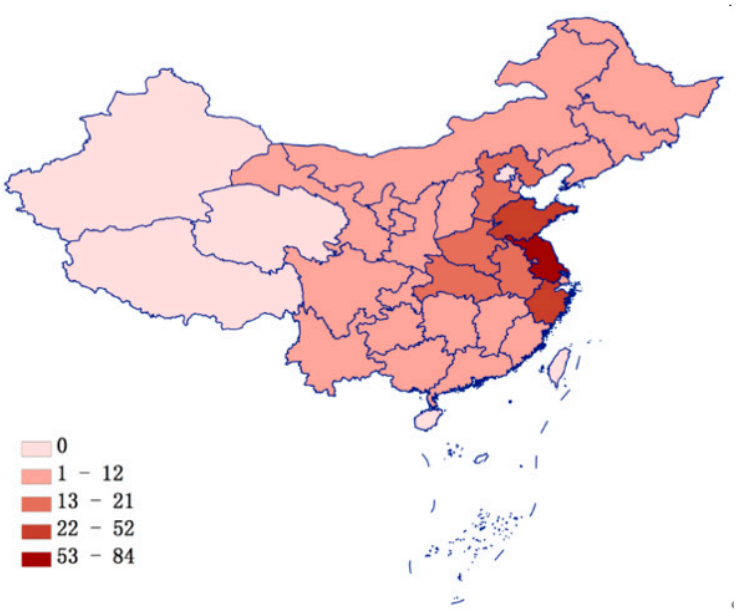

Figure S1. The regional distribution of the pesticide factories in China.

Table S1. Evaluation for collection rate of VOCs in pesticide industry.

Evaluation node	Estimated exhaust gas collection rate/type of factory		
	Benchmark	Moderate	Poor
Preparation, feeding and reaction process	95% Basic automation, little exhaust gas	75% The collection effect is good, and the amount of exhaust gas is small. Some air collection hoods are used, the air volume of which meets the requirements for controlling the wind speed.	0 The collection hood does not meet the requirements for controlling the wind speed, and there is an open work interface.
Solid–liquid separation	95% Fully enclosed solid–liquid separation equipment	75% Solid–liquid separation equipment with good airtightness is adopted, such as compartmentalized collection.	60% Solid–liquid separation equipment with good airtightness or other outmoded solid–liquid separation equipment is adopted.
Drying	95% Fully enclosed drying equipment such as a vacuum rake dryer	85% Other drying equipment with good airtightness is used, and the exhaust gas collection effect is good.	75% Work occurs in a confined space with local gas collection.
Solvent recovery, vacuum system	98% Environmentally friendly water-flushing pumps, water-ring pumps, oil-free pumps and other vacuum pumps with good airtightness are used, and two or more stages of condensation are installed before and after the pump. The equipped solvent recovery system is a fully closed process.	95% Environmentally friendly water-flushing pumps, water-ring pumps, oil-free pumps and other vacuum pumps with good airtightness are used, and two or more stages of condensation are installed before and after the pump. The equipped solvent recovery system is a fully closed process.	85% The water tank using the vacuum pump has a nonintegrated design or the exhaust gas of the vacuum pump is not collected directly through the pipeline. The equipped solvent recovery system is a fully closed process.

Evaluation node	Estimated exhaust gas collection rate/type of factory		
	Benchmark	**Moderate**	**Poor**
Packaging	95% Fully automatic packaging and sealing in closed rooms	85% Dust suppressants or other similar dust suppression measures are included in the packaging process or semi-automatic/automatic packaging is performed in a fume hood with local exhaust air, where the air volume meets the requirements for controlling the air speed at the pollution point.	0 The system is equipped with a suction hood, but the controlled wind speed near the packaging opening is less than 0.3 m/s.
Solvent storage and transportation	95% A fixed-top storage tank is used, equipped with a gas phase balance pipe, a breathing valve on the top of the tank, a nitrogen seal, and a condensing system. The exhaust gas is connected to the buffer tank and finally to the exhaust gas main pipe.	75% A fixed-top storage tank, equipped with a gas phase balance pipe, with a breathing valve on the top of the tank and a nitrogen seal are adopted.	50% The fixed-top storage tank is equipped with a gas phase balance pipe or without a gas phase balance pipe, but the exhaust gas is connected to the exhaust gas pipeline through a virtual connection.
Others (hazardous waste temporary storage, dynamic and static equipment sealing, process sampling, circulating water system)	90% Hazardous waste is used for secondary packaging, and the waste gas collection device is equipped in the temporary storage warehouse.	75% The exhaust gas collection device is equipped in temporary storage	0 Hazardous waste is not used for secondary packaging, and the waste gas collection device is not equipped in the temporary storage warehouse.
	LDAR is implemented according to specifications, timely repairs are made, and the leakage rate shall not exceed 5%.	LDAR is implemented according to specifications, timely repairs are made, and repaired in time, and the leakage rate shall not exceed 10%.	LDAR is not implemented.
	A closed sampler, a closed sampling system, and a high degree of automation are used.	A closed sampler and sampling system are used.	Containment sampling is not used.
	The COD in the circulating water is not higher than 100 mg/L, and the TOC concentration at the outlet is not greater than 10% of the inlet concentration		

Table S2. Evaluation of the facility removal rate of VOCs in the pesticide industry.

Evaluation node	Estimated facility removal rate/type of factory		
	Benchmark	**Moderate**	**Poor**
Production process	95% High-efficiency treatment facilities such as combustion systems are adopted with reasonable selection, a high configuration level, and equipment maintenance in place.	75% Adsorption-desorption and other VOC recovery processes or absorption to treat water-soluble waste gas are adopted.	30% Low-efficiency combined treatment processes such as plasma, photocatalysis and disposable activated carbon are used.
	95%	95%	0

Solvent storage and transportation	The collection method is compliant with the requirements of benchmark factories, and the exhaust gas is treated with efficient processes such as incineration.	The collection method is compliant with the requirements of moderate factories, and the exhaust gas is treated with efficient processes such as incineration.	Exhaust gas is not treated by treatment facilities.
Sewage station	90% High-concentration waste gas is treated by high-efficiency treatment such as combustion; low-concentration waste gas is treated by biological methods, adsorption concentration coupled with combustion and other treatment technologies; and the design and selection are reasonable.	60% The waste gas from the sewage station is not divided into high and low concentrations, and treatment technologies such as biological methods or adsorption concentration coupled with combustion are adopted.	30% The waste gas from the sewage station is not divided into high and low concentrations, and treatment technologies such as chemical oxidation, photocatalysis, and plasma are adopted.
Hazardous waste temporary storage	95% The collection method is compliant with the requirements of benchmark factories. There is no obvious peculiar smell in the warehouse or there is a peculiar smell but it is treated by efficient treatment processes such as incineration.	60% The collection method is compliant with the requirements of moderate factories. There is a peculiar smell in the warehouse, but it is treated by adsorption and other technologies.	30% Absorption, photocatalysis, plasma and other technical treatment technologies are adopted.

Table S3. Evaluation of the facility commissioning rate of VOCs in the pesticide industry.

Evaluation node	Estimated facility commissioning rate/type of factories		
	Benchmark	**Moderate**	**Poor**
Production process/Solvent storage and transporta/ Sewage station/ Hazardous waste temporary storage	95%	80%	50%
Remarks	High degree of automation; operation and maintenance are in place	Low degree of automation; operation and maintenance are relatively in place	Operation does not meet requirements; agents should be added but are not, and adsorbents need to be replaced or have not been regenerated for a long time.