priority action to take to implement the national strategy for chemicals management.

iii. Formulating the special laws for national chemicals management

Chemicals management is related to the important areas including the national economy, social sustainable development and environmental protection, and involves important aspects of national economic development and people's welfare. As a result, establishing the special legislation for national chemicals management is not only an essential need, but also the foundation for developed countries to establish a sound chemicals management system and continuously push forward the chemicals management. China has been lack of special laws for chemicals management. The coverage of existing legal instruments in China is limited and has a bias towards occupational safety management. The fundamental system of national legislations for chemicals management, including related to chemicals production, use, release, and transfer register, is only remain in the level of ministerial rules. Both the efficacy of regulations and the scope of management are limited, and are difficult to ensure an effective inter-sectoral coordination among the relevant management departments on chemicals. Therefore, formulating the special laws for national chemicals management in line with the direction of contemporary chemicals management and the orientation of strategy implementation shall be an important priority action for China to improve its chemicals management.

iv. Improving the established coordination mechanisms for national chemicals management

The risks to environment and human health caused by chemicals may occur at all stages of the life cycle of chemicals. Moreover, the chemicals management is usually related to multiple sectors, many relevant administration departments, and multi-stakeholders. Thus, only

establishing a coordinated and harmonized government management system as well as a public governance mechanism can meet the needs of today's chemicals management. Chemicals management in China involves many relevant administration departments in multiple sectors, including economic industries, commercial trade, occupational safety, environmental protection, agriculture, public health, transportation, quality inspection and customs, and also involves chemicals related industries and a wide range of stakeholders. In terms of the management policy coordination and action harmonization, China's chemicals management system still remains insufficiency. Therefore, improving and establishing a coordination mechanism for national chemicals management to meet the needs of today's chemicals management shall be one of priorities for China to refine its chemicals management.

v. Strengthening the national chemicals management institutions and technical support capabilities

Chemicals management contains risk assessment and risk management for chemicals, which requires high technology and complex organizational management. Thus, the main developed countries in the world have set up a special institution for chemicals management as well as professional institutions of technical support. In view of the long lagged behind of China's chemicals management development, the institutions and technical support capabilities for chemicals management need to be improved. Moreover, since administrative staff and technicians of chemicals management are very limited, and technical capacity is weak, it's not only difficult to effectively conduct some basic tasks of chemicals management, including hazard identification, risk assessment and risk management for existing chemicals, but also hard to meet future needs for continuously strengthening the country's chemicals management. Therefore, systematically strengthening institution and technical support capabilities for national chemicals management shall be a priority for China.

vi. Promoting and popularizing education, publicity and training on chemicals management

Currently the whole society in China has limited awareness of environmental risk and health risks of chemicals. The level of public awareness and public participation in chemical risk prevention is significantly behind the developed countries. Furthermore, the chemicals practitioners are lack of protection awareness of occupational health, and have received inadequate trainings on the relevant knowledge and skills on chemicals. Therefore, it's recommended that in the fields of public education, publicity, and associated industries related to chemical production and use, the basic knowledge related to health and environmental risks of chemicals, and risk management of chemicals shall be broadly popularized and promoted at the multi-level and in the multi-field; the technical trainings including the risk control of hazardous chemicals and measures

and methods of sound chemicals management will be organized to greatly promote education, publicity and training on **c**hemicals management.

vii. Actively expanding international cooperation on international chemicals management

International environmental management of chemicals has gone through nearly 40 years development, and accumulated a large number of basic knowledge and information resources on chemicals hazard, the environmental and health risks of chemicals, and risk management regarding chemicals. Meanwhile, the active international cooperation has also contributed to the remarkable development of China's chemicals management in recent years. As a developing country, China should continue to actively expand international cooperation on chemicals management, take full advantage of existing international resources, and facilitate the progress of technical level and innovation capacity on chemicals, so that national chemicals management will possibly achieve great-leap-forward development.