



# Soil environmental management systems for contaminated sites in China and the EU. Common challenges and perspectives for lesson drawing



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## ARTICLE INFO

### Article history:

Received 12 January 2015

Received in revised form 30 April 2015

Accepted 15 May 2015

### Keywords:

Environmental management

Soil pollution

Contaminated sites

China

EU

## ABSTRACT

This paper aims at appraising the current progress of China's contaminated sites environmental management system, identifying its bottlenecks and individuating areas for lesson drawing based on the relevant EU experience. The paper provides an overview of policies, laws, standards, administrative functions, and management processes relevant to China's contaminated sites environmental management. Based on its current development status, the following shortcomings can be individuated in the Chinese case: (a) inadequate monitoring system; (b) incomplete legislation; (c) overlapping of competencies in sites administration; (d) lack of a dedicated funding scheme. Similar challenges have been characterising also the development of the management system for contaminated sites in EU Member States. Based on the experience matured in the EU in tackling such challenges, the final section of the paper puts forward recommendations targeted on the Chinese case. Proposed recommendations are discussed against the broader background of China's institutional and policy environment.

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## 1. Introduction

The world has witnessed in the last thirty years the astonishing growth of China's economy. Although unevenly distributed, economic development has produced a sensible rise in living standards of the Chinese population. This came, however, at a considerable environmental cost. Environmental degradation became in the late 1990s an important issue in Beijing's political agenda. The commitment toward environmental protection was conceptualized in 2003, when the Hu-Wen administration called for the adoption of a "Scientific Outlook on Development" (kexue fazhanguan), advocating an approach to development balancing economic growth with social and environmental concerns (Lam, 2006; Saich, 2011). Beijing considers prevention and timely resolution of environmental crises as a precondition to guarantee economic and social stability, and ultimately the stability of country's polity. Considerable atten-

tion has been devoted since the late 1990s to curb air and water pollution (He et al., 2012). In recent years, Chinese authorities have paid increasing attention also to soil pollution. This has occurred as a by-product of several factors: (a) escalating prevalence of diseases associated with soil contamination, particularly related to heavy metals; (b) scandals affecting the food industry, related to the utilization of pesticides; (c) change in land utilization, due to extensive processes of industrialization and rapid urbanization (CCICED, 2010; Caldwell and Wang, 2011). The latter phenomenon is evident in the outskirts of major cities, where obsolete industrial plants and waste sites are gradually leaving space to new factories, commercial and residence buildings, roads, and public spaces (CCICED, 2010).

Increased attention toward soil pollution led to the realization of the first nationwide survey on soil contamination between 2006 and 2010.<sup>1</sup> Survey's findings—showing diffuse contamination—are contributing to create the political momentum needed to place soil

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<sup>1</sup> A first general soil survey was conducted in 1958–1960, followed by a second in 1979. Extensive surveys were conducted in the 1980s to define soil background values. The survey released in 2014 was the first one specifically focused on pollution to be carried out nationwide. See Teng et al. (2014).

contamination among the priority issues in government agenda (see of MEP, 2010b; MEP and MLR, 2014). In March, 2014, the Ministry of Environmental Protection (MEP) approved a “Soil Pollution Prevention and Remediation Action Plan,” calling for the strengthening of environmental management of contaminated sites (Xinhua, 2014; CWR, 2014). Laws and regulations specifically targeting soil environmental protection and management of contaminated sites are at present being discussed by MEP and other relevant authorities. Among others, the Soil Pollution Prevention and Control Law<sup>2</sup>, whose draft was finalized in 2014. In 2014, the definition of technical standards and guidelines for site investigation, environmental monitoring, risk assessment, and site soil remediation has gained much progress as well (Luo et al., 2009; CWR, 2014).

These measures show a strong political commitment. However, capacity available in China in dealing with soil contamination remains limited, due to legislative, administrative, financial, and technical bottlenecks. At this regard, European contribution to enhance China’s soil environmental management—the complex of strategies “to allocate and conserve resources, [...] regulating the impact of human activities on the surrounding environment” (Alexander, 2005: 235)—can be of considerable importance.<sup>3</sup> European countries, especially those of old industrialization, have since the 1970s developed a wide range of institutional and technical tools to face phenomena of soil contamination, particularly related to industrial and mining activities. The participation of China in numerous international fora, such as Sino-EU Panel on Land and Soils, the International Conference on Soil Pollution and Remediation (SOILREM), and the International Committee on Contaminated Land (ICCL), indicates the commitment by China’s authorities and practitioners to establish long-term platforms for policy transfer.<sup>4</sup>

The purpose of this paper is to review the current soil environment management system of China, exposing its shortcomings, and identifying possible areas for lesson drawing based on the European experience. The paper is subdivided in three parts: in the first a situational assessment on contaminated soil management in China is provided. In the second section the European experience is analyzed, focusing on common challenges. In the last section, perspectives for lesson drawing to enhance the Chinese soil environment management system are discussed.

## 2. Situational assessment on soil management in China

### 2.1. Presence of soil contamination and monitoring activities

In Spring, 2014 MEP and the Ministry of Land and Resources (MLR) released the first National Soil Pollution Survey.<sup>5</sup> The survey was reportedly conducted on a total surface of 6,300,000 sq Km (65.6% of the national total surface), including all arable lands in the country. The survey targeted as well 690 industrial sites, 81 abandoned industrial sites, 146 industrial parks, 188 solid waste processing venues, 13 oil producing districts, 70 mining areas, 55 sewage irrigation areas, and road-side soils of 267 major roads. Results indicate that soil quality of 19.4% of arable land does not reach national environmental quality standards (for standard values, see MEP, 1995). Major contaminants are cadmium, nickel,

copper, arsenic, mercury, lead, DDT, and polycyclic aromatic hydrocarbons (PAHs). As for heavily polluted industrial sites, soil quality does not reach the national standard in 36.3% of cases. Soil contamination by PAHs and heavy metals (cadmium, arsenic, lead) is particularly severe in the case of mining areas (33.4% of soils does not meet national requirements) (MEP and MLR, 2014). Conservative estimates published in 2014 by the China Environment Chamber of Commerce put at over 500,000 the number of contaminated sites in the country (CECC, 2014).

Published literature suggests that the situation might be, at least in certain areas, even more severe than the one depicted in the National Survey. According to a study realized by Wei and Yang between 2007 and 2009 on a sample of 20 cities, “urban soils in the cities from China have been significantly influenced by the heavy metals derived from anthropogenic activities [...]. Approximately 65% of all the cities have high or extremely high contamination levels of heavy metals in urban soils and urban road dusts” (Wei and Yang, 2010).<sup>6</sup> Comparing these data to those relevant to three European cities, published by Hursthouse et al. (2004)—namely Sevilla, Turin, and Glasgow—it appears that mean concentrations are very close in the case of Copper (Cu), Zinc (Zn), and Nickel (Ni), but quite different in the case of Lead (Pb) and Chromium (Cr) (Hursthouse et al., 2004; Wei and Yang, 2010. See Table 1).

Although the availability of information over soil pollution in China is increasing, both in terms of published scientific literature and official reporting, nonetheless at present no register of contaminated sites has yet been established. The State Council—the highest body of the Chinese executive—recently acknowledged shortcomings in domestic soil pollution information systems, calling for the establishment of routine assessment and monitoring procedures, as well as of a register of contaminated areas (State Council of P.R. China, 2013).

### 2.2. Regulatory structure

China has no dedicated national legislation regulating contaminated soil management. Provisions relevant to soil protection are dispersed among a variety of sources. These include the Constitution, the Criminal Law the Environmental Protection Law and sectorial laws and regulations (see Table 2). Although piecemeal, this body of legislative sources establishes fundamental principles, such as the ‘Polluters pays’ principle, first introduced in the 1989 Environmental Protection Law (NPC, 1989). Requirements consistent with this principle are included in the 2004 Circular on Effective Prevention and Control of Environmental Pollution in Relocation of Enterprises, requiring to: (a) carry out environmental monitoring and assessment report when land use is changed; (b) eliminate soil contamination (if present); (c) held enterprises formerly occupying the land accountable for soil contamination (SEPA, 2004). A comprehensive legislation on soil protection and contaminated sites management is currently under review by Chinese authorities. In 2014 a draft of the Soil Pollution Prevention and Control Law was finalized by MEP and submitted to the National People’s Congress (NPC), China’s top legislature. The draft, whose consultation is not open to the public, contains provisions relevant to monitoring and prioritization of contaminated areas and sites, as well as pertinent to their remediation and redevelopment (CWR, 2014; Wang et al., 2013).

With particular reference to contaminated sites, in 2010 MEP released a draft for discussion<sup>7</sup> of the Provisional Rules for the

<sup>2</sup> In Chinese, Turang wuran fangzhi fa. In English language sources, this law is sometimes referred to as Soil Environmental Protection Law.

<sup>3</sup> For an in-depth description of environmental management paradigms, see Colby (1991).

<sup>4</sup> See <http://eussoils.jrc.ec.europa.eu/internationalcooperation/sepls/>, <http://www.relasc.org/docs-anexos/2nd-circular-soilsem2012.pdf>, <http://www.iccl.ch>.

<sup>5</sup> Publication of survey results came after a long debate engaging relevant bureaucracies, allegedly due to the sensitivity of data (People’s Daily Online, 2013. See also Zhao, 2013).

<sup>6</sup> For a list of major incidents related to lead pollution occurring in 2009–2010 in China and reported by national media, see Zhao (2013): 25–26.

<sup>7</sup> Drafts for discussion (zhengqiu yijian gao) are frequently used by Chinese State’s organs to reach a consensus within the bureaucracy over specific provisions in regu-

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