



CCM Data & Business
Intelligence

Pesticide Industry Migration in China

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Executive summary

With the sudden outbreak of COVID-19 and shrinking global market since 2020, China has undertaken international industry migration. Through the reform and opening-up policy and accession to the WTO, China's economy has developed rapidly in response to new opportunities. And China, as the only country in the world with all the industrial categories listed in the industrial classification of the United Nations, has actively integrated into economic globalization.

In recent years, the Chinese government has proposed to strengthen the planning and guidance of China's chemical industry, carry out the identification and regulations of chemical parks and industrial transfer parks, and provide subsidies and other incentives for enterprises that relocate their business. More than 20 provinces and cities have announced government-recognised chemical industry parks, including provinces like Jiangsu, Shandong, Hubei, Henan and Liaoning.

Domestic chemical enterprises have also implemented capacity transfer, with capacity shifted to lower-cost regions in China. Forced by the increasing pressure of environmental protection in the Yangtze River Delta and some coastal areas, as well as the rectification of chemical industry parks in the original production areas, many enterprises in pesticide industry have set up new production sites in the central and western regions of China.

China's pesticide enterprises have greatly expanded in this round of industry migration, which may cause overcapacity of some varieties and even lead to blind competition in the near future. In view of the key protection of the Yellow River basin by the latest environmental protection policies, enterprises in the new sites may be fined or even shut down if they fail to take environmental protection measures.

Methodology

The report is drafted by diverse methods as follows:

- Desk research

The sources of desk research are various, including published magazines, journals, government statistics, industrial statistics, customs statistics, association seminars as well as information from the Internet.

- Internet

CCM contacted with players in the domestic agrochemical industry through B2B websites and software as well as obtained registration information on the internet.

- Data processing and presentation

The data collected and compiled are sourced from:

- CCM's database
- China Customs
- Published articles in periodicals, magazines, journals and third-party databases
- Statistics from governments and international institutes
- Telephone interviews with domestic producers, joint ventures, service suppliers and governments
- Third-party data providers
- Comments from industrial experts
- Professional databases from other sources
- Information from the internet

The data from various sources have been combined and cross-checked to make this report as precise and scientific as possible. Throughout the process, a series of internal discussions were held in order to analyse the data and draw the conclusions.

1 Overview of migration of China's pesticide industry

1.1 Investment in pesticide industry by region, 2016–2020

In recent years, China's pesticide enterprises have accelerated their external expansion. The investment on pesticide production mainly comes from East China, such as Jiangsu, Shandong, Zhejiang provinces, with stricter environmental protection supervision. The new capacities of pesticide are shifting to the central and western China with advantages in land, resources and policies. Besides, most of the new projects abide by national regulations to enter the standardised chemical parks.

During the 13th Five-Year Plan period (2016–2020), in terms of project construction sites, the number of projects planned or constructed in the central and western China has increased. Sichuan Province, Shaanxi Province, central and western Inner Mongolia Autonomous Region, Ningxia Hui Autonomous Region and Gansu Province have become target locations for new pesticide projects.

- East China

Benefiting from the abundant human resources, high technical level and good market resources, the investment in East China is relatively large. The total investment in East China is USD3,188.9 million (RMB20,470 million), mainly in Jiangsu Province and Shandong Province with USD1,107.6 million (RMB7,110 million) and USD992.3 million (RMB6,370 million) respectively. The investment in Anhui Province is relatively small, totaling USD313.1 million (RMB2,010 million), while that in Zhejiang Province was much smaller, at USD32.7 million (RMB210 million).

The main investment locations are Hefei and Huai'bei cities in Anhui Province, Nantong, Huai'an, Xinyi and Nanjing cities in Jiangsu Province, Weifang, Binzhou, Jining and Pingdu cities in Shandong Province, and Shangyu City in Zhejiang Province, and Xingan, Guixi, Yongxiu cities in Jiangxi Province. Although the investment and production capacity of pesticide industry has been transferred to northwest and north China in recent years, there are still many high-tech projects in east China.

- Central and Northwest China

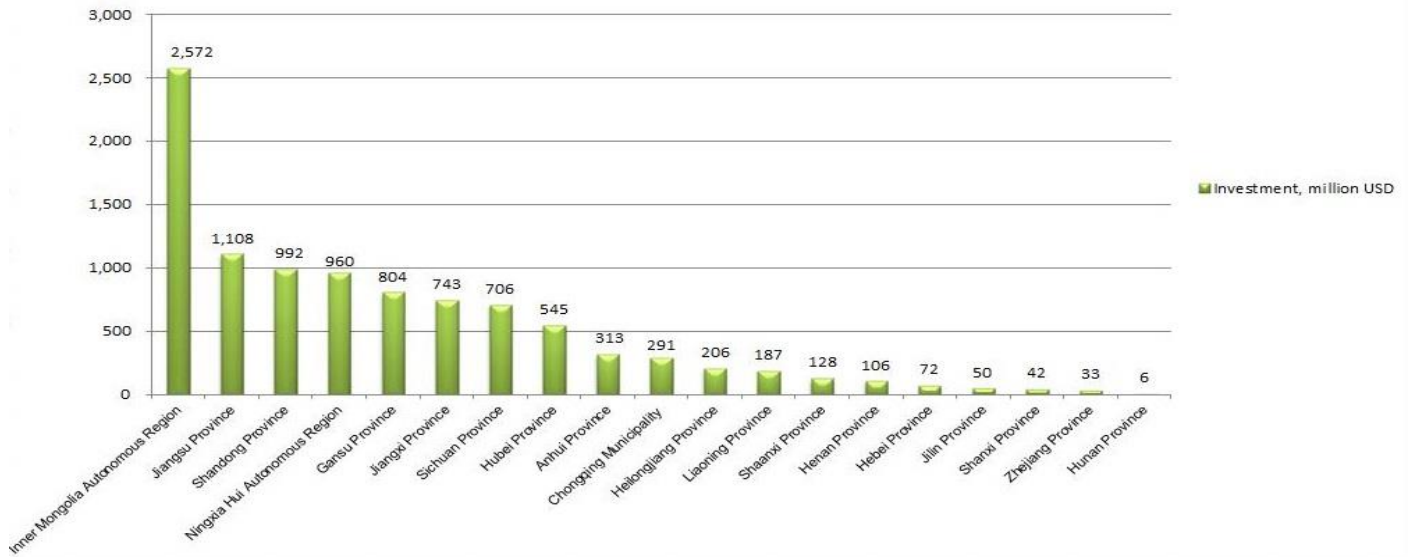
The largest investment with the amount of USD2,572.0 million (RMB16,510 million) is made in Inner Mongolia Autonomous Region, accounting for 26% of the total domestic investment. In the northwest provinces, the total investment is USD1,891.2 million (RMB12,140 million), among which Shaanxi, Gansu and Ningxia provinces are USD127.7 million (RMB820 million), USD803.8 million (RMB5,160 million) and USD959.6 million (RMB6,160 million) respectively. The investment in Shaanxi Province is relatively small.

The investment in Inner Mongolia Autonomous Region is mainly in Alxa and Wuhai, where locates in west China. The investment sites of northwest China are mainly distributed in 3 parks in Gansu, 3 parks in Ningxia and 2 parks in Shaanxi. It is worth noting that Gansu Province has many new projects, but the amount of actual investment in the province is not high.

- Northeast China

The investment in the three provinces of Northeast China, i.e. Liaoning, Jilin and Heilongjiang provinces, totals USD442.4 million (RMB2,840 million), accounting for 4.49% of the total domestic investment.

Figure 1.1-1 Investment in pesticide industry by region, 2016–2020



Source: CCPIA

Table 1.1-1 Locations of newly-built projects

Location	Province/Region	City/County	Specific Location
East China	Anhui	Hefei, Huaibei	Hefei Circular Economy Industrial Park, Huaibei Coal Chemical Industry Park
	Jiangsu	Nantong, Huai'an, Xinyi, Nanjing	Rudong Yangkou Chemical Industrial Park, Nantong Economic Development Zone, Huai'an Salt Chemical Base, Nanjing Jiangbei New Materials Industrial Park
	Shandong	Weifang, Binzhou, Jining, Pingdu	Weifang Economic Development Zone Chemical Industry Park, Binzhou Chemical Industry Park, Jining New Materials Industrial Park, Pingdu Xinde Ecological Chemical Industrial Park
	Zhejiang	Hangzhou	Shangyu Fine Chemical Industry Park, Hangzhou Binjiang New District
	Jiangxi	Xin'gan, Guixi, Yongxiu	Xin'gan Salt Chemical Town, Guixi Sulfur & Phosphorus Chemical Industry Park, Yongxiu Xinghuo Industrial Park
North China	Hebei	Cangzhou, Jinzhou	Lingang Economic Development Zone, Jinzhou Economic Development Zone
	Shanxi	Yuncheng	High-tech Zone, Linyi County
Northeast China	Liaoning	Huludao	Huludao Economic and Technological Development Zone
	Jilin	Jilin	Jilin Economic Development Zone
	Heilongjiang	Jiamusi, Anda	Chemical Industrial Park, Jiamusi High-tech Zone; Wanbaoshan Industrial Park
Northwest China	Inner Mongolia	Alxa	Alxa Economic Development Zone, Tengger Economic Development Zone, Alxa League Chemical Industry Agglomeration Zone Wuda Industrial Park, Hainan Industrial Park, Haibowan Industrial Park, Low Carbon Industrial Park
		Wuhai	
		Ordos	Dalad Industrial Park
	Gansu	Lanzhou, Baiyin, Yumen	Lanzhou New District Chemical Industry Park, Baiyin High-tech Zone, Yumendong Building Materials Chemical Industrial Zone
	Ningxia	Ningdong, Zhongwei, Pingluo	Fine Chemical Industry Park of Ningdong Energy Chemical Base, Zhongwei Industrial Park, Pingluo Industrial Park
	Shaanxi	Yushen, Pucheng	Yushen Industrial Zone, Qingshui Industrial Zone, Pucheng Coal Chemical Industry Park
Southwest China	Sichuan	Mianyang, Guang'an	Mianyang Economic and Technological Development Zone Industrial Development Park, Guang'an Economic and Technological Development Zone
	Chongqing	Chongqing	Chongqing Changshou Economic and Technological Development Zone
Central China	Henan	Sanmenxia, Hebi	Shanzhou District Industrial Agglomeration Area, Jijashan Industrial Park
	Hubei	Jingzhou, Yichang	Jingzhou Economic Development Zone, Yichang Baiyang Chemical Industry Park
	Hunan	Yueyang, Changde	Yueyang Yunxi Green Chemical Industrial Park

Source: CCM

1.2 Project dynamics of new investments, 2019–2021

Since the end of 2018, Chinese pesticide enterprises have actively responded to national industrial planning policies and accelerated the industry migration. As of Nov. 2021, judging from the construction progress of pesticide projects, there are 15 under the environmental impact assessment (EIA), 3 having received EIA approvals and 21 projects under construction. Thereinto, pesticide technical project as well as the project of pesticide technical and its intermediates have become the key construction direction, with total number reaching 61, about 62.9% of the total.

Table 1.2-1 Project progress of new investments, 2019–2021

No.	Project progress	Pesticide technical	Pesticide technical & its intermediates	Pesticide intermediates	Pesticide formulations	Pesticide technical & formulations and their intermediates	Total
1	Planning	0	2	0	0	0	2
2	Official approval for overseas investment	0	0	0	1	0	1
3	Under environmental impact assessment	10	2	0	2	1	15
4	Environmental impact assessment approved	2	1	0	0	0	3
5	Under construction	7	7	4	1	2	21
6	Construction completed	1	8	3	1	0	13
7	Completion inspection	0	0	1	1	0	2
8	Safety assessment approved	1	1	2	1	0	5
9	On trial	3	0	3	0	1	7
10	Production	10	6	9	1	2	28
Total		34	27	22	8	6	97

Source: CCM

In terms of planning capacities, the capacity of pesticide intermediates reaches 1,334,000 t/a in 2019–2021, accounting for 38.8% of the total; that of pesticide technical is 372,622 t/a, 10.8% of the total.

Compared with the traditional pesticide production provinces in east China, west and northwest China are the regions with higher scale of project construction. It is worth noting that pesticide technical & its intermediates projects are the key construction projects, especially in Inner Mongolia Autonomous Region.

In 2019–2021, the planning production capacities of pesticide technical & its intermediates reach 525,100 t/a in Inner Mongolia Autonomous Region, accounting for 79.1% of the provincial total production capacity, while that of pesticide technical is only 5.7%. In Shandong Province, the planning production capacity of pesticide technical & formulations and their intermediates totalled 460,000 t/a, occupying 80.3% of the total. In Jiangsu Province, the capacity of pesticide intermediates is 403,000 t/a, accounting for 79.3% of the provincial total.

Table 1.2-2 Capacity of projects by region, 2019–2021, t/a

No.	Province/Region	Pesticide technical	Pesticide technical & its intermediates	Pesticide formulations	Pesticide intermediates	Pesticide technical & formulations and their intermediates	Total
1	Inner Mongolia Autonomous Region	38,000	525,100	0	100,500	0	663,600
2	Shandong Province	28,100	72,000	50,000	0	460,000	610,100
3	Jiangsu Province	18,300	21,010	24,000	403,000	42,000	508,310
4	Gansu Province	33,400	61,900	0	117,300	20,000	232,600
5	Hubei Province	300	22,200	0	200,000	0	222,500
6	Jilin Province	10,000	0	0	200,000	0	210,000
7	Sichuan Province	73,000	0	0	130,000	0	203,000
8	Ningxia Hui Autonomous Region	26,522	82,000	0	13,200	51,000	172,722
9	Hunan Province	200	0	0	170,000	0	170,200
10	Anhui Province	5,500	155,000	0	0	0	160,500
11	Chongqing Municipality	122,000	0	19,000	0	0	141,000
12	Shaanxi Province	0	47,500	0	0	0	47,500
13	Jiangxi Province	7,000	0	34,000	0	0	41,000
14	Guangxi Zhuang Autonomous Region	0	0	20,000	0	0	20,000
15	Pakistan	0	0	15,000	0	0	15,000
16	Henan Province	1,300	0	7,000	0	0	8,300
17	Hebei Province	5,000	0	0	0	0	5,000
18	Zhejiang Province	4,000	0	0	0	0	4,000
Total		372,622	986,710	169,000	1,334,000	573,000	3,435,332

Source: CCM

1.3 Popular pesticide products of to-be-established projects

On the basis of the analyses of new projects released by pesticide enterprises in China in 2019–2021, we sort out 17 pesticides that the enterprises are likely to invest and build. From the perspective of the products and capacity changes involved, the current hot pesticide products in the market, such as glyphosate, mesotrione and so on, have been greatly expanded in this round of industry migration, which may cause overcapacity of some varieties and even lead to vicious competition in the near future.

Table 1.3-1 List of popular pesticide products of to-be-established projects, 2019–2021

Category	Name of pesticide
Herbicide	Glufosinate-ammonium
	Clethodim
	Mesotrione
	Sulfentrazone
	Nicosulfuron
	Topramezone
	Metamifop
	Oxadiazon
Fungicide	Difenoconazole
	Prothioconazole
	Tebuconazole
Insecticide	Chlorantraniliprole
	Pymetrozine
	Thiamethoxam
	Dinotefuran
	Flonicamid
Acaricide	Spirotetramat

Source: CCM

2 Chemical industrial parks and capacity migration for better environment

2.1 Normalised regulation of production safety and environment protection

In recent years, the Chinese government has proposed to strengthen the planning and guidance of China's chemical industry, identification and management of chemical parks and industrial transfer parks, as well as provide preferential terms and supporting facilities for enterprises that relocate their production capacity. As a matter of fact, since 2005, China has carried out four rounds of special rectification of chemical production enterprises and special rectification and improvement of chemical production safety. So far, more than 20 provinces and cities have announced government-recognised chemical industry parks, including provinces like Jiangsu, Shandong, Hubei, Henan and Liaoning.

In order to protect the safety of human lives and wealth, as well as the ecological environment, the Chinese government has implemented effective and guiding policies towards the chemical industry. In 2017, the former Ministry of Environmental Protection pointed out that a rigid constraint mechanism for ecological environment will be built, demarcating ecological protection red line in 11 provinces and municipalities along the Yangtze River, and the State Council issued the *Guiding Opinions on Promoting the Relocation and Rectification of Hazardous Chemical Production Enterprises in Densely Populated Urban Areas*, which stipulates that chemical production enterprises, which do not meet the safety or health protection distance standards, shall be relocated from or renovated in densely populated urban areas, in order to promote transformation & upgrading and green development of pesticide and intermediate industries.

In 2018, the Ministry of Ecology and Environment issued the Action Plan for the Battle for Protection and Restoration of the Yangtze River to strengthen strategic environmental assessment. The same year, the Ministry of Industry and Information Technology issued the Three-year Action Plan to Resolutely Battle Against Pollution from Industry and Communication Sectors, which required many chemical enterprises and industrial parks in key ecological protection areas to relocate or go through renovation, which include the Yangtze River Economic Belt.

In October 2021, the central government issued the Overall Plan for the Ecological Protection and High-quality Development of the Yellow River Basin. The basin covers 9 provinces and autonomous regions, including Qinghai, Sichuan, Gansu, Ningxia, Inner Mongolia, Shanxi, Shaanxi, Henan and Shandong. The plan is an important basis for formulating and implementing relevant planning schemes, policies and measures, and for launching engineering projects. Ecological protection in this area poses challenges for the westward relocation of pesticide production capacity and thus green and safe production are eternal themes in pesticide industry development.

2.2 Incentives for relocation and transformation of pesticide enterprises

In order to promote the transformation & upgrading and encourage green development of the pesticide and the intermediate industries, *Guiding Opinions on Promoting the Relocation and Rectification of Hazardous Chemical Production Enterprises in Densely Populated Urban Areas* was issued by the State Council in 2017. It stipulates that chemical production enterprises, which do not meet the standards on safety or healthy protection distance from living areas, should be rectified or relocated from densely-populated residential urban areas.

Accordingly, subsidies and other incentives have been given out to encourage migration of chemical production enterprises in many provinces. For example, according to Shandong Province's work summary of relocation and rectification in 2019, relevant provincial departments have formulated supporting fiscal, tax, financial and land policies to ensure smooth progress thereof. And in 2018, the provincial government allocated USD7.8 million (RMB50 million) special funds to cities in the province. Those qualified hazardous chemical production enterprises have been supported through financial channels, and some were even rewarded if they completed the relocation and transformation tasks in advance.

Meanwhile, Hubei Provincial Development and Reform Commission (HPDRC) took the lead in formulating the *Guidance for the Recognition of Chemical Parks*, and had confirmed 51 compliant chemical parks as of 13 April, 2021. Regarding the transformation and relocation of chemical enterprises & dangerous chemical production enterprises along the Yangtze River, the provincial finance department arranged a 3-year special award and subsidy fund, allocating USD31.2 million (RMB200 million) every year and totalling USD93.5 million (RMB600 million), and HPDRC arranged USD3.9 million (RMB25 million) annually to support chemical enterprises. Besides, four chemical parks in Hubei Province have been recognised as national

demonstration parks of circular transformation, and were granted subsidies adding up to USD91.9 million (RMB590 million) by National Development and Reform Commission.

Hubei Xingfa Chemicals Group Co., Ltd. is a major pesticide producer in Hubei Province. It was awarded USD11.4 million (RMB73.3 million) national technical transformation special subsidy. Recent years, it invested more than USD311.6 million (RMB2,000 million) to promote transformation, replacing old driving forces with new ones, actively developing microelectronics and silicone new materials, as well as new chemical materials.

2.3 Standardisation and rectification of chemical industrial parks

The major explosion in Xiangshui, Jiangsu Province on 21 March, 2019, speeded up the regulation progress for the chemical industry in this province, as well as across the whole China. Many provinces and autonomous regions have rolled out a series of guidance on chemical industrial parks. Many provinces also issued industry regulation plans to reduce the number of chemical industrial parks. The trend is set that chemical enterprises must enter chemical parks.

Table 2.3-1 Relevant measures for chemical parks adopted in some provinces

Region	Province	Measure
North China	Hebei	From March 2019 to December 2020, upgrading and rectification work was carried out in chemical industrial parks and towards safety production of such enterprises in the province. Thereinto, chemical parks should be assessed for safety risks. Setting up new chemical parks should be banned in principle.
East China	Jiangxi	There will be no new chemical-themed industrial parks set up in the bank area within 5 kilometers to the Yangtze River (Jiangxi section), Ganjiang River, Fuhe River, Xinjiang River, Xiaohe River, Xiuhe River and Poyang Lake.
	Shandong	A clean-up and rectification of the original 199 chemical parks in the province was carried out. At present, the number of chemical industrial parks in Shandong province is 93, but the target set out by the provincial government is lower than 85.
	Jiangsu	A total of 53 chemical industrial parks in Jiangsu Province were evaluated on the basis of the provincial park assessment of "one park, one policy". In Oct. 2020, the provincial government published a list of 14 chemical industry-positioning parks and 15 chemical industry-positioning centralised areas. Besides, 34 chemical enterprises outside chemical industrial parks within 1 km to both sides of the main stream and tributaries of the Yangtze River should be relocated by the end of 2020 in principle.
	Zhejiang	Establishment of any new chemical industrial park is prohibited, and rectification of existing chemical industrial parks should be strengthened.
	Anhui	Establishment of any new chemical industrial park is prohibited, and rectification of existing chemical industrial parks should be strengthened. Chemical enterprises that have to relocate out of downtown areas shall set a clear timetable for the relocation, and if there is a delay, these enterprises will face production suspension.
Central China	Henan	Approval of new chemical industrial parks (concentrated areas) should not be made, and approval should not be given to new chemical enterprises outside chemical industrial parks. For the 43 existing chemical industrial parks (concentrated areas), new construction, reconstruction and expansion of chemical projects should not be allowed before the parks go through safety capacity assessment and set up special safety supervision agencies. Any chemical project without required safety conditions shall not allow to enter a park.
	Hubei	Any new chemical projects and heavy chemical parks is prohibited within 1 kilometer along the banks of the Yangtze River, and new chemical projects are prohibited outside parks within 15 kilometers along the banks of the river.
Southwest China	Sichuan	It is forbidden to build or expand chemical industrial parks and chemical projects within 1 kilometer along the banks of the main stream of Tuojiang River.
Northwest China	Shaanxi	New chemical parks are banned in central part of the province, and the government should strengthen the management of existing chemical parks.

Source: Local governments and CCM

As of Oct. 2021, only 2 provinces, i.e. Shanxi and Qinghai had not announced their lists of recognised chemical parks. More than 24 provinces, autonomous regions and municipality in China have announced 543 designated chemical industrial parks or concentrated zones.

Table 2.3-2 Number of recognised chemical industrial parks or concentrated zones in China by region, as of Oct. 2021

Province/Region	Number
Shandong Province	85
Inner Mongolia Autonomous Region	58
Zhejiang Province	52
Hubei Province	51
Henan Province	47
Anhui Province	38
Jiangsu Province	29
Jiangxi Province	26
Liaoning Province	21
Shaanxi Province	21
Gansu Province	15
Hebei Province	13
Jilin Province	11
Guangxi Zhuang Autonomous Region	11
Hunan Province	10
Ningxia Hui Autonomous Region	10
Fujian Province	9
Guizhou Province	7
Xinjiang Uygur Autonomous Region	7
Guizhou Province	7
Yunnan Province	5
Sichuan Province	5
Hainan Province	3
Tianjin Municipality	2
Total	543

Source: CCM

2.4 Policy direction and future trend, 2021–2025

- Policy direction

During the 14th Five-Year Plan Period, efforts should be made in five directions to strengthen comprehensive strength and sustainability in China's chemical industrial parks to facilitate the leap from standardized development to high quality development.

I. Promote the development of industrial clusters, and optimize & upgrade industrial structure in chemical parks

- Coastal area: Give full play to the geographical advantage, and develop a number of high-quality coastal petrochemical bases, represented by Daya Bay (Guangdong), Shanghai and Ningbo (Zhejiang), where large petrochemical parks with international influence shall be built.
- Inland area: Rely on resources advantage to develop a number of inland petrochemical bases, represented by Nanjing (Jiangsu), Shijiazhuang (Hebei) and Wuhai (western Inner Mongolia), where demonstration parks with prominent characteristics or going through industrial transformation and upgrading shall be built.
- Western region: Focus on the construction of four large-scale modern coal chemical industry bases in Ningdong (Ningxia), Yulin (Shaanxi), Ordos (western Inner Mongolia) and Zhundong (Xinjiang), strengthening the comprehensive utilization of coal and fostering demonstration zones of advanced coal chemical industry.

II. Strengthen the guiding role of planning and norms and implement access management system

The goal of industrial transformation and upgrading in chemical industrial parks is to rationally plan specialized industries, extend the industrial chain, encourage differentiated development, as well as build synergy, and achieve mutual energy supply and resources recycling between upstream and downstream companies in a park.

Introduce access management system and withdrawal mechanism, and encourage upgrading and transformation in enterprises in such parks. Projects allowed to enter the parks should conform to the requirements of national industrial policies and industrial planning of an individual chemical park. Furthermore, hierarchical management of chemical parks in key provinces should be put in place.

III. Enhance risk prevention and control capability

Quantitative risk assessment and environmental impact assessment for chemical parks should be carried out. Three-tiered risk control system for production devices, enterprises and parks should be established and overall emergency plans be formulated, so as to reduce the possibility of major pollution accidents. The following establishments are essential, namely, professional institutions for safe production and environmental protection, safety supervision records of enterprises in park, as well as tiered risk control and hidden trouble investigation and management work arrangement. At the same time, a communication mechanism should be worked out with surrounding towns and communities; release the information of industrial development prospect and environmental protection results to the public and accept supervisions from government agencies, the public and relevant enterprises.

IV. Cultivate specialized and efficient management and services

Chemical industrial parks should improve on the mode of "government supervision + corporate-like services", to transform themselves from government-led parks to government-guided and market-led ones. Equip them with big data technology to push forward evolution. Speed up data connection between information systems in parks and public database, in order to gradually realize intelligent early warning on and analysis of production safety, environmental protection, emergency, energy consumption, logistics, and other public services.

V. Set demonstration projects to encourage overall high-quality improvement

Push forward the set-up of a standardization system. By 2025, a number of high-quality demonstration projects will be fostered, which have excellent management, good industrial coordination and strong innovation capacity, supported by large-scale, high-efficiency and high-level key projects, as well as by advanced producer service sector. And regard enhancing innovation ability as an important indicator and direction in improving the quality of chemical parks; by 2025, there will be at least 50 science and technology innovation centers in the parks.

- Future trend

China aims for better recycling in chemical industrial parks: better connect enterprises in upstream and downstream along the industry chain, realize efficient and comprehensive utilisation of resources through retreatment of waste materials, and build an ecological recycling system featuring good connectivity and resources sharing. Such recycling pilot programs in Hebei and Jilin have already proven effective.

Besides, development directions for China's chemical industry are:

➤ **New technology**

Use new technology to break the boundaries of traditional chemical industry and accelerate the cross-border integration.

➤ **New process**

Through updating and renewing production process, the chemical industry heads deeper into fine chemical products with complex molecular structure, strong commercial value and high added value, supported by large-scale refined and synthetic industrial products based on petrochemical industry.

➤ **New material**

New materials will lead energy-based chemical industry into new material-inspired chemical industry. The emergence of new materials breaks through the shackles put on chemical industry by traditional energy sources. With new energy sources, high quality, high performance or specially-functioned advanced chemical materials can be produced.

➤ **New concept**

The new concept of circular/recycling production will lead chemical industry on a green development path.

3 Migration direction in relevant provinces or regions

3.1 Advantages and risks of popular migration choices

The most popular provinces among pesticide companies to build new production bases are: the southern Liaoning Province and the eastern Hebei Province, which is around the Bohai Sea, as well as the central and western regions, such as eastern, central and western Inner Mongolia, Gansu, Ningxia, Sichuan and Chongqing. Each of these popular choices has its own advantages and risks, due to the terrain, climate and previous industrial capability.

Table 3.1-1 Advantages and risks of popular migration provinces or regions

Location	Province/Region	Advantages	Risks
Northern China	Liaoning	The southern part is adjacent to the Bohai Sea, and the environment has larger carry capacity there. Freshwater resources are abundant.	The Bohai Sea is almost enclosed by Liaodong peninsula and Jiaodong peninsula, so its water exchange and thus pollution carrying capacity is inferior to the Yellow Sea and East China Sea.
	Jilin	Freshwater resources are abundant. There are several industrial bases in its eastern area. The cost of labour is low.	It locates in the upper reaches of Songhua River. In case of any pollutant, it will place pollution risks to the middle and lower reaches of Songhuajiang River, and even Heilongjiang River.
	Eastern Inner Mongolia	Land resources are abundant. Its transportation is convenient as there is a railway linking China, Russia and Mongolia. Coal and freshwater are abundant. The costs of labour and land is low.	It locates in the agro-pasture ecotone. Ecological environment here can be easily affected compared with that in eastern coastal areas.
Western China	Gansu	Land resources are abundant, so are reserves of crude oil, natural gas and coal. Lanzhou City has industrial foundation for chemical industry as well as R&D capacity and talents. The cost of labour is low.	Located in upper reaches of the Yellow River, of which the ecological environment is fragil. Pollution will affect middle and lower reaches of the Yellow River.
	Ningxia	It has large installation of power equipment, and new energy industry is developing rapidly. The cost of land is low. It sets relatively low entry threshold.	
	Central and western Inner Mongolia	Land resources are abundant, so are reserves of crude oil and natural gas. It has quite large capacity of raw materials for inorganic chemicals. It sets relatively low entry threshold.	
	Sichuan	It locates in the middle and upper reaches of the Yangtze River and has comprehensive advantages of unique raw materials, land, freshwater, electricity, water transport, etc. Cities like Guang'an, Leshan, Dazhou and Mianyang have foundations for chemical industry. The cost of labour is relatively low and the cost of land is low.	Located in the upper reaches of the Yangtze River, the ecological environment is weaker compared with that in the lower reaches and eastern coastal areas. Great attention has been paid to the ecological protection and pollution control of the Yangtze River, so the restrictions on industrial activities are very strict.
	Chongqing	It locates in the middle and upper reaches of the Yangtze River with good water transportation conditions, and abundant freshwater, hydro-electricity and mineral resources. It has large population and low labour cost. In Changshou District and Wansheng Economic Development Zone, there is a foundation for chemical industry.	
Central China	Hubei	Located in the middle reaches of the Yangtze River, the province is a major railway & waterway hub. Pesticide technical, raw coal and chemical products can be conveniently distributed. There is already integrated development of petrochemical and coal chemical in Yaojiagang Chemical Industry Park in Zhijiang City.	Located in the middle reaches of the Yangtze River with dense river network, its ecological environment is weaker compared with that in the lower reaches and eastern coastal areas. Great attention has been paid to the ecological protection and pollution control of the Yangtze River, so the restrictions on industrial activities are very strict.

Source: CCM

In term of province or region, Northeast China (Jilin, Heilongjiang and Liaoning), where has a certain chemical foundation, is attractive to investors for its relatively low labour costs and abundant fresh water resources. Western China, where there are sufficient land and energy resources with low entry threshold, welcomes investors as well; Sichuan Basin (Sichuan Province and Chongqing Municipality) also has a certain chemical foundation.

However, regarding the treatment of pollutants, differences between the above-mentioned regions are not obvious. Bordering the Bohai Sea and surrounded by the peninsulas of Liaodong and Jiaodong, Liaoning Province is prone to pollution accumulation due to the blocked circulation of ocean currents, which seriously affects the ecological environment. Regions in the western part, like Ningxia Hui Autonomous Region, Gansu Province, are located in the upper reaches of the Yellow River, and the ecological environment there is vulnerable. In view of the latest environmental protection policies concerning the Yellow River basin, enterprises may be fined or even shut down if they fail to take proper environmental protection measures.

3.2 Migration trend of pesticide industry

In terms of the number of new investments, there are 67 enterprises to make new investments in east China, accounting for 69% of the total in 2019–2021. Most of the projects planned or constructed are concentrated in pesticide technical, intermediates, or both. Of all the new pesticide projects, 34 projects are designed to produce pesticide technical, 22 for intermediates, while 27 for technical & its intermediates.

Table 3.2-1 Number of enterprises to make new investments, 2019–2021

Province/Region	Pesticide technical	Pesticide intermediates	Pesticide technical & its intermediates	Pesticide formulations	Pesticide technical & formulations and their intermediates	Total
Jiangsu Province	9	6	12	2	2	31
Shandong Province	6	4	6	1	3	20
Zhejiang Province	4	0	3	0	0	7
Hebei Province	2	2	2	0	0	6
Sichuan Province	2	2	0	1	0	5
Anhui Province	3	0	0	0	1	4
Hubei Province	1	2	1	0	0	4
Hunan Province	2	1	1	0	0	4
Jiangxi Province	1	0	0	2	0	3
Beijing Municipality	1	1	0	0	0	2
Henan Province	1	0	0	1	0	2
Ningxia Hui Autonomous Region	1	1	0	0	0	2
Shanghai Municipality	0	1	1	0	0	2
Gansu Province	0	1	0	0	0	1
Guangdong Province	0	1	0	0	0	1
Guangxi Zhuang Autonomous Region	0	0	0	1	0	1
Inner Mongolia Autonomous Region	1	0	0	0	0	1
Yunnan Province	0	0	1	0	0	1
Total	34	22	27	8	6	97

Source: CCM

Table 3.2-2 Number of newly established projects by region, 2019–2021

No.	Province/Region	Pesticide technical	Pesticide technical & its intermediates	Pesticide intermediates	Pesticide formulations	Pesticide technical & formulations and their intermediates	Total
1	Inner Mongolia Autonomous Region	4	10	4	0	0	18
2	Gansu Province	3	4	9	0	1	17
3	Shandong Province	6	4	0	1	2	13
4	Ningxia Hui Autonomous Region	3	3	2	0	2	10
5	Jiangsu Province	4	1	2	1	1	9
6	Sichuan Province	3	0	2	0	0	5
7	Jiangxi Province	2	0	0	2	0	4
8	Anhui Province	2	1	0	0	0	3
9	Hubei Province	1	1	1	0	0	3
10	Shaanxi Province	0	3	0	0	0	3
11	Chongqing Municipality	1	0	0	1	0	2
12	Henan Province	1	0	0	1	0	2
13	Hunan Province	1	0	1	0	0	2
14	Jilin Province	1	0	1	0	0	2
15	Guangxi Zhuang Autonomous Region	0	0	0	1	0	1
16	Hebei Province	1	0	0	0	0	1
17	Pakistan	0	0	0	1	0	1
18	Zhejiang Province	1	0	0	0	0	1
Total		34	27	22	8	6	97

Source: CCM

Figure 3.2-1 Migration direction of pesticide industry, 2019–2021



Source: CCM

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