

A Spatial Distribution Mapping of China's Chemicals Industry Greenpeace East Asia Media Briefing

With over 25,000 large scale chemical companies and recorded usage of 45,000 types of chemicals, China is the world's largest consumer and manufacturer of chemicals.¹

In China there is a correlating high concentration of chemical facilities and population density, and as the country has urbanised, many cities have been, so to speak, besieged by chemical installations. This is a major concern. Moreover, in recent years safety and environmental accidents in the industry have proliferated², increasing risk to the public and to the surrounding environment.

At the same time, information relating to hazards in the industry is subject to insufficient disclosure and unsound management – currently, even basic information on the hazardous nature of a large number of the 45,000 chemical substances used in China is unknown. As a result, information often has to be gathered from piecemeal sources such as company safety evaluation reports, environmental impact assessments and other such documents. China's chemicals industry is serious lacking in transparency and has few opportunities for public oversight.

Using publicly accessible government statistics from 2010-11 and information from the National Geomatics Center of China³, Greenpeace East Asia have compiled a spatial distribution mapping of the risks China's chemicals industry poses to the public and to the environment. Information on a total of 33,625 chemical companies has been collated for the mapping, most of which are involved in chemicals production across the value chain. Greenpeace East Asia also assessed the potential risks of these companies to the local communities and sensitive ecological areas.

Data Discrepancies and Limitations

There could be discrepancies in the exact positions of the chemical companies concerned, as the actual locations where companies operate could differ from their registered commercial addresses. The accuracy of the locations indicated in the

¹ According to the Ministry of Environmental Protection's Chemicals Environmental Risk Prevention and Control 12th Five Year Plan, published in 2013.

² In 2008-2011 over 568 environmental accidents were reported to the Ministry of Environmental Protection, among which 51% involved hazardous chemicals; Chemicals Environmental Risk Prevention and Control 12th Five Year Plan, published in 2013. Also, see Greenpeace East Asia's China Chemical Accidents Counter.

³ There could be some discrepancies in the spatial information indicated in the mapping. This could be attributed to the following factors: a) the initial government statistical data indicate part of the company locations in longitude rather than work unit's actual addresses; b) the database used for deriving the spatial information may have inaccuracies of up to 1km.

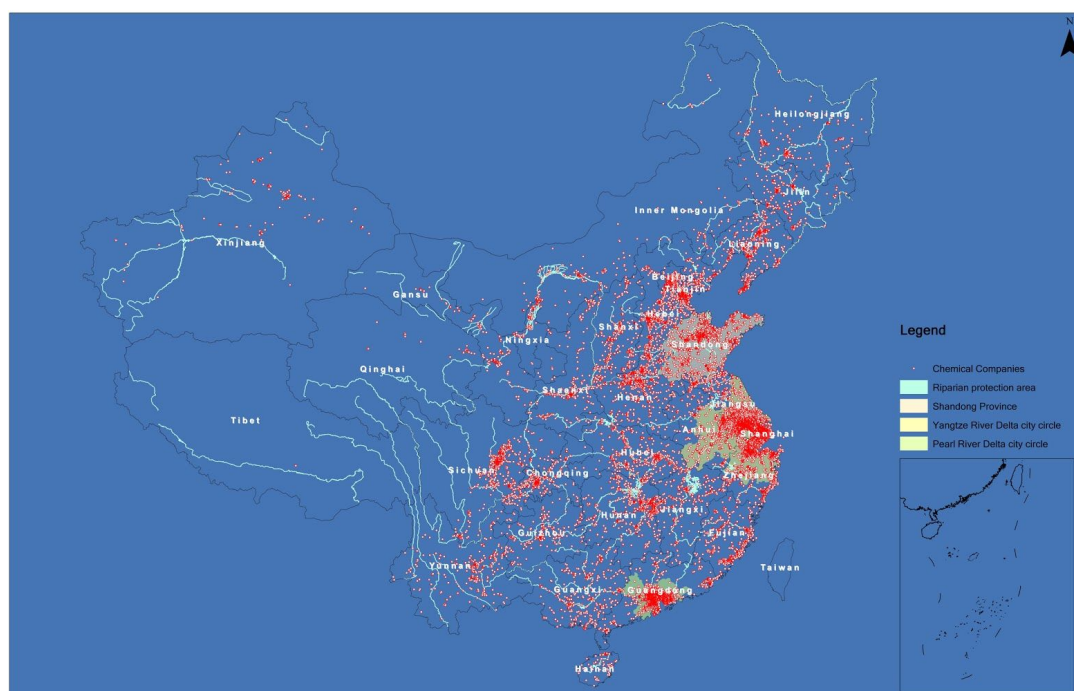
mapping is largely depended on the quality of the inspection data disclosed by the government, and the data quality in the spatial Point of Interest (POI) database used.

Findings

The distribution maps show the intersection of chemical companies with China's core ecological spaces⁴ as well as distribution trends in the 60 counties identified as safety production management priorities by the State Council (at city and county level).⁵

Greenpeace East Asia's chemicals industry distribution mapping shows:

National Distribution Map of Major Chemical Companies in China



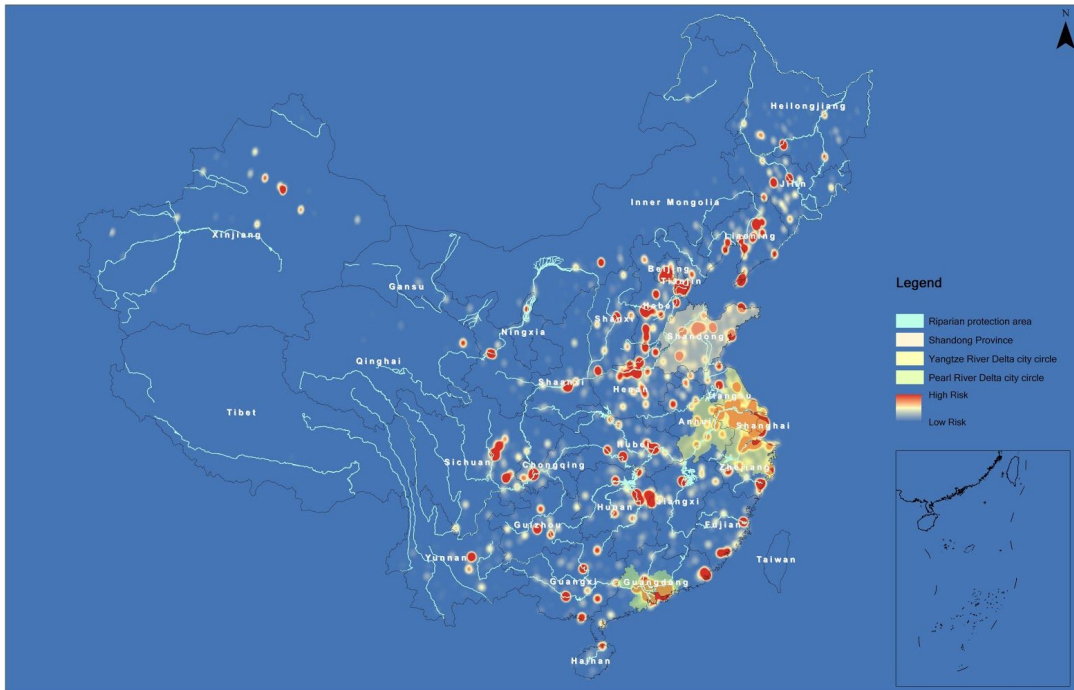
⁴ “China's core ecological spaces” are areas of critical ecosystem value and indispensable and irreversible ecosystem service. They are also essential for safeguarding China's ecological red line areas. The national core ecological space includes six types of areas, namely: water conservation areas, soil conservation areas, wind-breaking and sand-fixing areas, flood storage areas, Riparian protection areas and biodiversity conservation areas. For more on the zoning program of core ecological space in China please read:

http://www.resci.net/ch/reader/create_pdf.aspx?file_no=20150703&flag=1&journal_id=resci&year_id=2015

⁵ State Security Committee issued “Hazardous Chemical key Counties (cities, districts) Safe Production Work Program” (State Security Committee [2014] No. 8)

- Most of China's 33,625 chemical companies are located in China's most densely populated eastern and central areas, positively correlated with urban population density. Of these, the three counties with the highest concentration of hazardous chemical companies are;
 - Wujin District, Changzhou City, Jiangsu Province
 - Xishan District, Wuxi City, Jiangsu Province
 - Liuyang Town, Changsha City, Hunan Province

Potential Risk Levels of China Chemical Companies



2. If the location of these companies is weighted spatially by population (1km population grid), and subjected to kernel density analysis, we can see the distribution trends of potential risks to the public. The areas with the highest potential risks are the Yangtze River Delta, the Pearl River Delta and big cities, such as Beijing, Tianjin and Chengdu. In these areas, both chemical companies density and population density are very high. Areas in Hebei and Henan, Liaoning and Shandong (Zibo and Weifang cities) also show up as having high levels of potential risk, despite having comparatively lower population density, due to their extremely high density of chemical companies.

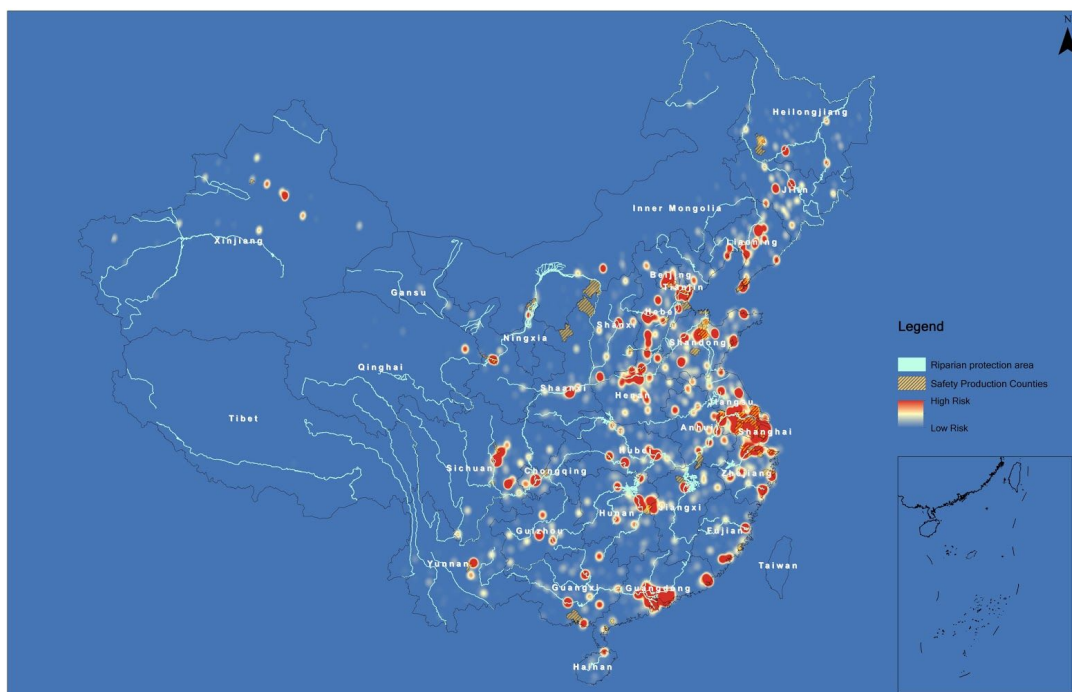
Chemical Companies Located in Core Ecological Space



3. Of the 33,625 major chemical producers operating in China, 5,995 (17.8%) are located in China's core ecological spaces. More than half (63.4%) of these companies are alongside rivers (within 2km of a major river) in areas where water protection is particularly critical.⁶

⁶ 《中国核心生态空间的现状、变化及其保护研究》，许尔琪，张红旗，2015
http://www.resci.net/ch/reader/create_pdf.aspx?file_no=20150703&flag=1&journal_id=resci&year_id=2015

60 Safety Production Counties and Potential Risk Levels



4. Only 5,470 chemical producers are located in the 60 safety production counties listed by the Safety Production Committee of the State Council (city and county levels)⁷. 83.73% of major chemical producers are located outside of the safe production areas, meaning they receive less proactive safety inspections, especially in terms of controlling risks posed by the chemicals to the public and environment.

Industry and Policy Background

According to the report ‘Global Chemicals Outlook--Towards Sound Management of Chemicals’ publicized by the United Nations Environment Programme in 2013, China has become a major destination of the global chemicals production shift from developed to developing countries.⁸ China’s chemicals production growth nearly tripled in the ten years between 2000 and 2010⁹, and its global sales share (based on dollar values) rose from 6.4% to 24.4%.¹⁰ In 2010, China became the world’s largest

⁷ List of 60 Safety Production Countries, Safety Production Committee of State Council, http://www.chinasafety.gov.cn/newpage/Contents/Channel_21111/2014/0221/230257/content_230257.htm

⁸ Global Chemicals Output, UNEP, 2013, http://www.unep.org/hazardoussubstances/Portals/9/Mainstreaming/GCO/The%20Global%20Chemical%20Outlook_Full%20report_15Feb2013.pdf

⁹ American Chemistry Council (2009). 2011 Guide to the Business of Chemistry (ACC, 2011), Table 4.8, page 51.

¹⁰ The European Chemical Industry Council (CEPIC) (2011). Facts and Figures 2011. The European

chemical producing country, with sales of US\$ 754 billion.¹¹ Moreover, 66% of global annual chemical production growth is predicted to occur in China from 2012 to 2020, making it the world's fastest growing chemical industry.¹²

However, in contrast to China's chemicals intensification, the seemingly advanced chemicals management regulations have made modest impact in terms of preventing harm from hazardous chemicals. In 2010 Ministry of Environmental Protection led a series of investigations to inspect and evaluate the environmental risks posed by chemicals production in key sectors in China. These investigations concluded the environmental risks posed by chemical productions existed at various levels, and local residents, air and water safety were at high risks.

Following the investigations led by the MEP at the national level, the 'Chemicals Environmental Risk Prevention and Control 12th Five Year Plan (2011-2015)' called for a preventative chemicals management system to be put into place covering the entire life-cycle of chemicals, including both existing and new chemicals, by 2015.¹³ However, this objective has yet to be achieved.

In November 2015, the Ministry of Industry and Information Technology (MIIT) issued a relocation and reconstruction plan of high-risk hazardous chemicals producers in densely populated areas¹⁴, followed by a guideline to standardise future development of chemical industrial parks in China, in order to prevent new industrial sites from being established in environmentally sensitive areas.¹⁵

In addition to the unfinished 12th Five-Year Plan on chemicals environmental risk management, in July 2016, the MEP revoked the Measures for the Environmental Management Registration of Hazardous Chemicals (MEP Order 22) following a public consultation for the revision of the measures launched in late 2015.¹⁶ As a result, the gap between the unknown impacts of chemicals and better protection of human health and the environment is now widening.

Chemical Industry in a Worldwide Perspective. Available from <http://www.cefic.org/Facts-and-Figures/>.

¹¹ The European Chemical Industry Council (CEFIC) (2011). Facts and Figures 2011. The European Chemical Industry in a Worldwide Perspective, page 5. Available from

<http://www.cefic.org/Facts-and-Figures/>. Figures converted from Euros to dollars using the following conversion: 1 Euro = 1.32 dollars in December 2010.

¹² Swift, T.K., Gilchrist Moore, M., Bhatia, S. et al. (2011). Mid-Year 2011 Situation & Outlook. American Chemistry Council; total growth in North America and Western Europe over the same period is predicted to be about 25 and 24 per cent, respectively.

¹³ Ministry of Environmental Protection's Chemicals Environmental Production Risk Prevention and Control 12th Five Year Plan, published in 2013.

http://www.mep.gov.cn/gkml/hbb/bwj/201302/t20130220_248271.htm

¹⁴ <http://www.lneic.gov.cn/ljxw/2015/11/09/79523.html>

¹⁵ Ministry of Industry [2015] No. 433

<http://www.miit.gov.cn/n1146295/n1652858/n1652930/n4509650/c4533643/content.html>

¹⁶ http://www.mep.gov.cn/gkml/hbb/bl/201607/t20160715_360790.htm

Greenpeace East Asia Recommendations

1. The widening gap on chemicals management in China is underpinned by the structural and, to a large extent, unknown risks of chemicals being currently manufactured and used. In the restructuring of the chemical industry, these risks must be recognized and future chemicals management policy must be based on the intrinsic hazards of chemicals to ensure not only production safety, but also health and environmental safety.
2. Coherent industrial and environmental policies must be developed to enable the sound managements of chemicals and the sustainable growth of chemistry in China without harm to human health and the environment. The industry must embrace and be managed with a long-term perspective, preventing harm to the environment and to local populations. Hazardous chemicals facilities should be moved away from densely populated urban and environmentally sensitive areas and must clean up the sites with caution. Current and newly developed 'chemical parks' must operate a precautionary and transparent chemicals management system, and keep safe distance from areas of potential environmental and human risk.
2. In conjunction with other departments, the Ministry of Environmental Protection (MEP) and the State Administration of Work Safety must work to improve transparency in the chemicals industry. The MEP should lead the way in publicly and proactively publishing hazard-related information such as the location of chemical enterprises, information on chemical substances, risk prevention and control in environmental management of chemicals.
3. Both Ministry of Industry and Information Technology and MEP should promote the transformation and upgrading of the chemical industry, including downstream chemical users, to eliminate or substitute hazardous chemicals with non-regrettable alternatives.
4. China should play a leadership role in the use and production of chemicals in ways that lead to the minimization of adverse effects on human health and the environment. By 2020 (the end of the 13th Five Year Plan period), China should show progress on this front in line with the sound chemicals management goal committed to in the 2002 Johannesburg Plan of Implementation of the World Summit on Sustainable Development .