

LEGAL REPORT

Management of Contaminated Sites in
Vietnam: New legal developments and
opportunities in the wake of the 2020 Law on
Environmental Protection

Sarah Kovac

Dr. Trang Dao Minh

Dr. Johannes Franke

Dr. Michael Zschiesche

Published at the Independent Institute for Environmental Issues (UfU e.V.)

Contact Sarah Kovac

E-Mail sarah.kovac@ufu.de

Office Greifswalder Str. 4 10405 Berlin

Phone (030) 428 49 93-0 **Fax** (030) 428 00 485

E-Mail mail@ufu.de **Web** www.ufu.de

Content

List of figures	4
Abbreviations	5
Summary	7
Zusammenfassung	8
Tóm tắt	10
1. Challenges and opportunities in managing contaminated sites in Vietnam.....	11
2. Aspects in the management of contaminated sites and soil pollution.....	13
3. Reducing risks through the successful identification, assessment and remediation of contaminated sites	15
3.1 Mapping the legal framework of identification, assessment and remediation of contaminated sites	15
3.1.1 The amended LEP from November 2020 and the former LEP from 2014	17
3.1.2 Degree No. 40/2019/ND-CP and Circular No. 25/2019/TT-BTNMT	18
3.1.3 The 2010 Mineral Law and its sub-law documents.....	22
3.1.4 Decree No. 03/2015/ND-CP dated January 6, 2015 on the determination of environmental damage	24
3.2 Take aways and opportunities: legal framework for the management of contaminated sites	28
3.2.1 Ensure a constantly good quality of measurement and remediation technologies and the admission of proven experts	29
3.2.2 Calculation of environmental damage related to soil contamination	37
3.2.3 Legal requirements of damage control, risk prevention and compensation for holders of contaminated sites	42
4. Integrating contaminated sites into land use planning	45
4.1. Mapping the legal framework on contaminated site management in intersection with land use planning.....	46
4.1.1 The Land Law from 2013 and forthcoming developments.....	46
4.1.2 Circular 60/2015 on the technical assessment and evaluation of soils	47
4.1.3 Circular No. 24/2014 / TT-BTNMT and Decree No. 43/2014 / ND-CP	49
4.1.4 Legislation on E-Government and related planning	49
4.2 Integration tools to successfully consider contaminated sites in provincial and urban land use planning.....	51
4.2.1 Integration tool 1: Statistical inventory and mapping of the land use status for land use planning and urban planning	51
4.2.2 Integration tool 2: Strategic environmental assessment in the context of urban planning	55
4.2.3 Integration tool 3: Information sharing via E-Government	58
5. Conclusion and outlook	60
References	62
Annex: Draft strategy to put focus opportunities into practice.....	67

Appendix 1: Focus opportunity 3 to establish an expert committee on contaminated site management.....	68
Appendix 2: Focus opportunity 4 to establish the legal framework to determine the requirements for the admission of experts for risk assessment and remediation planning	70

List of figures

Figure 1: Aspects of a successful management of contaminated sites. Own figure.	13
Figure 2: Process of managing (potentially) contaminated sites. Figure from Mark et al. (2018).....	15
Figure 3: Overview of current legal framework on land quality assessment and environmental remediation in Vietnam. Own figure	16
Figure 4: Steps from preliminary assessment to classification of contaminated sites. Own figure.	19
Figure 5: Classification of contaminated soils and following-up activities. Own Figure.	20
Figure 6: Content of a plan for environmental treatment, renovation and restoration of contaminated sites, as defined in appendix V of Circular No. 25/2019/TT-BTNMT. Own figure	21
Figure 7: Content and structure of the appendixes dealing with the management of soil contamination as in the appendix of the new Decree updated in 2021. Own figure	22
Figure 8: Decrees and Circulars complementing the Mineral Law from 2010 regarding issues on environmental rehabilitation. Own figure	23
Figure 9: Identified opportunities regarding the legal framework for contaminated site management. Own figure.	29
Figure 10: Key characteristics of opportunity 3: Establish an expert committee on contaminated site management.....	32
Figure 11: Topics and methods elaborated and discussed in the permanent committee "Contaminated sites" of LABO in Germany. Own figure.....	34
Figure 12: Key characteristics of opportunity 4: Establish the legal framework to determine the requirements for the admission of experts for risk assessment and remediation planning.....	34
Figure 13: Educational and professional requirements of admitted experts for soil protection and soil contamination, according to regulation SU-BodAV NRW from NRW. Own figure.....	35
Figure 14: Investigation areas in which testing laboratories for the assessment of soil contamination needs to prove knowledge and experience, according to regulation SU-BodAV NRW from NRW. Own figure.	36
Figure 15: Identified opportunities within Integration Tool 1: Statistical inventory and mapping	52
Figure 16: Relationship between different types of planning according to Article 6 in the Law on Planning from 2017. Own figure.....	53
Figure 17: Identified opportunities within Integration Tool 2: SEA in urban planning.	57
Figure 18: Identified opportunities within Integration Tool 3: Information sharing via the E-Government	58
Figure 19: Focus opportunities to strengthen contaminated site management in Vietnam. Own figure.....	67
Figure 20: How to establish an expert committee on contaminated site management	68
Figure 21: Establishment of the legal framework to determine the requirements for the admission of experts for risk assessment and remediation planning	70

Abbreviations

ALA	Permanent Working Group on Contaminated Sites
AQS	Analytische Qualitätssicherung (Analytical Quality Management)
BauGB	Baugesetzbuch (Federal Building Code)
BBodSchG	Bundesbodenschutzgesetz (Federal Soil Protection Act)
BBodSchV	Bundes-Bodenschutz- und Altlastenverordnung (Federal Soil Protection and Contaminated Sites Ordinance)
BGH	Bundesgerichtshof (Federal Court of Justice)
BMU	Federal Ministry for the Environment, Nature Conservation and Nuclear Energy
BORA	Permanent Working Group on Law
BOVA	Permanent Working Group on Precautionary Soil Protection
DIN	Deutsches Institut für Normung (German Institute for Standardization)
DoC	Department of Construction
DONRE	Department of Natural Resources and Environment
DPI	Department of Planning and Investment
DWA	Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall (German Association for Water, Wastewater and Waste) ehem. Deutscher Verband für Wasserwirtschaft und Kulturbau, (German Association for Water Management and Cultural Engineering)
EN	Europäische Norm (European Standard)
GDLA	General Department of Land Administration
EIA	Environmental Impact Assessment
IEC	International Electrotechnical Commission
InNET	Institute of Natural Resources and Environment Training
ISO	International Organization for Standardization
ITVA	Ingenieurtechnischer Verband für Altlastenmanagement und Flächenrecycling e.V.
LABO	Bund/Länder-Arbeitsgemeinschaft Bodenschutz (Public Expert Working Group on Soil Protection)
LAWA	Bund/Länder-Arbeitsgemeinschaft Wasser (Public Expert Working Group on Water)

LEP	Law on Environmental Protection
MOC	Ministry of Construction
MONRE	Ministry of Natural Resources and Environment
MOSD	Ministry of Security and Defence
MPI	Ministry of Planning and Investment
NRW	North Rhine-Westphalia
NGO	Non-Governmental Organization
SEA	Strategic Environmental Assessment
SFRI	Soils and Fertilizers Research Institute
SPO	Soil Protection Ordinance
VDI	Association of German Engineers
VEA	Vietnam Environment Administration
VEPF	Vietnam Environmental Protection Fund
WG	Working group

Summary

In the context of an ongoing industrialization and urbanization, the management of contaminated sites is an important tool to prevent negative impacts on the environment and human health originating from soil contamination. Although of significant progresses in the development of the legal framework for soil contamination in the last years, only a minority of (potentially) contaminated sites in Vietnam are assessed in detail or remediated. With the new Law On Environmental Protection (LEP) coming into force in 2022, Vietnam initiated a revision process of related regulations.

In this context, this study shows opportunities to further strengthen different aspects in the management of contaminated sites. To this end, the existing legal framework and current legal developments in contaminated sites management, on the calculation of damages from soil contamination, on the consideration of contaminated sites in land use planning and on technologies for contaminated soil management have been compared to similar laws and regulations in Germany.

Ten opportunities were identified that further support the identification, assessment and remediation of contaminated sites and the calculation of environmental damages. Among them are steps to apply the classification of risks on a case-by-case basis, the implementation, extension and constant updating of the comparison table for remediation technology as method to choose most suitable remediation options, and the further assessment of legal options to hold different actors responsible for damage compensation for soil pollution. The establishment of expert working groups on contaminated site management and the development of organizational structures to establish an admission system for experts in risk assessment and remediation planning are further options to ensure that the latest technologies are used and the management of contaminated sites follows high quality standards.

The study further identified integration tools in the nexus of contaminated site management and land use planning. Integration tools are legal entry points to support the consideration of contaminated sites in urban and land use planning with the aim to minimize negative impacts on objects of protection. They comprise the Statistical Inventory and Mapping of the Land Use Status for Land Use Planning and Urban Planning, the Strategical Environmental Assessment in the context of Urban Planning and information-sharing via E-Government.

Each integration tool included opportunities to strengthen the interaction between the two topics. Identified opportunities comprise, among others, the consequent financial support of the preliminary investigation process, the consideration of (potentially) contaminated sites in the statistical inventory and mapping of land uses, the disclosure of information about sites under suspicion to be contaminated on an E-Government online platform and measures to ensure that data on soil contamination is always exchanged together with the interpretation of an assigned expert.

This study shows that Vietnam possesses an extensive legal framework for contaminated site management. Starting from this base, capacity-building for provincial authorities and a better cooperation among planning authorities are key steps to strengthen the management of contaminated sites in the provinces.

Zusammenfassung

Vor dem Hintergrund einer fortschreitenden Industrialisierung und Urbanisierung ist das Management von Altlasten ein wichtiges Instrument, um negative Auswirkungen auf die Umwelt und die menschliche Gesundheit zu verhindern. Obwohl in den letzten Jahren hinsichtlich des gesetzlichen Rahmens zum Management kontaminierter Flächen erhebliche Fortschritte erzielt wurden, wird nur eine Minderheit der (potenziell) kontaminierten Standorte in Vietnam vertieft analysiert und saniert. Mit dem Inkrafttreten des neuen Umweltschutzgesetzes im Jahr 2022 hat Vietnam nun einen Prozess zur Überarbeitung der entsprechenden Vorschriften eingeleitet.

In diesem Zusammenhang zeigt die vorliegende Studie Möglichkeiten auf, wie verschiedene Aspekte des Altlastenmanagements in Vietnam gestärkt werden können. Dazu wurde der bestehende Rechtsrahmen und aktuelle Rechtsentwicklungen zum Altlastenmanagement, zur Berechnung von Schäden aus Bodenverunreinigungen, zur Berücksichtigung von Altlasten in der Flächennutzungsplanung und zu Technologien im Altlastenmanagement mit ähnlichen Gesetzen und Regelungen in Deutschland verglichen.

Es wurden zehn Möglichkeiten identifiziert, anhand deren die Identifizierung, Bewertung und Sanierung von kontaminierten Standorten sowie die Berechnung von Umweltschäden verbessert werden können. Dazu gehören Schritte zur Anwendung der Risikoklassifizierung auf Einzelfallbasis, die Einführung, Erweiterung und ständige Aktualisierung der Vergleichstabelle für Sanierungstechnologien als Methode zur Auswahl der am besten geeigneten Sanierungsoptionen und die Prüfung von rechtlichen Möglichkeiten, verschiedene Akteure für die Entschädigung von Bodenverunreinigungen verantwortlich zu machen. Die Einrichtung von Expertenarbeitsgruppen für die Altlastenbewirtschaftung und die Entwicklung von Organisationsstrukturen zur Schaffung eines Zulassungssystems für Experten für Risikobewertung und Sanierungsplanung sind weitere Optionen, um sicherzustellen, dass die Bewirtschaftung von Altlasten hohen Qualitätsstandards folgt und die neuesten Technologien eingesetzt werden.

In der Studie wurden außerdem Integrationsinstrumente zur Verbindung von Altlastenmanagement und Flächennutzungsplanung identifiziert. Integrationsinstrumente sind rechtliche Ansatzpunkte, um die Berücksichtigung von Altlasten in der Stadt- und Flächennutzungsplanung zu unterstützen und negative Auswirkungen auf Schutzgüter zu minimieren. Sie umfassen die statistische Bestandsaufnahme und Kartierung des Flächennutzungsstatus für die Flächennutzungs- und Stadtplanung, die strategische Umweltprüfung im Rahmen der Stadtplanung und den Informationsaustausch über E-Government.

Jedes Integrationsinstrument enthält Möglichkeiten zur Stärkung der Interaktion zwischen den beiden Themen. Darunter fallen unter anderem die konsequente finanzielle Unterstützung des Voruntersuchungsprozesses, die Berücksichtigung *potenziell* kontaminierter Standorte in der statistischen Bestandsaufnahme und Kartierung von Landnutzungen, die Offenlegung von Informationen über

kontaminationsverdächtigen Standorten auf einer E-Government-Online-Plattform und Maßnahmen die sicherstellen, dass Daten über Bodenkontaminationen immer zusammen mit der Interpretation eines beauftragten Experten ausgetauscht werden.

Die vorliegende Studie zeigt, dass Vietnam über einen umfassenden Rechtsrahmen für die Verwaltung von Altlasten verfügt. Ausgehend von dieser Grundlage sind wichtige Schritte der Aufbau von Kapazitäten bei den Provinzbehörden und eine bessere Zusammenarbeit zwischen den Planungsbehörden, um die Verwaltung von Altlasten in den Provinzen weiter zu unterstützen.

Tóm tắt

Trong bối cảnh công nghiệp hóa và đô thị hóa đang diễn ra, việc quản lý các khu vực ô nhiễm là một công cụ quan trọng để ngăn chặn các tác động tiêu cực của ô nhiễm đất đến môi trường và sức khỏe con người. Mặc dù trong những năm qua, Việt Nam đã có những tiến bộ đáng kể trong việc xây dựng khung pháp lý về ô nhiễm đất, chỉ một số ít các khu vực ô nhiễm (có khả năng bị ô nhiễm) ở Việt Nam được đánh giá chi tiết hoặc được khắc phục. Với việc Luật Bảo vệ Môi trường mới có hiệu lực vào năm 2022, Việt Nam đã bắt đầu quá trình sửa đổi các quy định liên quan.

Trong bối cảnh đó, nghiên cứu này đưa ra các cơ hội để tăng cường hơn nữa các khía cạnh khác nhau trong việc quản lý các khu vực ô nhiễm. Vì vậy, khung pháp lý hiện có và việc phát triển các văn bản pháp lý hiện hành về quản lý các khu vực ô nhiễm, về tính toán thiệt hại do ô nhiễm đất, về việc xem xét các khu vực ô nhiễm trong quy hoạch sử dụng đất và về công nghệ quản lý đất bị ô nhiễm đã được so sánh với các luật và quy định tương tự ở Đức.

Trong nghiên cứu này, chúng tôi đã xác định mười cơ hội để hỗ trợ thêm cho việc xác định, đánh giá và khắc phục các khu vực ô nhiễm và tính toán thiệt hại môi trường. Trong số 10 cơ hội, có các bước áp dụng phân loại rủi ro theo từng trường hợp cụ thể, việc thực hiện, mở rộng và cập nhật liên tục bảng so sánh về công nghệ khắc phục làm phương pháp để lựa chọn các phương án khắc phục phù hợp nhất và đánh giá thêm các phương án pháp lý để yêu cầu các chủ thể khác nhau chịu trách nhiệm bồi thường thiệt hại do ô nhiễm đất. Việc thành lập các nhóm làm việc chuyên gia về quản lý khu vực ô nhiễm và phát triển cơ cấu tổ chức để thiết lập một hệ thống đăng ký các chuyên gia trong việc đánh giá rủi ro và lập kế hoạch khắc phục là những lựa chọn bổ sung để đảm bảo rằng việc quản lý các khu vực ô nhiễm tuân theo các tiêu chuẩn chất lượng cao và áp dụng các công nghệ mới nhất.

Nghiên cứu đã xác định thêm các công cụ tích hợp trong mối liên hệ giữa quản lý khu vực ô nhiễm và quy hoạch sử dụng đất. Các công cụ tích hợp là các đầu vào hợp pháp để hỗ trợ việc xem xét các khu vực ô nhiễm trong quy hoạch đô thị và sử dụng đất với mục đích giảm thiểu tác động tiêu cực đến các đối tượng bảo vệ. Các công cụ này bao gồm Kiểm kê và Lập bản đồ Thống kê về Hiện trạng Sử dụng Đất cho Quy hoạch Sử dụng Đất và Quy hoạch Đô thị, Đánh giá Môi trường Chiến lược trong bối cảnh Quy hoạch Đô thị và chia sẻ thông tin thông qua Chính phủ điện tử.

Mỗi công cụ tích hợp đều bao gồm các cơ hội để tăng cường sự tương tác giữa quản lý khu vực ô nhiễm và quy hoạch đô thị và sử dụng đất. Các cơ hội được xác định bao gồm việc hỗ trợ tài chính sau đó cho quá trình điều tra sơ bộ, việc xem xét các khu vực có khả năng ô nhiễm trong kiểm kê thống kê và lập bản đồ sử dụng đất, cập nhật các thông tin về các khu vực bị nghi ngờ ô nhiễm lên hệ thống chính phủ điện tử và các biện pháp để đảm bảo rằng dữ liệu về ô nhiễm đất luôn được trao đổi cùng với sự diễn giải của một chuyên gia được chỉ định.

Nghiên cứu này cho thấy Việt Nam có một khung pháp lý khá đầy đủ về quản lý các khu vực ô nhiễm. Dựa trên cơ sở này, việc nâng cao năng lực cho chính quyền cấp tỉnh và sự hợp tác tốt hơn giữa các cơ quan lập kế hoạch là những bước quan trọng để tăng cường công tác quản lý các khu vực ô nhiễm ở các tỉnh tại Việt Nam.

1. Challenges and opportunities in managing contaminated sites in Vietnam

Inaccurate production processes and handling of chemicals in industrial plants and handicraft villages, insecure storage of waste and pesticides, mining activities, but also the war between 1955 to 1975 resulted in a growing number of contaminated sites in Vietnam.¹

Contaminated sites can have negative impacts both on the environment and human beings, especially when ignored or handled inappropriately. Mobile contaminants of a single source at a site can migrate from the soil into on-site or off-site drinking water sources or can also be released from bottom sediments in lakes, rivers, and coastal areas and therewith contaminate large quantities of drinking water. Contaminated sites can also emanate dust and fumes which in turn affect outdoor and indoor air quality.² Those pathways in turn can affect human and animal health.

The prevention of such negative impacts demands the structured search and identification of contaminated sites and their registration in a cadaster, as well as their proper management through a combination of rehabilitation and securing activities with appropriate land use planning tools.

It can be observed that only a minor part of all Vietnamese provinces finalized structured and area-wide observations to identify (potentially) contaminated sites in the area they are responsible for. Thus, only a minority of provinces possess an adequate cadaster of (potentially) contaminated sites, and/or have reported detailed findings to the Ministry of Natural Resources and Environment (MONRE). The majority of contaminated areas in Vietnam are not yet officially registered. Besides, only a small part of the (potentially) contaminated sites registered underwent a more detailed analysis to identify the extent of the soil contamination and related risks, also taking into account the impacts of the contamination source on objects of protection such as ground and drinking water, humans, animals and other.

Other challenges relate to the management of contaminated sites after they have been identified as such. For example, the implementation of suitable securing and decontamination measures is still in the starting phase in Vietnam especially for non-ex-mining sites. This might have multiple reasons, among them uncertainties in the technical preparation and financial responsibilities to carry out remediation projects, and limited financial resources of provincial authorities to carry out often costly securing and decontamination measures if the polluter cannot pay or cannot be identified.

There is also a limited number of admitted professionals with knowledge and experience in the planning and implementation of securing and decontamination activities being employed in responsible public authorities which in turn complicates the evaluation of proposals for decontamination and securing measures submitted by companies.

¹ Mark et al. (2018)

² Government of Canada (2012)

Within this context, this study shows opportunities how to strengthen different aspects in the management of contaminated sites supporting the implementation of activities to reduce risks originating from these areas. The new legal framework and current developments are thus assessed to find answers to the following questions:

- What guidelines and principles does German legislation follow in the calculation of damages originating from contaminated sites, and what suggestions for improvement can be conducted for the legal framework in Vietnam?
- What principles does German legislation follow in the determination of responsibilities of owners and polluters for the securing and remediation of contaminated sites, and what suggestions for improvement can derive for the legal framework in Vietnam?
- How can a suitable, legal-administrative framework contribute to ensure that the selection and application of evaluation, securing and remediation technologies for contaminated sites follow and meet high quality standards?
- What legal, administrative, planning and cooperative opportunities can be used to further ensure the adequate consideration of contaminated sites in land use planning, e.g. to prevent risks to human health?

Out of the identified opportunities, Opportunity 3 and 4 are further outlined in the annex of this publication proposing the establishment of an Expert Committee on contaminated site management and the establishment of the legal framework to determine the requirements for the admission of admitted experts for risk assessment and remediation planning.

2. Aspects in the management of contaminated sites and soil pollution

Contaminated site management is a multi-dimensional topic involving various aspects in different sectors, which are partly overlapping (Figure 1).

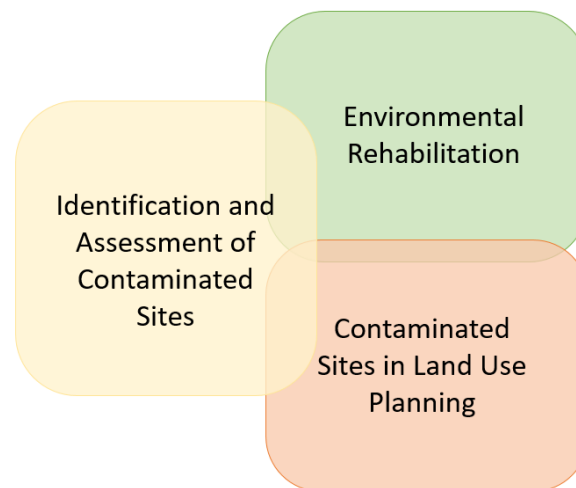


Figure 1: Aspects of a successful management of contaminated sites. Own figure.

In general, the **identification and assessment of contaminated sites**, partly within the broader process of land quality assessment, is the starting point of the management process. The identification and assessment process includes the evaluation of the extent and severity of soil pollution as well as the identification of possible pathways from pollutions at the site to objects of protection. Based on this information, suitable securing and remediation measures can be planned and damage costs originating from soil contamination can be assessed.

The **environmental rehabilitation and remediation** of contaminated sites is in itself a complex topic combining the necessary technical, administrative and social aspects and processes to secure or remediate soil contaminations. It includes aspects related to the consideration of limit values and contamination pathways in the assessment and evaluation of risks originating from contaminated sites, to responsibilities and cost coverage for site assessment, remediation and securing activities, the use of suitable technologies for soil assessment and remediation, and many more.

The active consideration of **contaminated sites in land use planning**, including urban planning, is one method of hazard prevention and plays a role when (potentially) contaminated sites are identified, but decontamination activities are not (yet) implemented, or are seen as unfeasible.

The legal framework playing into contaminated site management in Vietnam is orientating towards these three main aspects. This is the reason why laws and regulations from various fields, including laws about land use and urban planning, but also the mineral law needs to get considered accordingly, and why actors from various departments needs to work together to successfully manage contaminated sites.

During the last years, Vietnam progressed in the development and harmonization

of the legal framework regulating the management of (potentially) contaminated sites.

The revision of the LEP in the year 2020 comes along with reviews and specifications of regulations regarding the identification, risk assessment and remediation planning of contaminated sites; specifications of legal aspects regarding environmental monitoring; environmental information systems and databases as well as the compensation for environmental damage (incl. damage from soil contamination). The implementation provisions for the LEP, previously consisting of various decrees and related appendixes, are in this process currently about to be summarized into one Decree (Decree detailing a number of articles of the 2020 LEP – now named *Draft Decree No./2021*) and its appendixes. This new structure makes it easier to gain and keep the overview over all important environmental regulations regarding contaminated sites and soil management.

3. Reducing risks through the successful identification, assessment and remediation of contaminated sites

The management of contaminated sites always includes a process starting from an initial suspicion of soil being contaminated, the verification or dismissal of this suspicion, the mapping of the extent and severity of the actual pollution to the planning and implementation of necessary remediation activities, including the calculation of related costs and aftercare (see Figure 2).

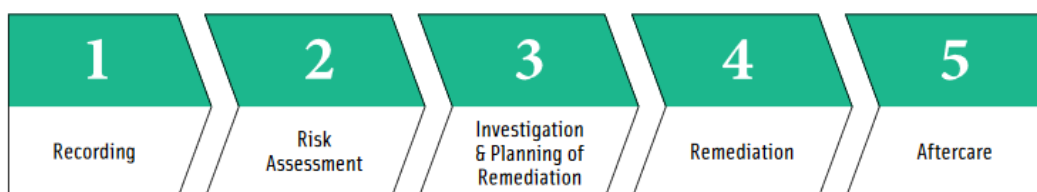


Figure 2: Process of managing (potentially) contaminated sites. Figure from Mark et al. (2018)

Although looking like a linear, simple process, it often involves complex decision-making and problem-solving structures, that are based on a combination of technical, financial and socio-economic aspects that needs to be considered.

In this chapter, the juridical framework organizing the management process of contaminated sites in Vietnam will be presented, starting with laws and regulation managing the identification and assessment process of contaminated sites including the definition of damage extent and severity and ending with the existing legal framework defining obligations of damage compensation in the form of remediation measures.

3.1 Mapping the legal framework of identification, assessment and remediation of contaminated sites

In Vietnam, the legal framework defining the identification process of contaminated sites, as well as the assessment of soil pollution and its remediation pans across various laws, regulations and sectors. This differentiates it from the legal context in Germany, where at the national level, most of those aspects are regulated by only one law, the Law for the Protection against Harmful Soil Changes and for the Remediation of Contaminated Sites (Federal Soil Protection Act or *Bundesbodenschutzgesetz* - BBodSchG) ³ with the related Federal Soil Protection and Contaminated Sites Ordinance (*Bundes-Bodenschutz- und Altlastenverordnung* - BBodSchV) ⁴ and its respective sub-laws at the level of the *Länder*⁵.

In Vietnam, the identification and assessment process of contaminated sites,

³ Federal Republic of Germany (1999b)

⁴ Federal Republic of Germany (1999a)

⁵ *Länder* are states within the Federal Republic of Germany. The *Länder* have their own parliaments and governments.

including the definition of the extent and severity of damage caused by pollution is regulated by both, the (Revised) LEP and the Land Law, as well as their sub-law documents. The main aspects of environmental remediation are regulated by the (Revised) LEP and the Mineral Law, including related sub-law documents (see figure 3).

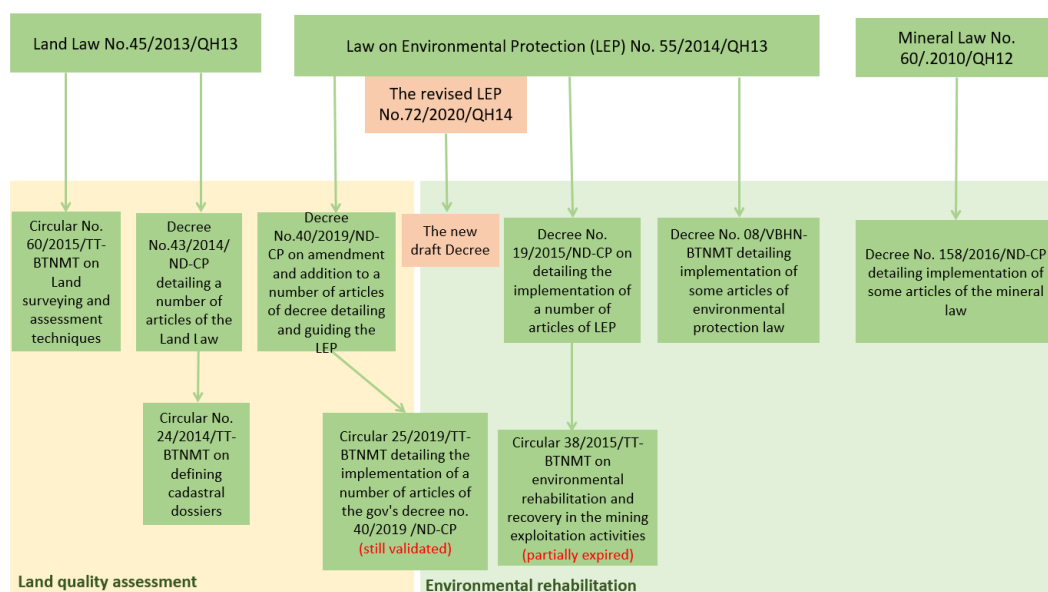


Figure 3: Overview of current legal framework on land quality assessment and environmental remediation in Vietnam. Own figure

Note: The figure includes the Revised LEP, which will be come into force in 2022. Recently developed draft decrees are not considered.

In recent years, there have been a number of changes in legal documents related to contaminated sites. In 2020, the Vietnam's National Assembly has approved the Revised LEP, which includes updated articles on the management of contaminated sites. The revised LEP comes into force in 2022. In addition, there have been some updates regarding the regulations pursuant to the existing LEP, namely the approval of Decree No. 40/2019/ND-CP dated May 13, 2019⁶ and Circular No. 25/2019/TT-BTNMT dated 31 December 2019⁷, which have replaced Circular No. 30/2016/TT-BTNMT dated 12 October 2016⁸. With the new LEP, related sub-laws and regulations are currently reviewed and summarized in *Draft Decree No./2021*⁹ and its appendixes, which are planned to come into effect in 2022. Besides the issues outlined in the currently validated Decree No. 40/2019/ND-CP and Circular No. 25/2019/TT-BTNMT, questions related to the calculation and compensation of environmental damages originating from contaminated sites, and regarding the Strategical Impact Assessment are also included in this new decree.

The most important laws and regulations, including possible updates that regulate issues regarding the management of soil contamination will now be presented in detail, focusing on the most relevant aspects and changes.

⁶ Socialist Republic of Vietnam (2019d)

⁷ Socialist Republic of Vietnam (2019a)

⁸ Socialist Republic of Vietnam (2016)

⁹ Socialist Republic of Vietnam (2021a)

3.1.1 The amended LEP from November 2020 and the former LEP from 2014

Issues regarding the identification, assessment and remediation of soil pollutions and contaminated sites are regulated by the LEP. In Vietnam, the currently legally valid LEP is law No. 55/2014/QH13¹⁰, from now on referred to as LEP 2014. Article 59 of LEP 2014 clearly states that organizations, households and individuals that pollute the soil environment are responsible for treating, improving and restoring it. According to Article 107, LEP 2014, the People's Committees of the provinces have the responsibility to determine local polluted areas and submit annual reports to MONRE which is responsible to establish criteria to classify polluted areas, to provide instructions on environmental remediation and monitor remediated areas, and to manage interprovincial polluted areas. LEP 2014 also defines that organizations and individuals being active in sectors with a high risk to cause soil pollution are responsible to plan and carry out remediation activities (Article 37, 38, 58, 71 and 93).

Article 111 of the LEP 2014 also provides regulations on the contents of investigation and determination of damages caused by environmental incidents to serve as a basis for requesting polluters to compensate the damage.

In 2020, Vietnam's National Assembly amended the LEP and MONRE was assigned as leading agency for the revision, while Vietnam Environment Administration (VEA) coordinated the revision process among relevant departments and stakeholders. The revised version of the LEP was passed by Vietnam's National Assembly on the 17th of November, 2020. The Revised LEP No. 72/2020/QH14 will go into effect on 1st January 2022, while the LEP 2014 will be annulled from this day on.

The main highlights in the Revised LEP from 2020 can be mentioned as follows:

- **The residential community is regulated as taking a vital role in environmental protection.** The LEP 2020 has added "residential community" into the scope of the regulation and as a subject of application. This paves the way to a better disclosure of information, to a stronger consultation of the resident communities and the promotion of their supervision and monitoring to ensure the rights and interests of the community when participating in environmental protection activities;
- **Promotion of a circular economy by reorganizing the sustainable management of waste.** LEP 2020 has a stronger focus on the promotion of the separation of solid waste at source and enhances the responsibility of socio-political organizations and communities in monitoring waste management.
- **Changings in the methods to screen investment projects.** The revised LEP applies scientific environmental criteria to screen and manage the environment for investment projects, while simultaneously regulating the issuance of environmental permits based on zoning and the load-bearing capacity of the environment.
- **Broad reform of administrative procedures for environmental licenses.** The revised LEP integrates seven types of licenses into one environmental license

¹⁰ Socialist Republic of Vietnam (2020c)

and introduces a strong decentralization for localities in the Environmental Impact Assessment (EIA) approval and appraisal¹¹

Regarding contaminated site management, the LEP 2014 in Section 3 of Chapter VI on the Protection of the Soil Environment is emphasized through 3 articles of the law. The Revised LEP approved in November 2020 also includes Section 3 (Chapter II) on the Protection of the Soil Environment, which contains an update related to the Management of contaminated areas.

In Article 17 of LEP 2020 on soil environmental quality management, polluted areas must be investigated, assessed, zoned, treated, renovated and restored. This is supplemented by three new articles:

Article 16 on the Classification of polluted areas defines the term "soil polluted area" and gives criteria for classifying pollution. These criteria include: source of pollution, ability to spread, and who is affected. Article 17 also identifies different levels of soil pollution.

Article 18 on treatment, rehabilitation and restoration of soil environment provides more detailed contents on controlling and improving soil pollution areas, and other measures to minimize impacts on child health and people's health. Article 18 also defines which areas will be given priority in the event of limited resources.

The new Article 19 gives more details on the specific responsibilities of the authorities at the provincial and national level. The main responsibility for the management of polluted sites lies in the provinces: They have to conduct investigation, assessment, identification and zoning of areas at risk of soil pollution and treat areas with soil pollution and areas with serious soil environmental pollution. Provinces also need to report areas with signs of interprovincial soil pollution and areas with particularly serious soil pollution to MONRE, and have to update information on areas with environmental pollution in the environmental database on soil contamination and land use.

Thus, the Revised LEP includes many updated contents, related to key topics, responsibilities, objects of protection and tools to protect the environment. In the field of contaminated site management, a number of new provisions have been introduced, mainly focusing on the content of existing circulars, emphasizing the importance of these objectives and tasks. A specific article clearly defines and separates the duties and responsibilities of the provincial People's Committees, MONRE and the Ministry of Security and Defense (MOSD). In general, the Revised LEP strengthens the responsibilities of departments, agencies and sectors at provincial level in the registration and management of contaminated sites.

3.1.2 Degree No. 40/2019/ND-CP and Circular No. 25/2019/TT-BTNMT

In 2019, the Government of Vietnam approved Decree No. 40/2019/ND-CP dated May 13, 2019 on amending and supplementing several articles of decrees detailing and guiding the implementation of the LEP. This decree partially amends various

¹¹ Results of the digital roundtable reducing risks through the consideration of cadasters of contaminated sites in urban planning in Vietnamese provinces taking place at 26 January 2021 with representatives of environmental authorities in Vietnam.

Governmental Decrees, including regulations regarding the Environmental Impact Assessment, the Strategical Impact Assessment and the Management of Environmental Quality.

According to Article 11 on "Environmental Quality Management", the soil, water, and air environmental components must be assessed for the current state and quality developments as well as polluted areas must be promptly alerted. In addition, environmental quality monitoring and evaluation data must be connected and shared with all environmental state management agencies nationwide through the national database on environmental quality.

The content of "Management of soil environment quality" is specified in Article 14 of this Decree, which clearly states that the areas need to be assessed and monitored for changes in soil environment quality and pollution, chemical storage, plant protection drugs, including chemical contaminated areas during the war; areas with industrial parks, manufacturing factories, chemical warehouses, waste burial sites, and trade villages that have been closed or relocated; the area where the exploitation of a toxic mineral has been finished; and agricultural areas using high quantities of chemicals. Based on the results of investigation and assessment, warnings need to be issued if areas are polluted, the causes of pollution need to get identified and measures must be taken to treat the pollution, and to improve and restore the quality of the environment.

Circular No.25/2019/TT-BTNMT detailing the implementation of a number of articles of the Government's Decree No. 40/2019 / ND-CP dated May 13, 2019 amends and supplements a number of articles of the decrees detailing and guiding the implementation of the LEP and regulations on the management of environmental monitoring services. Regarding the management of polluted land, regulations on investigation, assessment and warning of environmental quality; determination of the extent, scope, cause of pollution, and improvement and restoration of the land environment have been stated in Articles 25 to 31 of this Circular.

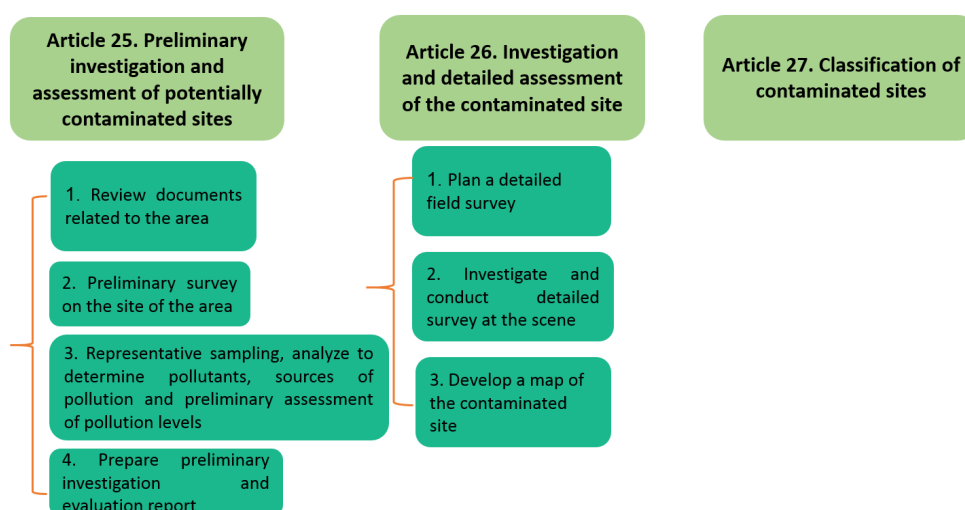


Figure 4: Steps from preliminary assessment to classification of contaminated sites. Own figure.

According to article 27 of Circular 25, polluted areas are classified to three different risk and pollution levels, namely

- **Area with the total weighted score of the criteria below 50 points:** level of environmental contamination, including pollution with chemicals and pesticides
- **Area with total weighted score of criteria from 50 to 75 points:** Medium-level environmental contamination, including pollution with chemicals and pesticides
- **Area with the total weighted score of more than 75 points:** High-level to extremely severe environmental contamination including pollution with chemicals and pesticides.

Depending on the score of the individual area, the contaminated site is either only managed by pollution control activities or by treatment, rehabilitation and immediate restoration activities, or by a mixture of both (Figure 5).

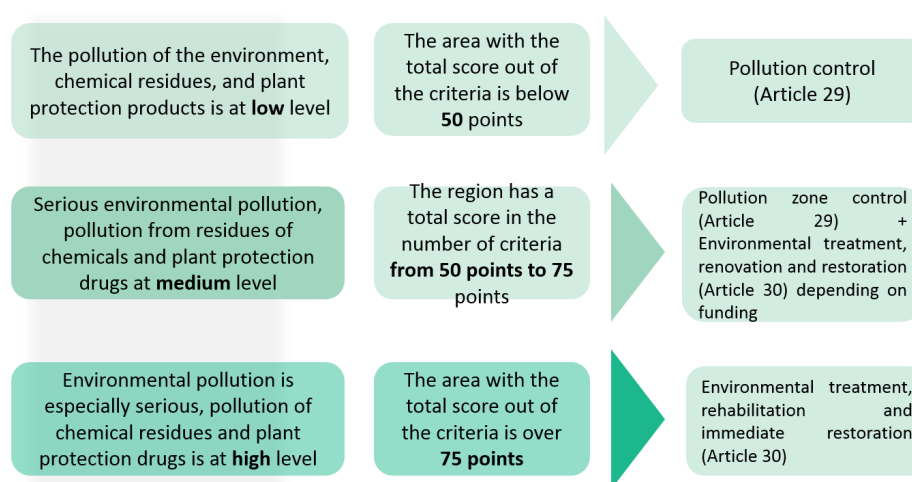


Figure 5: Classification of contaminated soils and following-up activities. Own Figure.

The score-based evaluation applied is based on five indicators, namely (a) indicator on the hazardous level of residual pollutants, (b) indicator of the level of exceeding technical regulations on intervention and treatment, (c) indicator on the volume of contaminated soil exceeding the technical regulations on intervention and treatment, (d) indicator on the number of parameters on residual pollution exceeding the technical regulation on intervention and treatment and (e) indicator on the size of the polluted area. It is conducted according to the Form No.03 in Appendix V of Circular 25/2019.

Appendix V of Circular 25 gives further details about the procedures for the investigation and primary assessment of sites suspected to be contaminated, and for their detailed investigation. This includes a list of the most important poorly soluble, hazardous pollutants.

The Appendix also defines the detailed contents of a plan for environmental treatment, renovation and restoration of the sites (Figure 6).

**DETAILED CONTENTS OF ENVIRONMENTAL TREATMENT,
RENOVATION AND REHABILITATION PLAN****CHAPTER I. GENERAL INFORMATION****CHAPTER II. THE CURRENT SITUATION OF THE CONTAMINATED AREA****CHAPTER III. SELECTION OF HANDLING OPTIONS****CHAPTER IV. CONTENT OF THE PLAN OF HANDLING OPTIONS****CHAPTER V. SUPERVISION AND CONTROL DURING AND AFTER TREATMENT**

Figure 6: Content of a plan for environmental treatment, renovation and restoration of contaminated sites, as defined in appendix V of Circular No. 25/2019/TT-BTNMT. Own figure

Among other factors, the plan also needs to mention the socio-economic conditions near the site, including inhabitants living nearby, the description of possible contamination pathways and health effects originating from the assessed site.

The selection of handling options should be carried out based on a table to compare different options and their contribution to the objectives of the rehabilitation. Objectives are, according to Appendix V, the prevention, treatment or elimination of sources of pollution; the prevention of pollution transmission routes and the protection of affected objects. With this, it differs from the appendix of the previous regulation, which left the choice of handling options to a committee of local decision-makers.

The appendix also differentiates between technical measures to protect the affected objects before the actual decontamination, measures to handle the pollution source and to prevent the dissemination of pollution and measures to control the contaminated area after the treatment.

According to Article 31 of Circular 25/2019, MONRE is responsible for investigating, evaluating, synthesizing and publishing the list of contaminated sites as well as developing, updating and operating the information and data system of contaminated sites nationwide. In addition, MONRE is also in charge of formulating and promulgating technical instructions for environmental renovation and restoration for each type of contaminated sites as well as organizing the inspection of the work of land environment treatment, improvement and restoration according to the provisions of law.

Articles 32 regulates the responsibilities of the People's Committees of provinces, as following:

- Compile, update and report to the MONRE the list of chemical-contaminated areas in war; areas with industrial parks, manufacturing factories, chemical warehouses, plant protection drugs, waste burial sites, and trade villages that have been closed or relocated; the area where the exploitation of a toxic mineral has been finished and agricultural cultivation areas using many chemicals in the area.
- On the basis of results of preliminary assessment and the detailed investigation, Provincial People's Committees have to update information on the polluted areas to the information system and database about

contaminated sites of MONRE.

STRUCTURE AND CONTENT OF APPENDIXES ABOUT THE MANAGEMENT OF SOIL CONTAMINATION AND CONTAMINATED SITES

APPENDIX 1. Structure and content of plans on environmental treatment, remediation and restoration for extremely seriously contaminated sites

APPENDIX 2. Guidelines for preliminary investigation and assessment of potentially contaminated sites

APPENDIX 3. Guidance on detailed investigation and assessment of contaminated sites

APPENDIX 4. Reporting form on list of extremely seriously contaminated sites

Figure 7: Content and structure of the appendixes dealing with the management of soil contamination as in the appendix of the new Decree updated in 2021. Own figure

The new LEP and the ongoing review of related regulations seems to lead to a restructuring of the decrees, circulars and appendixes about the assessment, evaluation and remediation of contaminated sites. As for now (end of July 2021), articles regarding soil contamination management from Decree No. 40/2019/ND-CP and Circular No. 25/2019/TT-BTNMT are merged as a Section of the *Draft Decree No./2021* detailing a number of articles of the LEP. Former Appendix 5 is now split into new Appendixes 1 to 4 of this new decree. Thereby, the content itself remains the same with only further detailing of the requested content of the management, remediation and restoration plans and the report about particularly seriously contaminated sites. The structure changes as indicated in Figure 7. It is noticeable that Appendix 1 and 4 regulating remediation activities only refer to seriously contaminated sites.

3.1.3 The 2010 Mineral Law and its sub-law documents

Although being a type of contaminated site, areas with pollution originating from mining activities play a special role in the legal management framework of contaminated sites in Vietnam. There is only given a very short overview of regulations regarding mining sites, since the topic is an important part of the existing legal framework, but this study focuses on contaminated sites not being related to mineral extraction.

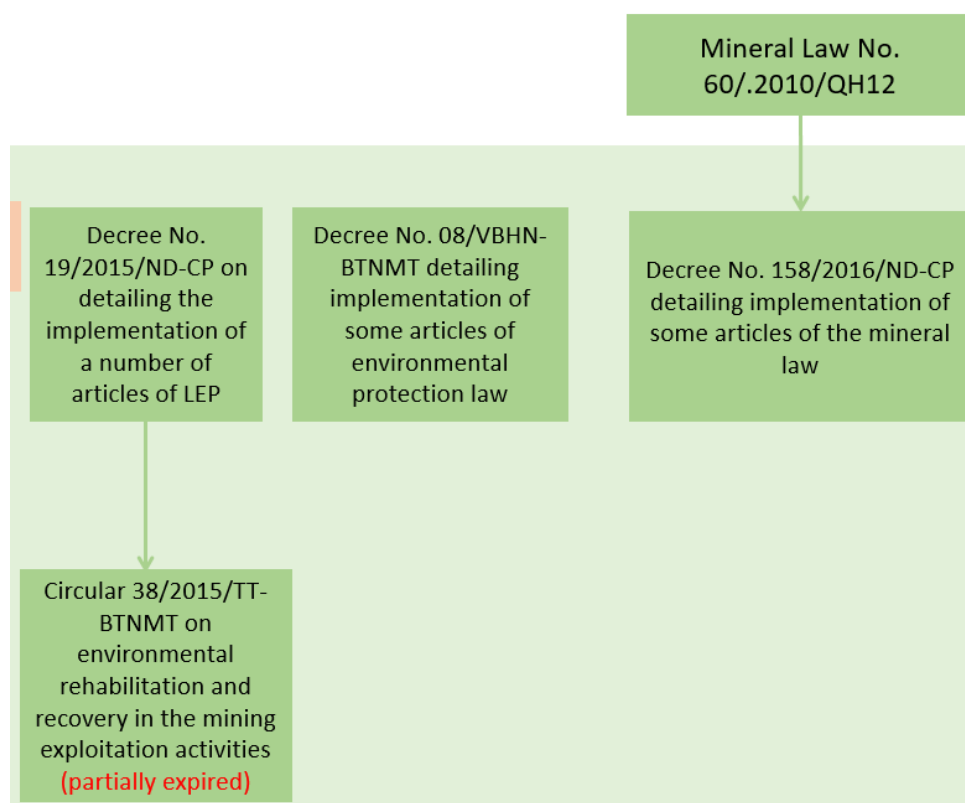


Figure 8: Decrees and Circulars complementing the Mineral Law from 2010 regarding issues on environmental rehabilitation. Own figure

In addition to regulations on environmental rehabilitation regulated by the LEP (2014 and 2020) and corresponding bylaws documents, the environmental rehabilitation of soil environment of post-mining sites is regulated in the Mineral Law (2010) and its bylaws documents.

According to Article 30 of the Mineral Law approved by Decision No. 60/2010/QH12 dated 17 November 2010¹², the organizations and individuals engaged in mineral activities are required to:

- Implement measures to prevent and minimize negative impacts on the environment and improve and restore the environment
- Implement solutions and bear all costs of environmental protection, rehabilitation and restoration. The solutions and costs for environmental protection, renovation and restoration must be determined in the planning phase of the investment project, namely in the environmental impact assessment report and the environmental protection commitment written by the competent state management agency
- Establish a deposit for environmental rehabilitation and restoration before conducting mineral exploitation.

The Mineral Law is complemented by a number of decisions and circulars (Figure

¹² Socialist Republic of Vietnam (2010):

8).

Circular 38/2015/TT-BTNMT dated 30 June 2015

In order to implement the 2014 LEP and the 2010 Mineral Law, MONRE issued Circular 25/2019/TT-BTNMT dated 30 June 2015 on environmental rehabilitation and recovery in the mining exploitation activities¹³. The Circular guides the implementation of regulations on environmental rehabilitation and restoration and deposit for environmental rehabilitation and restoration for mineral exploitation activities of Decree No. 19/2015/ND-CP dated 14 February 2015¹⁴. The regulation is partially expired.

Decree No.08/VBHN-BTNMT dated 14 February 2015

In order to implement the 2014 LEP and the 2010 Mineral Law, MONRE issued Decree No.08/VBHN-BTNMT at 25 October 2019¹⁵. No.08/VBHN-BTNMT combines two former decrees. It determines that mining companies have to write restoration and environmental rehabilitation plans and to implement them promptly, and regulates their content and approval (Article 4 to 10). Article 14 of the decree elaborates on the control of soil environmental pollution (Article 14).

Decree No. 158/2016/ND-CP dated 29 November 2016

Decree No. 158/2016/ND-CP¹⁶ defines procedures for the closing of mineral deposits, and adjusts demanded contents for the environmental rehabilitation plan (Article 44 to 46).

3.1.4 Decree No. 03/2015/ND-CP dated January 6, 2015 on the determination of environmental damage

Besides the determination of the extent and severity of soil contamination, aspects related to the calculation of damages and the level of compensation payments also play into the management of soil contamination. In Vietnam, these aspects are managed in the LEP from 2014 and its pursuing *Decree No. 03/2015/ND-CP*. With the revised LEP from 2020, the related decree gets currently reviewed and *Decree No. 03/2015/ND-CP*¹⁷ will be annulled up from January 1, 2022.

The 2014 LEP defines environmental damage as a degradation of environmental functions and therewith a degradation in usefulness of the environment, as well as damage to human life, health, property and legitimate interests of organizations and individuals resulting from these negative impacts.

According to Article 163 of the 2014 LEP, damages caused by environmental pollution and degradation include (1) the decline in the function and the usefulness of the environment and (2) damage to human life, health, property and legitimate interests

¹³ Socialist Republic of Vietnam (2015a)

¹⁴ Socialist Republic of Vietnam (2015d)

¹⁵ Socialist Republic of Vietnam (2015e)

¹⁶ Socialist Republic of Vietnam (2019f)

¹⁷ Socialist Republic of Vietnam (2015c)

of organizations and individuals as a result of the deterioration of the function and usefulness of the environment.

Article 165 of the LEP 2014 stipulates factors that have to be taken into account to determine the damages caused by environmental pollution and degradation, including the degree of deterioration; extent and limit attenuation; determination of the environmental composition which is degraded; regulations for calculating costs of environmental damage; and to determine damages to human health, life, property and legitimate interests of organizations and individuals due to environmental pollution and degradation.

Pursuant to the LEP from 2014, the Government of Vietnam has approved *Decree No. 03/2015/ND-CP* dated January 6, 2015 on the determination of environmental damage. This decree outlines activities to claim and determine environmental damage and the responsibilities and liabilities related to those damages, including the collection of data and evidence to determine environmental damage (Chapter II), the calculation of environmental damages (Chapter III) and the determination of responsibility for compensation to the environment (Chapter IV).

Article 2 of *Decree No. 03/2015/ND-CP* determines that organizations and individuals that commit acts of polluting or degrading the environment in the territory of the Socialist Republic of Vietnam are responsible to pay damage compensation. The compensation includes the costs to compensate for the damage itself (e.g. in the form of soil remediation measures), but also the costs for the determination of the damage and for the procedures to claim damages (article 13). An exception is made for organizations and individuals who can prove that they fully comply with the provisions of the LEP and that they do not cause environmental pollution and degradation (article 13).

The decree defines People's Committees at different levels and MONRE as organizations having the liability and responsibility to request damage compensation when they detect signs for degradation and pollution in their area of responsibility. They also have to collect and assess data and information to determine the actual damage to the environment at a given area. They can however select and hire service providers for the assessment, measurement and evaluation necessary to determine damages. A council then appraises the collected information and the calculated damage compensation.

Decree No. 03/2015/ND-CP further determines soil contamination as one out of four main components of environmental damage or pollution that can be identified at a defined area. Thus, it relates the definition and calculation of (monetary) damages and related compensation payments to all defined degradations.

According to Article 10 of this decree, the level of compensation costs for environmental damage for a certain area are equal to

- a) the costs of the remediation activities necessary to meet again the environmental standard of water and soil quality earmarked for the defined use of the area and
- b) the costs of activities aiming to recover local ecosystems and protected species in such a way that the initial state is restored.

According to Article 11, the total environmental damage caused by pollution or degradation to a geographical area is calculated by the following formula:

$$T = T^N + T^D + T^{HST} + T^{LBV}, \text{ in which:}$$

T is damage caused by pollution or degradation to the environment of a geographical area;

T^N is the damage caused by pollution or degradation to the water environment;

T^D is damage caused by pollution or degradation to the soil environment;

T^{HST} is damage caused by pollution and degradation to the ecosystem;

T^{LBV} means damage caused to species prioritized for protection due to pollution, degradation or damage.

With this calculation it is clarified that soil contamination is seen as one out of four "environmental components" out of which the state of the environment of a certain area is composed. Thus, they should be evaluated and calculated jointly to define the environmental damage impacting a pre-defined area.

Article 11 further elaborates on the calculation to evaluate the damage caused by pollution or degradation to the soil environment. Article 4 defines that data and evidence needs to be collected or estimated to determine the extent of soil (and water) degradation: Area, volume and quantity of contaminated water and soil, pollutant content in water and soil and official documents and licenses for planned and implemented land uses at the contaminated site.

Taking into account the level of the damage to the soil environment caused by the pollution and the land use at the defined site, *Decree No. 03/2015/ND-CP* regulates that the damage to the soil environment ($T_{\bar{v}}^D$) should be calculated by using the formula:

$$T_{\bar{v}}^D = C_{\bar{i}}^D \times W_{\bar{v}}^D \times H_j^D$$

Thereby,

$C_{\bar{i}}^D$ is a damage coefficient defined by the land and soil use of the area according to planning documents, reaching from 5 (strictly protected subdivision of nature reserve, historical-cultural relic, ranked scenic spot) to 1 (serving other purposes or not yet planned)

$W_{\bar{v}}^D$ is the total quantity of contaminated soil as determined, estimated or assessed and

H_j^D is the cost norm for treating a unit of area, volume or weight of contaminated soil at level (j), meeting the environmentally standards for the quality of the soil environment.

In the calculation, the type of land use at the contaminated site (i) as defined by decisions, licenses and approvals, is considered by assigning it to a range of values (from 1 = strictly protected subdivision of nature reserve, historical-cultural relic, ranked scenic spot, to 5 = serving other purposes or not yet planned); while the level of pollution of the soil environment is assigned to values of 1 (polluted), 2 (considerably polluted) to 3 (severely polluted).

If several land uses are defined or planned at the contaminated site, the differing land uses are considered accordingly.

The Revised LEP from 2020, does not include any changes regarding the determination of environmental damage. LEP 2020 defines environmental damage in article 132, using the same guidelines than LEP 2014.

However, with the new LEP and the revision of related regulations, *Decree No. 03/2015/ND-CP* is planned to be integrated as ***Chapter X: Prevention, Response of Environmental Events, Compensation for Environmental Damages*** into the recently developed *Draft Decree No./2021* detailing a number of articles of the LEP. Related to the assessment of environmental damages, Chapter X includes Section 2: Responsibilities to Claim a Damage to the Environment; Section 3: Determination of Environmental Damages, and Section 4: Inspection for Damages of Decrease of Functions of Environmental Benefits".

Although structured differently, the respective chapter in the new regulation builds upon *Decree No. 03/2015/ND-CP*. The definition of damage and the aspects of the damage taken into consideration remain the same as in *Decree No. 03/2015/ND-CP*.

The main differences to the revised decree are the following: Article 141 determines the responsibility of public agencies receiving dossiers that request a damage assessment to get active. However, it remains open who can hand in such a dossier, and if public authorities can do it themselves, e.g. when area-wide assessments resulted in the identification of (potentially) contaminated sites.

Proposed article 138 adds the following new types of data and information that should get collected and evaluated to determine damages related to soil pollution and degradation:

- Data and information about the environmental status of the area before the contamination occurred
- Other monitoring, investigation and inspection results from competent authorities defining the environmental status of the soil at the defined area
- Information, documents, maps and data on natural and socio-economic conditions at the site, about the management and use of land and natural resources and about land quality and land potential in the area where pollution is to be determined
- Other relevant data and information

With Article 139, surveys, field surveys, the sampling and analyzing of soil samples and other procedures as defined by other regulations are defined as methods to determine the scope and extent of the contaminated area. In article 140, methods to determine the extent of environmental damage and thus the damage compensation

costs were extended. The current draft regulation defines that competent agencies, as well as organizations and individuals that caused pollution may choose one out of several methods to determine the cost of environmental rehabilitation, depending on the specific case. Methods are:

- a) Organizations and individuals having caused the pollution hire themselves a competent unit with the necessary capacities to plan and carry out the necessary environmental rehabilitation activities to meet the previous state of the environment or the limit values defined by law and pay all costs involved
- b) Competent state agencies determine the costs of environmental rehabilitation activities to meet the previous state of the environment or limit values defined by laws, following the calculation defined in the same article
- c) Competent public authorities calculate costs to compensate damages based on similar previous cases of equivalent scope and nature or based on a cost estimation for the necessary environmental rehabilitation activities to reach the previous state of the environment as being estimated or simulated
- d) Other options

The calculation for method b) is mostly similar to the formula in *Decree No. 03/2015/ND-CP*, considering the same components. However, the damage caused by the pollution of the soil environment is different, now calculated as the area/volume of contaminated soil mass (in kg/m³) times the norm for the treatment of one kg/m³ of soil so that it meets technical regulations again. Different to No. 03/2015/ND-CP, *Draft Decree No./2021* does not possess a damage adjustment system.

3.2 Take aways and opportunities: legal framework for the management of contaminated sites

In the previous chapter, the current legal framework regarding the identification and management of contaminated sites is presented. This also included a first overview over *Draft Decree No./2021* detailing a number of articles of the LEP. *Draft Decree No./2021* is currently formulated by MONRE.

The legal framework and the draft new regulations were compared to the legal framework in Germany dealing with the same topics. In Germany, the Federal Soil Protection Act and the Federal Soil Protection and Contaminated Sites Ordinance regulate, together with the laws and regulations from the individual *Länder*, the identification and management of contaminated sites.¹⁸ Based on the comparison of Vietnamese and German law, opportunities have been identified to further ensure that *Draft Decree No./2021* and its appendixes enable the choice and use of high quality technologies and methods for contaminated site management and the determination of damages in the soil environment, and can consider responsibilities of polluters and users in a way that a fast and efficient remediation of contaminated sites can be supported. The most important opportunities are outlined in the following chapter.

¹⁸ <https://www.umweltbundesamt.de/en/topics/soil-agriculture/soil-protection/soil-protection-law#national-law> (26.07.2021)

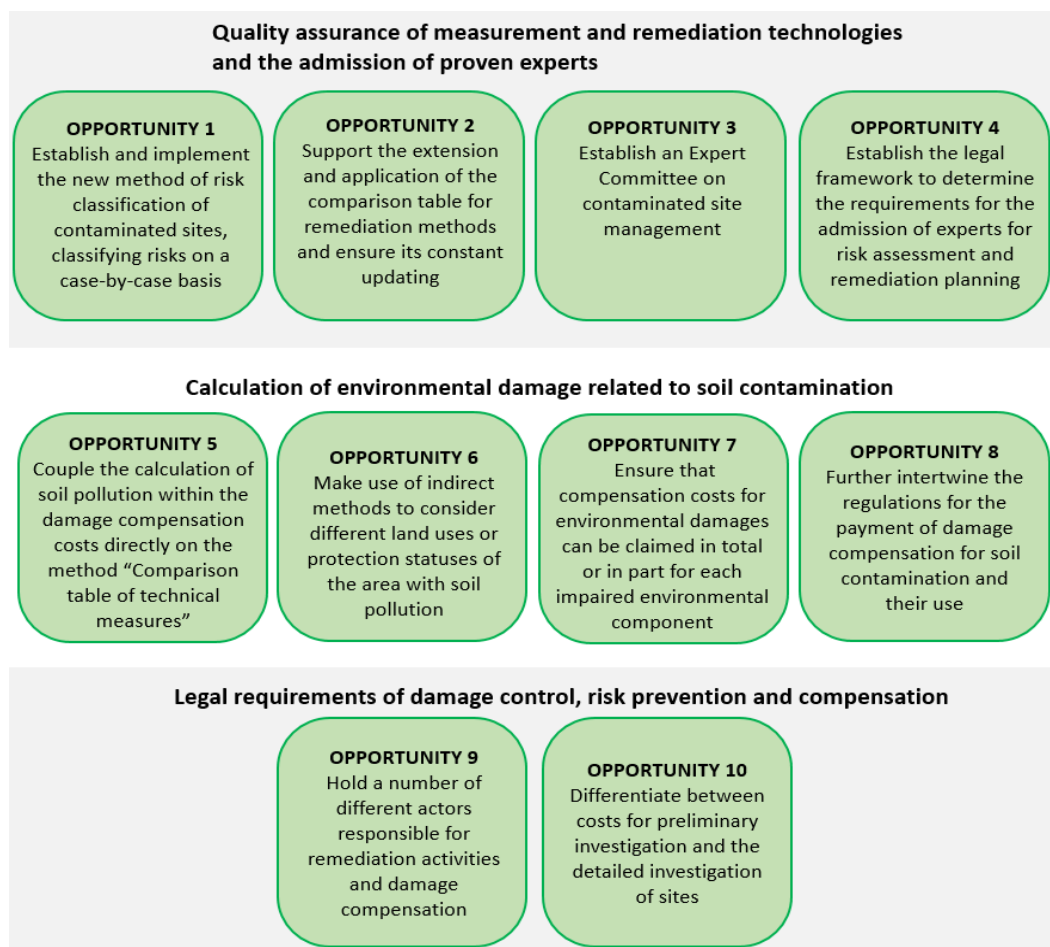


Figure 9: Identified opportunities regarding the legal framework for contaminated site management. Own figure.

3.2.1 Ensure a constantly good quality of measurement and remediation technologies and the admission of proven experts

OPPORTUNITY 1: Establish and implement the new method of risk classification of contaminated sites as defined in Draft Decree No./2021 and its annexes, thereby giving experts more flexibility by classifying risks originating from contaminated sites on a case-by-case basis

The classification of the level of pollution plays into the assessment of actual risk originating from a contaminated site and thus significantly influences the decision for necessary and suitable options for risk management and reduction at contaminated sites.

In Vietnam, Circular No. 25/2019/TT-BTNMT and related Module 04 in Appendix V, as well as new *Draft Decree No./2021* with Appendix 3 regulate the risk classification of contaminated sites. They apply a criteria scheme differentiating contaminated sites into sites with pollution on a low level, medium level or high level, as it is outlined in Chapter 2.2. In Circular No. 25/2019/TT-BTNMT, sites with a low level of pollution should only be controlled, without taking action to reduce possible risks for objects of protection. At sites with a medium level of pollution, a remediation plan should be developed and

decontamination activities should take place “as budget allows it”, while only at sites with a high level of pollution, a remediation plan needs to be established and carried out immediately.

Appendix I of the *Draft Decree No./2021* determines in Chapter II that the risk originating from the site needs to get classified in the report about the detailed investigation. However, it also defines that the expert has to outline the method of risk classification for the assessed contaminated site in its report. Thus, it seems that the new Decree leaves it to the expert’s experience to classify the risk who does not have to follow a pre-defined scheme as it was the case with Module 04 in Appendix V of Circular No. 25/2019/TT-BTNMT. The new *Draft Decree No./2021* does not determine different follow-up procedures for different pollution levels but rather proposes options, emphasizing that the suitable restoration and remediation measures needs to be chosen on a case-by-case basis, using the method of a comparison table of technical measures.

The new *Draft Decree No./2021* and its appendixes are thus very similar to the legal framework in Germany, where a detailed risk assessment on case-by-case basis needs to take place always when a preliminary indication occurred. Based on the results of the detailed investigation, suitable securing and remediation measures are defined and implemented to interrupt contamination pathways and to reduce the risk for objects of protection originating from the contaminated soil. After such a detailed investigation at a specific site, it is possible that the risks are very low and thus no further control or remediation activities need to be carried out. However, the basis for such a decision is always the individual case, and not a pre-defined classification scheme. Admitted experts are supporting in applying adequate methods of risk classification by government agencies publishing guidelines and collections of methodologies¹⁹ (e.g. the Federal Environmental Agency, *Umweltbundesamt*) and obligating admitted experts for the assessment and management of contaminated sites to participate successfully in regular trainings.

The revision of the content related to risk classification and the change to a more flexible method oriented on a case-by-case basis rather than on a fixed scheme has introduced a method to the new *Draft Decree No./2021* that is proven for years in practice.

A risk assessment on a case-by-case basis, as defined in the new *Draft Decree No./2021*, has multiple advantages. Responsible organizations, individuals and authorities need to get active at all sites. It minimizes the risk that a site is classified wrongly as “low level” in the detailed investigation and poses a risk because it is not managed accordingly. When a detailed investigation confirms a risk for an object of protection, a prompt management of all contaminated sites further broadens the possibility that the polluter can be identified and taken into account for remediation measures and the payment of related damage compensation.

¹⁹ Federal Environmental Agency of Germany (2014)

OPPORTUNITY 2: Support the extension and application of the comparison table for remediation methods and ensure its constant updating

In Circular 25/2019 and Chapter III: Selection of Handling Options of Appendix V defines management and remediation methods for contaminated sites and how to choose and apply them, as outlined in chapter 3.1 b. of this study. In Chapter III of Appendix V, different technical options to handle pollution, to control pollution and to secure the site before decontamination measures take place are listed, and it is determined that a comparison table for technical measures should be the method used to choose the most suitable option(s), taking into consideration criteria such as the degree of pollution reduction, the reliability of the proposed technology, financial expenses, implementation time, technical feasibility and other effects. Objectives of the application of the technical options are the prevention, treatment or elimination of sources of pollution, the prevention of pollution transmission routes and the protection of affected objects. Article 31 of Circular 25/2019 outlines that MONRE is responsible to formulate and promulgate technical instructions for environmental renovation and restoration for each "type" of contaminated sites.

The appendixes of *Draft Decree No./2021* detailing a number of articles of the LEP have not been changed regarding the method of the comparison table, the technical options listed and the objectives of handling options.

Although giving guidelines for correct sampling and determining action values, trigger values and precautionary values for different land uses and contamination pathways, the German BBodSchG and its annexes do not explicitly list soil remediation technologies and measures. Part Three, Article 5 states that "decontamination measures should be based on technically and economically feasible methods which make their practical suitability for the environmentally sound elimination or reduction of pollutants appear certain." When planning their application, the consequences of their interference with soils and water bodies must thus be taken into account. The same article also defines that securing measures can be part of remediation activities if they guarantee that "the pollutants remain in the soil or on contaminated sites will not lead to any lasting risks or considerable disadvantages or nuisances for individuals or the general public."

An up-to-date overview of decontamination and securing technologies and measures are guaranteed by an expert infrastructure consisting of expert groups coordinating between ministries and governance level e.g. the public expert working group *LABO* (*Bund/Länder-Arbeitsgemeinschaft Bodenschutz*, see page 31), but also Non-Governmental Organizations (NGO's) such as the *Ingenieurtechnischer Verband für Altlastenmanagement und Flächenrecycling e. V. (ITVA)*, that regularly discuss and exchange the newest developments from science and further elaborate the latest technologies and measures. They regularly publish the results in manuals, toolboxes and other information material, while the material is then used in trainings for admitted experts^{20 21}. On the other side, the regulations regarding the admission of experts for soil

²⁰ <https://www.labo-deutschland.de/Veroeffentlichungen-Altlasten.html> (26.07.2021)

²¹ <https://www.itv-altlasten.de/publikationen/arbeitshilfen-und-richtlinien/> (26.07.2021)

remediation demands their regular attendance in trainings (see page 35); thus ensuring that the new knowledge reaches the admitted experts responsible for the planning and application of soil remediation activities.

It is now important to include in the comparison table for remediation measures also suitable securing measures – if they fulfill quality requirements as e.g. defined in the German BBodSchG. Also the application of the table to define remediation measures should be supported, e.g. by trainings for experts.

Furthermore, a regular updating of the list of technologies and measures in the appendix needs to be encouraged by adopting a slightly modified Article 31 of Circular 25/2019 to the new *Draft Decree No./2021*, leaving at MONRE the responsibility to formulate and promulgate technical instructions for environmental renovation and restoration and to constantly review the list of remediation actions, including those listed in the Appendixes of *Draft Decree No./2021*.

The demand for such information could be built by introducing an admission system for experts (see page 35) with the Institute of Natural Resources and Environment Training (*InNET*) and by establishing a working group to discuss the newest developments for decontamination and securing activities, added by the publication and distribution of related material such as guidelines, manuals and other.

OPPORTUNITY 3: Establish an Expert Committee on contaminated site management coordinating activities and sharing information about legal-technical developments between the national level and the provinces

OPPORTUNITY 3

ESTABLISH AN EXPERT COMMITTEE ON CONTAMINATED SITE MANAGEMENT

- **Members:** Legal and technical experts from MONRE, experts from the provinces with large industrial hubs and many handcraft and recycling villages, experts from universities and further relevant institutes
- **Objective:** Constant and regular exchange of technical methods and experiences between experts, with a main focus on capacity building and awareness raising among experts at the local and province level. Focus might be the discussion on newest technologies and developments, but also on how to make best use of scientific information in practice.
- **Structure and operation:** Development of working groups with a thematic focus under a flexible coordination. Regular meetings. Joint definition of topics for discussion and elaboration, and joint prioritization of topics for publications.
- **Adoption of results:** Ensure that results and publications from the expert committee are shared among experts in provincial and national authorities, but also among experts in scientific institutes and universities

Figure 10: Key characteristics of opportunity 3: Establish an expert committee on contaminated site management

Both in Germany and Vietnam, responsibilities for the identification and management of contaminated sites are divided between different administrative levels. In Germany, the competences of public authorities executing and implementing soil protection law are split between the federal, the *Länder* and the local level.

The Federal Ministry for the Environment, Nature Conservation and Nuclear Energy (BMU) is responsible for soil protection within the Federal government which has issued

the Federal Soil Protection and Contaminated Sites Ordinance (*Bundesbodenschutz- und Altlastenverordnung, BBodSchV*), that specifies the requirements of the BBodSchG. It deals with the investigation and evaluation of areas suspected of being contaminated, determines safeguarding, decontamination and restriction measures, regulates procedural issues in remediation and specifies requirements for precautionary soil protection. Thus, the Soil Protection Ordinance (SPO) lays down concrete standards in order to standardize the requirements for soil protection and the remediation of contaminated sites throughout Germany.

The 16 *Länder* are the competent authorities to implement and enforce the BBodSchG. Within each *Land*, there is a hierarchical order of soil protection authorities (Higher and Lower Soil Protection Agencies). Higher Soil Protection Agencies exercise supervision over the Lower Soil Protection Agencies, which in turn deal with single cases on a local level. Those local authorities are usually responsible for investigating suspected contamination and for assessing the dangers originating from contaminated sites as well as for ordering or carrying out remediation measures.

In Vietnam, the administrative frame for the identification and management of contaminated sites is less complex, consisting of the national level and the provincial administration as well as external services such as universities or other experts to carry out the identification, evaluation and remediation process.

In both cases, the complexity of the topic and the multiple actors involved make it advisable to install an institution responsible for the exchange of technical and juridical expertise, as well as the coordination of activities and processes for the management of contaminated sites.

In Germany, the working group *LABO* was established for the coordination between the federal and the *Länder* level. Its members are representatives of the Federal Ministry for the Environment and of the competent (environment) ministries of the *Länder*. The LABO consists of three permanent working groups (WGs), namely WG 1: Legal issues (BORA), WG 2: "precautionary soil protection" (BOVA) and WG 3: "contaminated sites" (ALA).²² In the permanent working groups, a wide range of topics is discussed, regarding the current needs arriving from the practice.^{23 24}

Among others, the LABO publishes an annual report bringing together the *Länder* statistics on contaminated sites²⁵, but also guidelines and tools to examine and manage them.²⁶ Manuals and guidelines give experts and responsible entities at the local level an orientation about how to evaluate the individual situation considering multiple factors. The constant and regular exchange of technical methods and experiences between experts and the flexible coordination in the working groups further ensure that experts at local and *Länder* level are aware of the newest technologies and developments but also understand how to best use information on technologies, limit values and other in their daily practice.

²² <https://www.labo-deutschland.de/Ausschuesse.html> (19.07.2021)

²³ <https://www.labo-deutschland.de/Ausschuesse-ALA.html> (19.07.2021)

²⁴ <https://www.labo-deutschland.de/Ausschuesse-BORA.html> (19.07.2021)

²⁵ Bund/Länder-Arbeitsgemeinschaft Bodenschutz (LABO, 2020)

²⁶ <https://www.labo-deutschland.de/Veroeffentlichungen-Altlasten.html>

- Assessment, risk assessment and evaluation of contamination pathways
- Reactivation of contaminated sites and conversion of former military areas
- Advancement and equivalence of methods for sample taking, extraction and analysis
- Remediation methods, as well as securing and restriction measures
- Examination, evaluation, consideration and monitoring of natural contaminant reduction processes
- Contaminated sites and regulations of the European Union
- Technical and administrative requirements for qualified experts and investigation authorities and bodies according to § 18 BBodSchG
- Statistics and questions of data management related to contaminated sites and the management of cadasters of contaminated sites

Figure 11: Topics and methods elaborated and discussed in the permanent committee "Contaminated sites" of LABO in Germany. Own figure

The establishment of an inter-level expert committee on the management of contaminated sites with different thematic working groups would be a suitable step to accelerate the implementation of contaminated site management at the province level and to strengthen capacities and knowledge to identify and manage contaminated sites among experts at the provincial level. A regular exchange about technical methods and practical experiences and their publication can lead to a constant "update" of applied technologies at the regional level, and to better coordination within authorities at the provincial level, and between authorities at the provincial and the national level.

OPPORTUNITY 4: Establish the legal framework to determine the requirements for the admission of experts for risk assessment and remediation planning

OPPORTUNITY 4

ESTABLISH THE LEGAL FRAMEWORK TO DETERMINE THE REQUIREMENTS FOR THE ADMISSION OF EXPERTS FOR RISK ASSESSMENT AND REMEDIATION PLANNING

- **Legal framework** that experts who are responsible to assess risks and develop remediation activities need to be certified and regularly proved to possess a pre-defined legal and scientific background.
- **Legally define analytical methods, equipment and skills** that admitted experts for risk assessment and remediation planning need to possess to gain an operating license.
- **Education and training** to realize courses and regular official audits orienting on international standards (DIN/ES/ISO) for admitted experts, and legally define that the issuing of licenses depends on regular successful participation.

Figure 12: Key characteristics of opportunity 4: Establish the legal framework to determine the requirements for the admission of experts for risk assessment and remediation planning

The identification of contaminated sites, the evaluation of actual risks and the

planning and implementation of suitable remediation measures is a complex and multi-dimensional process. For the selection of suitable remediation measures, various aspects need to be considered and information and data about the natural and built environment, the type and extent of contamination, existing contamination pathways as well as the safety, longevity, sustainability, feasibility and costs of the solution need to be taken into account.

Due to this complexity, authorities and (private) responsible parties have to rely on experts in the vast majority of cases. Given their central role in dealing with contaminated sites, experts in Germany must be admitted in order to be allowed to carry out tasks under the BBodSchG. Many *Länder* in Germany have own regulations to regulate the requirements for the admission of experts and testing laboratories active in the area of soil protection and the assessment of soil contamination, as well the duties they have to fulfil.

An example for such a legal document is the regulation SU-BodAV NRW from the Land North Rhine-Westphalia (NRW)²⁷. According to this regulation, *admitted experts* need to have expertise in certain subject areas (Figure 11), require personal reliability (e. g. no prior convictions) and possess the defined equipment to carry out their work. They also need to prove the existence of a liability insurance policy.

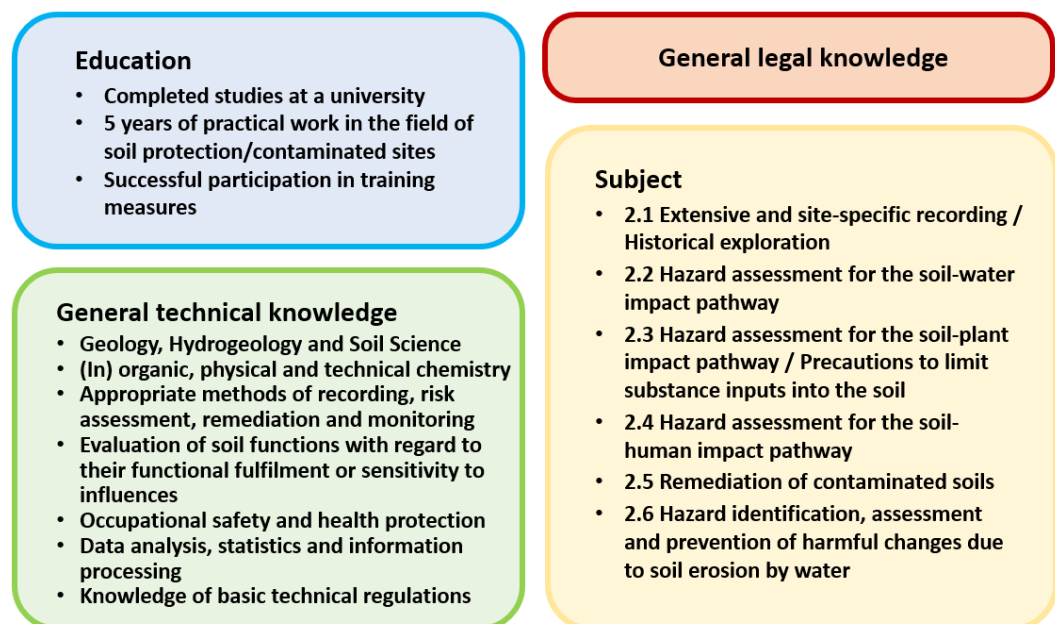


Figure 13: Educational and professional requirements of admitted experts for soil protection and soil contamination, according to regulation SU-BodAV NRW from NRW. Own figure

Note: Admitted experts need to possess - besides the knowledge and education listed in the blue, green and red box - in-depth knowledge and experience of at least one of the subjects listed in the yellow box. In the appendix 1 of the regulation each subject is further specified by listing components and aspects of each sub-area, which in turn are differentiated according to "specialization" and "special technical knowledge".

In addition to the points listed above, admitted experts need to carry out an internal

²⁷ State Government of NRW (2002)

quality assurance and successfully take part in a suitable advanced training at least every three years to keep their admission. According to the regulation, the admission is granted by an expert committee, while the admission office is within the responsible trade or industry chamber or chamber of engineers.

In its appendix 2, the regulation SU-BodAV NRW defines the prerequisites and requirements for *testing laboratories for the assessment of soil contamination*. The regulation defines that testing laboratories must meet the personnel and material requirements according to *DIN/EN/ISO/IEC 17025* and additionally standards of Analytical Quality Assurance (Analytische Qualitätssicherung - AQS). Certain requirements also exist for the personnel working in the laboratories and for an internal and external quality assurance. The appendix also lists the technical equipment and infrastructure which a testing laboratory needs to possess to be officially admitted. Finally, the appendix of the regulation lists sub-areas including methods for sampling and analysis in the respective sub-areas in which the testing laboratory needs to proof knowledge (Figure 12).

Investigation areas

- Investigation area P1: Solid sampling
- Investigation area P2: Soil sampling
- Investigation area P3: Sampling of groundwater, leachate and surface water
- Investigation area P4: Sampling of soil air and landfill gas
- Investigation area 1: Solids: Inorganic parameters
- Investigation area 2: Solids: Organic parameters
- Investigation area 3: Solids: Dioxins and furans
- Investigation area 4: Groundwater, leachate and surface water
- Investigation area 5: Soil air, landfill gas

Figure 14: Investigation areas in which testing laboratories for the assessment of soil contamination needs to prove knowledge and experience, according to regulation SU-BodAV NRW from NRW. Own figure.

Note: In the appendix 2 of the regulation, each investigation area is further specified by giving a reference to standardized procedures, professional guidelines and handbooks.

Thereby, for nearly every method, it makes a reference to standardized procedures such as *DIN/EN/ISO*, or procedures described in guidelines and regulations such as the AQS bulletin, guidelines and regulations of the German Association for Water, Wastewater and Waste (Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall - DWA), the guidelines of the Association of German Engineers (VDI), handbooks of the Working Group of the Federal States on Water (Bund/Länder-Arbeitsgemeinschaft Wasser - LAWA) and others.²⁸ Thereby it orientates itself by the methods for the sampling and assessment of soil listed in the appendix of the BBodschG

²⁸ State Government of NRW (2002)

and its regular updates by *LABO*.

In Vietnam, *Decree No. 03/2015/ND-CP* on the determination of environmental damage defines in Article 6 the orders and procedures for collecting and appraising data and evidence to determine the environmental damage. It outlines that MONRE should stipulate criteria for the selection and responsibilities of service providers regarding the monitoring, evaluation and measurement of collecting data and evidences to guide the establishment and operation of data and evidence appraisal councils.

Moreover, *Decree No. 127/2014/ND-CP* dated December 31, 2014 of the Government stipulating the conditions for organization of environmental monitoring service activities, regulates the requirements for laboratories and similar organizations participating in the monitoring activities in service of state management of environmental protection, and defines the related test procedures.²⁹ Requirements, conditions and test procedures are currently under revise and are planned to be included as Chapter 3 in *Draft Decree No./2021* and related appendixes. Different from the German context, the regulation in Vietnam refers to “environmental quality monitoring” as such and does not – as it is the case in some German *Länder* regulations – refer specifically to methods and equipment for the assessment and evaluation of soil contamination and the planning of remediation methods. *Decree No. 127/2014/ND-CP* as well planned Chapter 3 in *Draft Decree No./2021* and related appendixes do only refer to test laboratories and related institutions with its employees, which is different from many regulations of the German *Länder* also ***regulating the approval and testing of admitted experts for risk assessment and remediation planning for contaminated sites***.

Establishing the legal framework for the approval of admitted experts for soil remediation and risk assessment would lay the foundation for further quality assurances for proposed risk assessments and remediation plans from the site of private companies and others, and their evaluation from the site of the state. This legal framework needs to go hand in hand with the establishment and/or extension of suitable education, testing and approval structures and mechanisms. International technology and knowledge transfer can play an important role to build up such a certification infrastructure.

3.2.2 Calculation of environmental damage related to soil contamination

OPPORTUNITY 5: Couple the calculation of the soil pollution aspects within the damage compensation costs directly on the method “Comparison table of technical measures” as determined in Appendix V of Circular No. 25/2019/TT-BTNMT and align damage calculations more closely to actual costs of soil remediation and risk mitigation measures

In Vietnam and Germany alike, the calculation of the damage to the environment is based on the costs to remediate the pollution. This can be soil remediation measures aiming to reach a quantity of pollution in the soil that meets the limit values defined by

²⁹ Socialist Republic of Vietnam (2014b)

law. In Vietnam, an option is also to restore the soil to a previous state of soil quality. In Germany, "pollution remediation activities" also include measures to secure the area and to interrupt contamination pathways. These measures do not "decontaminate" the soil, but they significantly reduce the risks originating from soil contamination hotspots. An optimal procedure for the remediation of soil contamination needs to get determined on a case-by-case basis.

Costs to carry out those remediation measures can vary strongly, depending, inter alia, on the relevant pollutant, the soil and water components that are affected, the intensity and duration of the pollution and so on. This is even the case within a certain remediation category (e. g. decontamination). Thus, the German BBodSchG and the related BBodSchV knowingly avoid any general formula to define damage compensation costs for soil contamination, even when land is sold between private parties (see Excursus on the practice of value reduction calculations). That distinguishes it from the Vietnamese regulations, that either determine the use of a general formula as only method for the soil component in the general damage calculation (*Decree No. 03/2015/ND-CP*) or define it as one among the possible options (Article 140 of the *Draft Decree No./2021*). The use of a formula with quotas for the remediation of defined quantities of soil would limit the remediation options to measures of soil decontamination. It also entails the risk that calculated compensation payments are significantly underestimated and shortfalls need to get paid by the state.

Excursus

Practice of "value reduction calculations" of land plots in German civil law when selling contaminated areas

As the owner of a contaminated site is generally liable for the costs of remediation, it is common contractual practice to take into account a reduction in value for the contamination when selling contaminated land. Furthermore, the market value of land sometimes has to be determined in public law as well, for example in the context of expropriation. According to § 194 of the Federal Building Code (*Baugesetzbuch, BauGB*), the market value is determined by the price that would be obtained in the ordinary course of business in accordance with the legal situation and the actual characteristics, other features and location of the property. Therefore, contaminations must be taken into account as they reduce the market value of land.

The practical difficulty lies in determining the appropriate reduction amount. As outlined above, the costs associated with remediation highly depends on a number of factors (e. g. whether full decontamination or other measures are ordered, the type and degree of contamination etc.). Experts emphasize that remediation costs can seldom be reliably determined before the work is completed. Furthermore, the necessary form of remediation depends on the intended use of the land. Therefore, determining the appropriate value reduction must take into account a number of factors and anticipate which measures will be deemed necessary by the competent authority. In addition to those "contamination-specific" considerations, there are other factors influencing the value of contaminated property, most notably the location of the property, at least in Germany. The mere suspicion of a contamination can make land unsaleable in some regions, while other properties might be attractive from an investor's standpoint, even though costly remediation measures are needed.

Considering the complexities, it is usually not sufficient to apply all-for-one discounts (such as 10 % for a suspected contamination), as the Federal Court of Justice (*Bundesgerichtshof, BGH*) has decided. Rather, an individual soil expertise must be obtained in each case in order to determine a "court-proof" reduction in value. Such an expertise would then evaluate the market value of the contaminated site considering the factors mentioned above. Even though there is some room for generalizations in calculating value reduction (for example forming groups of cases with regard to certain pollutants and pollution thresholds), the facts of each case have to be established carefully before any formula can be applied.

In addition to the general limitations outlined above, value reduction calculations

A suitable way to include the soil contamination aspect (T^D or TD) in the formula for the calculation of overall damage in a defined area ($T = TN + TD + THST + TLBV$ in Decree No. 03/2015/ND-CP or in article 140 of the Draft Decree No./2021) is to refer to the calculation of the damage from soil pollution to the method "*Comparison table of technical measures*" as determined in *Chapter III: Selection of Handling Options* of Appendix V of Decree No. 40/2019/ND-CP and Circular No. 25/2019/TT-BTNMT and in the Appendixes of the Draft Decree No./2021. The evaluation of the soil contamination

on a case by case basis, followed by the choice of a suitable remediation option based on the "Comparison table of technical measures" supports the consideration of pro's and contra's regarding important aspects (pollution reduction, implementation time, expenses, technical feasibility etc.) when choosing the best remediation option. Thus, it leads to a sound calculation of the damage based on the actual costs of either the decontamination of the polluted soil in the defined area, or the securing of the site by measures interrupting contamination pathways. As an indirect advantage, the reference between the regulations would also support that damage compensation payments are coupled to the implementation of actual measures to reduce risks for objects of protection originating at these sites; which in turn initiates direct action.

OPPORTUNITY 6: Make use of indirect methods to consider the different land uses or protection statuses of the area with soil pollution, rather than a damage adjustment system with fixed coefficients

In the appendixes of Decree No. 03/2015/ND-CP dated January 6, 2015 on the determination of environmental damage, a damage adjustment system is defined to take into consideration not only the remediation costs but also the (planned) land use when damage and compensation costs are calculated. This includes an adjustment system for the use of the land environment, which is outlined in Appendix II. It seems that this adjustment system is not part of the draft Draft Decree No./2021.

Furthermore, the German BBodSchG and related regulations does not include coefficients when outlining remediation methods. Rather, (planned) sensitive land uses at contaminated sites are considered indirectly in the determination of damage via the application of stricter action values, trigger values or precautionary values for contaminants in the environment that needs to be met with the remediation measures (Annex 2 BBodSchV), by the definition of suitable sampling methods (Annex 1 BBodSchV) and by the choice of a suitable remediation measure for the individual case by the admitted expert. Here, the location of unique landscapes such as historic buildings or national parks or a unique scenery can, for example, be considered by the choice of more advanced (and thus often more expensive) remediation measures that might affect the scenery or landscape to a lesser extent. The related costs have to be compensated by the organization or individual being defined as responsible for the damage compensation.

OPPORTUNITY 7: Ensure that compensation costs for environmental damages can be claimed in total or in part for each impaired environmental component

While in Germany damages originating from contaminated sites are defined according to the remediation costs and by civil law, Decree No. 03/2015/ND-CP and the draft Draft Decree No./2021 are regulating the calculation of damage compensation in Vietnam. Damage caused by pollution or degradation of the soil environment is one out of four different aspects of environmental damage that needs to be considered to calculate the overall environmental damage within a defined area. Decree No. 03/2015/ND-CP and the draft Draft Decree No./2021 alike does not seem to define if the damages on all four aspects needs to be charged to the polluter in one amount, or if it

is possible that authorities can claim the damages aspect by aspect.

With the creation of the new Draft Decree No./2021, it should be taken care of that the provisions in it enable public authorities to claim the damage compensation for each of the four aspects of environmental damage individually. This way, a timely application of remediation activities to reduce risks originating from contaminated sites is ensured, even when the damages on other aspects are not yet calculated or cannot be defined due to missing data. Thus, it seems useful to insert in the new Draft Decree No./2021 a clarification that environmental damages might be claimed “in total or in part for each impaired environmental component”.

OPPORTUNITY 8: Further intertwine the regulations for the payment of damage compensation for soil contamination and their use, and thereby ensure that damage compensation payments for defined contaminated sites are always used for the remediation of the very same site

The German BBodSchG closely links the calculation and payment of compensation costs for damages related to soil contamination with the necessary remediation activities. If responsible parties cannot be identified or cannot pay for the costs of the remediation measures, the state carries the (financial) burden of the remediation.

The legal framework in Vietnam combines several options of how to proceed with compensation costs for soil contamination damages.

The LEP and *Decree 25/2019* make polluting parties responsible for the remediation of contaminated sites, including the bearing of related compensation costs, with exceptions for cases when polluters cannot be found.

However, *Decree No. 03/2015/ND-CP* on the determination of environmental damage defines that agencies such as People’s Committees at different levels “may use the financial compensation after subtracting expenses for damage calculation for investments in contaminated site remediation. In case of contaminations crossing provincial borders or borders of centrally-run cities, People’s Committees should transfer the damage compensation to the Vietnam Environmental Protection Fund (VEPF), which should use it for remediation activities at contaminated sites. Thus, *Decree No. 03/2015/ND-CP* does not seem to define that the paid damage compensation needs to be used for the payment for the remediation at the particular area.

In chapter 2, section 3, article 12, the new *Draft Decree No./2021* makes polluting agencies, organizations, residential communities, households and individuals polluting the soil directly responsible for the remediation of the soil which they polluted and thus for the payment of related remediation costs, including the expenses for detailed investigations and remediation planning. When polluters are not known, it falls under the responsibility of People’s Committee’s at the provincial level to develop, implement and pay for remediation projects according to the law on finance. Contaminated sites being extremely seriously polluted can be eligible for support from the central budget via the VEPF. In this case, the reception funds for the compensation of damages are also dependent on the finalized planning and later implementation of suitable remediation activities at the defined site, since a project plan needs to be

submitted to MONRE. Moreover, section 3 article 140 of the *Draft Decree No./2021* defines that polluting organizations and individuals have to bear the costs for the restoration of the environment (and therewith the soil environment as one part), thus directly linking damage compensation to remediation activities for the same site.

Following the successful harmonization of the regulations related to the use of damage compensation expenses for the related site, it is now important to ensure that suitable structures are in place ensuring that damage compensation payments are applied directly for the remediation of the related site.

3.2.3 Legal requirements of damage control, risk prevention and compensation for holders of contaminated sites

OPPORTUNITY 9: Hold a number of different actors responsible for remediation activities and damage compensation to broaden the effectiveness of hazard control

The Vietnamese legislation is strongly based on the polluter-pays-principle, holding in most cases organizations and individuals responsible for damage compensation that commit acts of environmental pollution or degradation in the territory of the Socialist Republic of Vietnam" (article 2, *Decree No. 03/2015/ND-CP* dated January 6, 2015 on the determination of environmental damage). Furthermore, the *Draft Decree No./2021* holds the agencies, organizations, residential communities, households and individuals causing soil pollution accountable for carrying out the necessary preliminary and detailed investigations, as well as remediation activities at the polluted site (Section 3, article 13).

The German BBodSchG establishes the legal responsibility for contaminated sites under § 4 (3). Different from the Vietnamese law, the German law holds a *number of different actors responsible*: the polluter and his or her legal successors, the present property owner and the present holder of the relevant property (e. g. a tenant), earlier owners who abandoned the site, and even – though only as an exception³⁰ – managers and owners of corporations. In addition to that, earlier owners can be held responsible if they knew or should have known of the contamination when they transferred the property. All those actors are equally obliged by law to remediate any soil or water pollution caused by contaminated sites in such a manner that no hazards, considerable disadvantages or considerable nuisances for individuals or the general public occur in the long term.

The reason for holding the owner/holder and the polluter equally responsible is the effectiveness of hazard control. It is often much more difficult to find the polluter and enforce a remediation order than it is to identify the owner/holder. For the same reason, each party is legally responsible for full remediation.

The *competent soil protection authorities* enforce the remediation responsibility. They do so by ordering one or more of the above-mentioned actors to remediate a contaminated site. When choosing between the responsible parties, authorities

³⁰ The provision is intended to close liability loopholes when corporate law is abused to avoid liability. For example, if a contaminated site is transferred to an undercapitalized company in order to avoid liability, BT-Drs. 13/6701, p. 51.

primarily consider the effectiveness of hazard control (see above). Therefore, they will take into account the capabilities to actually clean up the contamination. For example, if both a big corporation and a private individual with limited means are legally responsible, authorities will most likely address the remediation order to the corporation.

In summary, German soil protection law establishes a rather extensive and strict liability of private actors. The law holds quite a number of parties responsible for contaminated sites, giving the soil protection agency the possibility to choose to which parties it addresses the remediation order. Moreover, financial liability is limited for holders of contaminated sites and owners who did not know and should not have known about the contamination (*bona fide* owners).

Ultimately, the state is responsible. It must ensure that contaminated sites are remediated regardless of whether the polluter, owner or holder of the site can be held responsible. This is true for sites that are not privately owned or held and for sites where the polluter, owner or holder cannot be investigated or – as it is often the case – is not able to pay for costly remediation measures. In all those cases the state has to carry the (financial) burden of remediation. In that sense, the state's responsibility for the common interest prevails over the polluter (or owner) pays principle.

The extension of parties that can be made responsible for the remediation of contaminated sites and thus for bearing the related costs might also be a suitable option in the Vietnamese context to initiate broader action for actual risk reduction with, besides the state, other parties being (financially) responsible for remediation. This would also support the implementation of paragraph 5 of article 13 of the new *Draft Decree No./2021 on treating, renovating and restoring the soil environment in areas with soil pollution left behind by history or unidentified polluting organizations and individuals*, calling to "encourage the diversification of capital sources to treat, improve and restore the land environment in accordance with law. However, it needs to be carefully assessed how the extension of responsible parties can be matched with the unique plot lending structures in Vietnam.

OPPORTUNITY 10: Differentiate between costs for preliminary investigation and the detailed investigation of sites under suspicion to be contaminated and include them into the calculations of damage compensation accordingly

The Vietnamese and the German law outline a very similar process to identify and manage contaminated sites: Circular 25/2019, and the *Draft Decree No./2021* managing the process in Vietnam, differentiate in the identification and management process of contaminated sites between a preliminary investigation (comparable with the orientating investigation in Germany) and, if there arises a first evidence of soil contamination, a detailed investigation of the respective site (comparable with the second stage investigation in Germany).

Circular 25/2019 defines in article 26 that People's Committees at the provincial level are responsible to carry out preliminary investigations to identify contaminated sites. The same article determines that detailed investigations have to be carried out by the identified polluting organization or individuals, by MONRE or by the People's

Committee of the respective province if the polluter cannot be found.

Decree No. 03/2015/ND-CP defines in article 4 and 14 that from damage compensation payments at a defined area (thus integrating soil contaminations as only one out of four aspects), expenses incurred to determine the damages and organize the claim of damage compensation should be subtracted before the remaining damage compensation can be used for remediation and restoration activities.

Thereby, those expenses should be requested from organizations and individuals that cause damage to be refunded in the process of settling compensation for damage.

The new Decree follows Circular 25/2019 and defines in Chapter 2, Section 3, Article 14 that provincial-level People's Committees should organize preliminary investigations. Meanwhile, Article 15 defines that for the detailed investigation, after a preliminary suspicion of soil contaminations, organizations and individuals identified as polluters are responsible. If polluters cannot be identified, People's Committees on the provincial level have to carry out the detailed investigations. However, for the authors of this study, it is not clear from the present formulations if the responsibility to organize and implement investigations is equivalent to the bearing of all costs for the planning and implementation of those investigations.

For Germany, the BBodSchG clarifies the cost sharing for preliminary investigations necessary to confirm or dismiss suspicions of contamination, and the propagation and impact of detected soil pollution. According to the BBodSchG, the orientating investigations are an official duty solely for public authorities, which have to bear the occurring costs.

The costs for the second stage of investigation, beginning at the point when a suspicion is sufficiently supported by evidence, already fall under the responsibility of the polluter and his or her legal successors. Only if the suspicion is **not** confirmed after detailed investigations, the respective persons or legal persons can claim a reimbursement of investigation costs from the authorities.³¹ This clarification of responsibilities and related cost coverage avoids that sites remain under suspicion to be contaminated and/or necessary remediation activities are not carried out due to missing financial resources from public authorities.³²

The differentiation of compensation responsibilities within orientating and detailed (second stage) investigations have been proven efficient to activate the identification process of (potentially) contaminated sites by simultaneously limiting the payments of compensation costs by state agencies. A clearly comprehensible formulation of responsibilities for damage compensation for the costs of contaminated site assessment in the context of regulations on damage compensation might support the identification and assessment process in Vietnam.

³¹ Sanden, Joachim; Schoeneck, Stefan (1998): p.199f.

³² Sanden, Joachim; Schoeneck, Stefan (1998): p.199f.

4. Integrating contaminated sites into land use planning

The consideration of (potentially) contaminated sites into land use planning and urban planning is an often underestimated aspect of managing contaminated sites. In situations when there are shortcomings and delays in the application of remediation measures, especially in densely populated city areas, the prevention of sensitive uses and activities at contaminated sites is a useful tool to interrupt some of the contamination pathways and to reduce risks originating from contaminated sites.

The recently formulated *Resolution No. 67/NQ-CP from 2020, approving the Task of National Land Use Planning for the Period 2021 – 2030, with Vision to 2050*³³ will further accelerate the need to include (potentially) contaminated sites in land use and urban planning. Its objective to remove industrial areas from the inner city to industrial zones in the outskirts is welcomed as an opportunity to update infrastructure for environmental protection in the modernized industrial zones. However, relocations might also leave behind a number of (potentially) contaminated sites lying fallow and/or open for sensitive after-uses in densely populated areas, which might pose a risk for human health if not considered and secured effectively. Smart land use and urban planning can contribute significantly to the prevention of negative impacts on human health.

Both existing regulations about land use planning and environmental legislation form the basis and support the consideration of contaminated sites in urban and land use planning.

However, there are still shortcomings in translating information on contaminated sites into land use plans. This might be related to missing data and information about many contaminated and potentially contaminated sites. Additionally, the awareness for the issues of contaminated sites needs to be raised in public authorities responsible for land use planning in the provinces, such as the Departments of Planning and Investment (DPI) and the Department of Construction (DoC), to work towards their consideration on urban development and land use plans and the joint development of suitable solutions.

In this chapter, opportunities are identified on how to better use existing integration tools to ensure the consideration of (potentially) contaminated sites into land use planning and urban planning.

To this end, the legal framework regulating the integration of contaminated sites into land use and urban planning will be briefly outlined. This is followed by the presentation of the most important integration tools and related opportunities for further action.

³³ Socialist Republic of Vietnam (2020b)

4.1. Mapping the legal framework on contaminated site management in intersection with land use planning

Different from the legal framework on contaminated site management, the integration of contaminated sites into land use and urban planning is rather regulated by different decrees and circulars in the context of the Land Law, but also in the context of E-Government, since the latter's importance increases rapidly. They are now presented in detail.

4.1.1 The Land Law from 2013 and forthcoming developments

The Land Law No. 45/2013/QH13 defines the land ownership, powers and responsibilities of the State in representing the land owned by all people. It states that this land has to be managed by the state according to the law. It also prescribes structures and guidelines of land management and land use regimes, and the rights and obligations of land users over the land in the territory of Vietnam.

To implement the 2013 Land Law, the Government has issued 11 decrees, ministries have issued 40 circulars and joint circulars detailing the implementation of the law. *Decree No. 148/2020/ND-CP* amending some of the latest Decrees guiding the Land Law³⁴ will be effective from February 8, 2021.

The administrative geography and basic investigation of land was regulated in Chapter 3 of the Land Law, from Article 29 to Article 34. Regarding the land investigation and assessment, Article 32 regulates the activities, which include: (i) Investigating and evaluating land quality and land potential; (ii) Investigating and assessing land degradation and pollution; (iii) Agricultural land survey and classification; (iv) Land statistics and inventories; (v) Investigating and making statistics on land prices; monitoring land price fluctuations and (vi) Developing and maintaining the monitoring system for land resources. The techniques for the first 4 activities were further elaborated by Circular 60/2015/TT-BTNMT, which will be further analysed in latter section. Article 33 of the Land Law also regulated the responsibility of the Ministry of Natural Resources and Environment (MONRE) and that of the People's Committee at provincial level in the implementation of land investigation and assessment.

In 2021, the Government issued Resolution 06 / NQ-CP dated January 21, 2021 on the Action Plan to continue implementing Resolution 24-NQ / TW on proactively responding to climate change, enhancing natural resource management and environmental protection according to Conclusion 56-KL/TW³⁵. Accordingly, one of the tasks that the Government assigned to MONRE for implementation is to amend and supplement with ministries, agencies and localities a number of articles of the 2013 Land Law with the year of completion is 2022.

In fact, through the implementation of the Land Law 2013, land management has achieved important results. The localities have basically established a synchronous digital cadastral record system between cadastral maps and registration information

³⁴ Socialist Republic of Vietnam (2020a)

³⁵ Socialist Republic of Vietnam (2019c)

³⁶ Socialist Republic of Vietnam (2021b)

and certification. Some localities have operated cadastral databases, creating an important foundation for developing a unified land database, serving multiple purposes. However, in addition to the results achieved, the 2013 Land Law also revealed certain shortcomings. According to the report to the National Assembly delegations of the provinces and cities of MONRE in mid-2020, the organization of law enforcement is not very effective, reducing the effectiveness and efficiency of State management on land. Moreover, in recent times, a number of new laws such as the Law on Public Property Management, Housing Law, Public Investment Law and Forestry Law have regulations related to the management and use of land use, too. This leads to overlaps and contradictions with the Land Law, what in turn significantly affects the organization and implementation of the law.

4.1.2 Circular 60/2015 on the technical assessment and evaluation of soils

With the legal regulation 60/2015/TT-BTNMT on the provisions of the technical investigation and assessment of soils³⁷, a circular of the environment minister, nationwide soil investigations for the creation of a national mapping of soils should be made possible.

The addressee of the regulation is the General Department of Land Administration (GDLA), which is why the regulation should rather be classified as an instrument of general recording with a view to agriculture and (spatial) planning. The instructions contain detailed provisions for the technical examination and assessment of the soil, soil quality and soil potential. A special focus is placed on the recording of agricultural areas. Contaminated sites should also be determined (at the provincial level) as part of the assessment criteria for soils, see Article 22 of the legal provision.

The assessment of soil contamination is carried out using:

- Documents and maps on (previous) use and activities with pollution risks and corresponding evaluation in terms of accuracy, objectivity and topicality.
- Short on-site inspections to collect data that is not yet available (collection of information on geographical conditions, soil sampling and photos)

However, it remains unclear to what extent the identification and recording of areas at risk of pollution is systematically carried out within the framework of this legal provision.

The classification of contaminated soils is carried out according to limit values set out in this ordinance and in other provisions, which result from the type of pollutant and land use. However, if the limit values are exceeded, no detailed analysis of the soil is initiated. Rather, the data and results are compiled in an assessment report and, if necessary, solutions for soil protection are proposed.

The responsible administrative body must be informed of the results and decide on further administrative and remedial measures. For example, experts can suggest management measures. However, the legislation does not provide any further details on the implementation and use of the data collected and the mapping of soils. According to Article 56 of the GDLA legislation, the chairmen of the regional people's

³⁷ Socialist Republic of Vietnam (2015b)

committees, the directors of the DONREs in the provinces, the heads of other departments under MONRE and other organizations as well as private persons are involved with the authorities in the implementation of the legal provision. However, it is unclear which bodies are responsible for collecting the data, taking samples and evaluating them.

Annex 10 of the legal regulation provides sample sheets for reporting but these do not contain precise instructions on the reporting obligation regarding regularity. Furthermore, the arched patterns for reporting seem to be more designed to give an overview of the number and locations of contaminated soils than to give details about the load situation on the respective areas. It is also not mentioned where reports are to be made and who can also get access to reports and cadastres.

The regulation does not contain any references to other administrative areas and levels for which the information collected could be of interest or serve as a basis for work. It is not defined whether the regulation has a specific objective. One could think of approval and licensing provisions in which spatial planners, authorities, architects, farmers, property owners, etc. could use the soil assessments as a basis for decision-making and working.

Practice has shown that maps and results drawn up on the basis of legal regulation 60/2015/TT-BTNMT are partially used as a basis for agricultural planning in Vietnam. The processes and work steps defined in this legal regulation thus appear to be implemented in some provinces.

According to the present legislation, all provinces are required to carry out statistical land surveys and soil assessments and enter the recorded and assessed results on a digital map. The recording should be completed by 2020. While some provinces have already concluded contracts with external specialists, such as the Center for Soil Assessment, the Soils and Fertilizers Research Institute (SFRI), other agricultural institutes, universities or private companies, there do not seem to be enough budget funds available in other provinces.

The SFRI Institute is currently responsible for the city of Hanoi and the province of Vinh Phuc and collects and analyses the data on site. These are then entered into a digital map and handed over to the province. The provincial administration submits the results to the planning authority for assessment.

With a view to the topic of contaminated sites as the main focus of this report, it must be stated that the contaminated site analysis is not systematically pursued, but rather data on contaminated sites can only be found in specific reports or in GeoMaps if knowledge about these points (more or less) coincidentally exists (e. g. through measurements that have already been carried out).

An example of the selective analysis of contaminated sites as part of the implementation of the legal regulation 60/2015/TT-BTNMT is the report on the soil status of the Thai Nguyen province from 2016. Here only the parameters soil fertility, drought /moisture, erosion, and compactness are examined and specified. There is no information on contaminated sites - although this is likely to be widespread in this province, mainly due to the local mining industry. Unfortunately, despite several inquiries, the authors do not have any more up-to-date reports on the implementation

of the regulation mentioned, nor reports from other provinces. Therefore, the current status of the implementation of the legal regulation 60/2015/TT-BTNMT and the consideration of contaminated sites in the associated reporting cannot be fully understood at this point in time.

4.1.3 Circular No. 24/2014 / TT-BTNMT and Decree No. 43/2014 / ND-CP

Pursuant to the Land Law (2013), MONRE issued Circular No. 24/2014 / TT-BTNMT dated May 19, 2014, which outlined the regulations on cadastral records. Article 4 of this Circular clearly states the components of the cadaster. For localities that have developed and operated cadastral databases, cadastral records are made in digital form and stored in land databases, including the following documents: (I) documents cadastral survey and measurement including cadastral maps and land-itemizing books; (ii) cadastral book; and (iii) record copy of the certificate. Cadaster of localities that have not yet built cadastral database also include the aforementioned documents but in paper and digital form (if any) and land change monitoring books in paper form.

For the preparation, update, and revision of cadastral records, Circular No. 24/2014 /TT-BTNMT also outlines the principles for the above activities in Article 5 and responsibilities of agencies (such as the Land Registration Office, Commune People's Committee, DONRE etc.) for this work in Article 6.

In 2014, *Decree No. 43/2014/ND-CP*³⁸ was approved on detailing a number of articles and clauses of the Land Law No. 45/2013/QH13. The content on "Land management and organization system and services in land management and use" were stated in Chapter 2, specifically in Article 4, 5 and 6. Cadastral mapping, cadastral records and land database development are the service activities in the land sector and are also included in Article 5. The contents of land use planning and plans are stated in Chapter 3, specifically from Article 7 to Article 12.

4.1.4 Legislation on E-Government and related planning

Besides laws and regulations on land use planning, the fastening development of E-Government structures in Vietnam is also highly relevant for an effective consideration of contaminated sites in provincial land use planning. In recent years, Vietnam has made considerable efforts and significant progress in the development of E-Government structures. The most important laws and regulations are now presented shortly.

The Law on Planning No. 21/2017/QH14 dated 24 November 2017³⁹ is the foundation for an interconnected information sharing by stipulating in Article 41 that the national planning information system and database should be built and operated in a uniform manner nationwide for planning activities. The national planning information and database system includes planning documents as well as natural, socio-economic, environmental, climate change, national defense and security data associated with the

³⁸ Socialist Republic of Vietnam (2014a)

³⁹ Socialist Republic of Vietnam (2017)

system. The national geographic database system has been standardized and updated regularly.

In March 2019, the government issued the Resolution No. 17-NQ-CP on some key tasks and solutions to develop E-Government in the period of 2019 – 2020 and towards 2025⁴⁰. The Resolution noted that “[dis]connection and self-management of information and data is still common, leading to duplication and inconsistency of information” within governmental structures. This is in line with earlier findings regarding contaminated sites noting that Vietnamese law established parallel registration systems:⁴¹ On the one hand, the Land Law and the related Circular 60/2015/TT-BTNMT aims at a nationwide mapping of land by the GDLA. Information on soil contamination is included where it is discovered but is not researched in a systematic way. On the other hand, there is legislation particularly focussing on the inspection of contaminated sites and establishing specific cadastres in the provinces (*Decree 40/2019/ND-CP* and Circular 25/2019/TT-BTNMT, with *Draft Decree No./2021*). Therefore, more clarity regarding competences and the flow of information between different authorities at different levels (state and province level) and responsible for different sectors (environmental, land use and urban planning) seemed advisable.⁴²

The E-Government Regulation No. 17/NQ-CP deals, inter alia, with the National Land Database. MONRE is responsible for leading and coordinating efforts “to implement the National Land Database to connect and share data with the National e-Service Portal, information systems and databases of ministries, sectors and localities”. MONRE should also “build and complete the database of natural resources and environment to connect and exchange information with systems and databases of ministries, sectors and localities”. There are no specifications regarding the registration of contaminated sites. However, such specifications can be found in Circular 25/2019/TT-BTNMT. According to Article 31 (1), MONRE is responsible for developing, updating and operating information and database systems for contaminated systems nationwide. The provincial People’s Committees have reporting duties towards the ministry. According to Article 32 (2), they have to update information in the MONRE database after they conducted investigations and assessments. Additionally, they have to compile, update and report sites with a heightened contamination risk – such as industrial parks, production plants, chemical depots, agrochemicals, waste landfills and craft villages which have been closed or relocated.

In Chapter VII, Section 3, the *Draft Decree No./2021* detailing a number of articles of the LEP order state agencies to develop, provide and implement online public services on the environment according to public plans and roadmaps, and to encourage organizations and individuals to use online services (Article 193). Article 194 outlines that environmental agencies need to ensure the exchange of data and information for state management with the national database. Consequently, MONRE is responsible to provide online public services for administrative procedures at the central level, while Provincial-level People's Committees should develop and provide online public services for administrative procedures within the scope of local government. Thereby,

⁴⁰ Socialist Republic of Vietnam (2019h)

⁴¹ For more details see Kovac et al. (2019), p.10ff.

⁴² Cf. Kovac et al. (2019), p. 24 ff.

they need to ensure the synchronization, connection and interoperability with the system of MONRE.

4.2 Integration tools to successfully consider contaminated sites in provincial and urban land use planning

Through the assessment of the existing legislation regulating the nexus of contaminated sites and land use planning, a row of “integration tools” could be identified. Integration tools are entry points to regulations of the Vietnamese laws which support a better linkage of contaminated sites management and (provincial and urban) land use planning.

Based on the laws and regulations presented in chapter 3.1, three **integration tools** could be identified: **The Statistical Inventory and Mapping of the Land Use Status** and **the Strategic Environmental Assessment (SEA)** as tools to prepare the provincial land use plan, as well as the emerging **E-Government structures** as tool which can support the comprehensive implementation of all activities. Located on the intersection between the management of contaminated sites and the land use planning and its application, those integration tools offer **opportunities** to strengthen the interconnections between the two processes and legal structures.

Thus, this chapter focuses on an overview of integration tools on the intersection between land use planning and contaminated sites management, and the opportunities for a better consideration of contaminated sites that each integration tool offer.

4.2.1 Integration tool 1: Statistical inventory and mapping of the land use status for land use planning and urban planning

Land use planning at the provincial and national level considers data and information about various aspects related to land quality and previous land uses, having been assessed in forehand of the land use plan development. Soil quality and pollution data are among those data. Circular 60/2015/TT-BTNMT gives the technical instructions to strategically investigate and evaluate soil data nationwide. This also includes data about contaminations in the soil. Based on the data, a soil map is created, which is one part of the land use plan developed by MONRE. For the current national land use planning period 2020 to 2025 and 2030, Directive 15/CT-TTg about Land Investigation and Mapping of the Land Use Status for the year 2019⁴³ activates all responsible authorities to strategically collect and evaluate data about land uses in the last years. It is not entirely clear in how far 15/CT-TTg also includes the collection of soil quality and soil pollution data.

In the statistical survey for the previous period of land use planning, only few provinces included a comprehensive list of (potentially) contaminated sites into the statistical report of land use in their province. In turn, the consideration of contaminated sites in the provincial land use planning is reduced, because it is established based on

⁴³ Socialist Republic of Vietnam (2019g)

this data and information. The accessibility of information about soil contaminations on areas on which sensitive uses are planned can support the application of remediation of the contaminated sites before it is re-used for (sensitive) uses. For example, this can be regulated through the issuing of building permissions, which could be coupled on the previous application of soil decontamination or securing measures paid by the party interested to establish a building project.



Figure 15: Identified opportunities within Integration Tool 1: Statistical inventory and mapping

OPPORTUNITY 1: Ensure that the identification process of contaminated sites outlined in Circular 25/2019 and the subsequent decree receives enough attention and resources to be carried out

(Potential) soil contaminations, especially when related to point sources, are easiest to find and to evaluate when the procedure outlined in Circular 25/2019 and follow-up *Draft Decree No./2021* is followed. By narrowing down broader areas with pollution suspicion to a few hotspots by a previous historical investigation, the number of necessary measurements to detect pollutions can be reduced significantly without risking that soil contaminations are missed out, which in return reduces costs. Although Circular 25/2019 is based on the LEP and not on the Land Law, structures and processes that ensure a further integration of information and data from this process of contaminated soil identification into the statistical recording and mapping of the land use situation are outlined in 60/2015/TT-BTNMT and 15/CT-TTg, and are directly considered in land use planning.

It is also crucial that DONRE receives enough financial and human resources to implement the process outlined in Circular 25/2019, even if this means to prefer it to the identification process of soil contamination outlined in 60/2016/TT-BTNMT. By covering the aspect of (potentially) contaminated sites with the method outlined in Circular 25/2019, followed by an integration of the results via mapping and reports into the land use and quality statistics outlined in regulation 15/CT-TTg, a fair amount of laboratory work and related costs can be avoided while maintaining a high level of quality in the assessments of possible risks.

OPPORTUNITY 2: Ensure the application of legal derivability of urban planning from regional and provincial planning in the provinces

Urban planning and the related permissions of construction works play a key role in avoiding sensitive follow-up uses – such as schools, kindergartens, residential areas or parks – on non-secured contaminated sites. It is usually urban planning which defines the locations of these areas and buildings. Urban planning in Vietnam is regulated by the Law on Urban Planning from 2017 and prepared under the guidance of the Ministry of Construction (MOC) and the Departments of Construction in the provinces. The related sector master plans (e. g. for water, transport and other) are developed by sectoral authorities. As outlined in the previous chapters, information about (potentially) contaminated sites enters the land use planning as one among many data and information on which the land use plans are based.

(Potentially) contaminated sites are then considered in the urban and rural planning when the urban planning is elaborated on the regional and national land use planning. The revised Law on Planning from 2017 (No. 21/2017/QH14), regulating the relationship among types of planning and their legal derivability in article 6 (see Figure 13), is thus an important development to ensure that negative follow-up uses at non-secured contaminated sites are avoided.

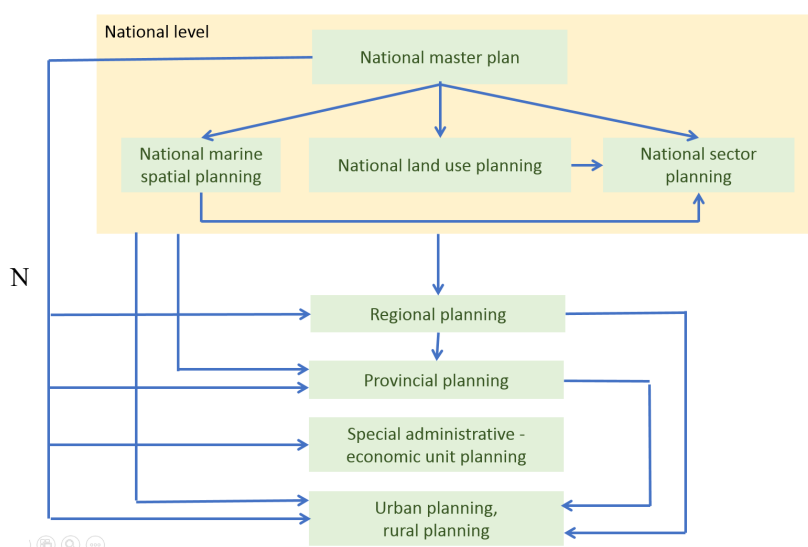


Figure 16: Relationship between different types of planning according to Article 6 in the Law on Planning from 2017. Own figure

Article 6 in the revised Law on Planning also defines priorities if individual planning documents conflict with each other. It is stated that the national master plan is the basis of all other planning, namely the national marine spatial planning, the national land use planning, the national sectoral planning, the regional planning, the provincial planning, the special economic - administrative unit planning, urban planning and rural planning nationwide. In case of conflicts, the more detailed planning for the smaller area must always get adjusted to the higher planning. Therefore, the law outlines that urban and rural planning have to be compatible with all higher planning, namely the national, regional and provincial planning.

In Germany, the relation of derivability between the land use plan ("Flächennutzungsplan") and the construction development plan ("Bebauungsplan") ensures that sites with suspected soil contaminations are considered in the urban development, and thus, sensitive follow-up uses on those areas are avoided.⁴⁴ Some *Länder*, as for example North Rhine-Westfalia, issued to this end the Decree "Consideration of areas with soil contamination, in particular contaminated sites, in urban land use planning and in the building permit process (Contaminated Sites Decree)"⁴⁵. The issue of this Decree was enabled by the cooperation of the two responsible ministries, the Ministry of Urban Development and Housing, Culture and Sports and the Ministry of Environment and Nature Conservation, Agriculture and Consumer Protection. It outlines how public authorities at the regional and city level need to consider sites with a suspected or verified contamination in the urban planning.

The revision of the Law on Planning gives Vietnamese authorities at all levels the necessary security and guidance to carry out a consistent planning. If information about (potentially) contaminated sites are available and considered for and in the previously mentioned plans, the Law on Planning from 2017 also serves as a basis to match this information about (potentially) contaminated sites with the planning of sensitive follow-up uses.

With the legal framework being in place; it is now essential to ensure the implementation of the principles outlined in the Law of Planning. Regarding overlapping issues of land use planning and urban planning in the context of contaminated sites, this can be realized by a constant cooperation and exchange between officials in DONREs, DPIs and Departments of Constructions and training programs informing about risks originating from contaminated sites, especially in combination with sensitive follow-up uses. It is also crucial to further elaborate training and information sharing for (urban) planning officials about soil contamination and its impacts, as well as the suitable consideration of these sites in urban planning to minimize risks, for example during the process of giving building permits or lending land.

OPPORTUNITY 3: Ensure the consideration of cadasters of (potentially) contaminated sites in the Statistical Inventory and Mapping of the Land Use Status and thus in the Land Use Planning

The confirmation of a contamination suspicion and the detailed identification of the type, extent and propagation of contaminations in the soil usually stands at the end of the identification and recording process or even at the beginning of the remediation process of contaminated sites. Thus, it is not surprising that many sites being currently listed in cadasters of contaminated sites in Vietnam fall under the category of being suspected to be contaminated, or potentially contaminated. For sites under this category, detailed information about pollutants and measurement results are usually not available yet. A shortage of or missing information about the detailed contamination profile at a site under suspicion to be contaminated should not be a

⁴⁴ Brandt (1993), p. 310f.

⁴⁵ State Government of NRW (2005, 2021)

reason to exclude the site from the land use plan. Rather, it is important that areas with a well-founded suspicion of contamination are also considered as such in the Statistical Inventory and Mapping of the Land Use Status, and therewith in the land use planning.

In Germany, state and local authorities are responsible to include and consider all (potentially) contaminated sites in the land use plan for the state and city level. This includes explicitly also sites with a strong initial suspicion. The marking of sites being *suspected* to be contaminated in the land use plan goes along with an initiation of detailed assessments.⁴⁶ Further assessments of the contamination impact are commissioned when the construction development plan is elaborated. If authorities are not in the position to verify a site's contamination during the elaboration of the land use plan, they can keep the respective site out of the land use planning until the matter is clarified. The decision is then justified in a related report.⁴⁷ This approach led in many cases to a successful prevention of sensitive after-uses and thus to a reduction of risks for human health originating from contaminated sites.

Considering sites under the status of an initial suspicion in provincial land use planning is an approach that is promising for Vietnamese provinces, because this way, possible health risks can be reduced significantly. The implementation of this approach requires the completion of area-wide investigations as described in Circular 25/2019 as a first step to identify all sites *under initial suspicion* to be contaminated. Those sites under suspicion to be contaminated then needs to be considered in the Statistical Inventory and Mapping of the Land Use Status and in the soil quality assessment outlined in 15/CT-TTg, even at a stage when they have not undergone a detailed assessment or measurements have not taken place yet. This way, public authorities can consider a possible contamination of the soil before lending land plots to interested parties. Depending on the Vietnamese law, it might also be possible to demand from tenants with sufficient financial means a detailed investigation of soil contamination. In the case of a confirmed contamination of the soil environment, this can be followed by the application of conditions of use or the determination of soil remediation activities as prerequisite for further site uses when the site is lent to an interested tenant.

4.2.2 Integration tool 2: Strategic environmental assessment in the context of urban planning

With increasing urbanization and growing cities, contaminated sites in urban areas can be a barrier to urban development and a risk for human health of the inhabitants, or the chance for urban renewal – if they have undergone a surface recycling tailored to individual circumstances.

The existing framework on urban and construction planning and on strategic environmental assessment (SEA), with its consideration of soil quality in the areas affected by urban development makes this nexus a possible tool to integrate contaminated sites in urban land use planning.

According to Article 3 of the LEP No. 72/2020/QH14, strategic environmental assessment is the process of identifying and forecasting trends of major environmental

⁴⁶ Brandt (1993), p. 305ff.

⁴⁷ Brandt (1993), p. 328

problems, serving as a basis for integrating environmental protection solutions in policies, strategies and planning. The revised LEP from 2020 has adopted this definition.

The LEP No. 72/2020/QH14 specifies the contents of "Strategic environmental assessment, environmental impact assessment and environmental permits" in Chapter IV. According to Article 25 of the LEP, provincial planning is one of the subjects required to carry out SEA. Article 27 further elaborates on the contents of the strategic environmental assessment in planning. It defines, among others, that in an SEA, the planning objectives and viewpoint should be compared and evaluated regarding objectives, policies and strategies for environmental protection (dd). It should also forecast results of positive and negative trends of the main environmental issues when implementing the planning, while solutions should be defined to maintain positive trends and minimize negative trends of major environmental issues (h).

The structure and content of the SEA report are specified in Form No. 01a, Appendix I issued together with Circular No. 25/2019/TT-BTNMT dated December 31, 2019 detailing the implementation of some articles of the Government's *Decree No. 40/2019/ND-CP* dated 13 May 2019, amending and supplementing a number of articles of decree detailing and guiding environmental protection law management of environmental monitoring services. Circular No. 25/2019/TT-BTNMT and *Decree No. 40/2019/ND-CP* have been taken over to the *Draft Decree No./2021* and its appendixes. In the decrees and appendixes is defined that one of the contents of the SEA report is the general description of the current state of the soil quality, changes in soil quality and soil retention in the region potentially affected by the landscape.

Also the Law on Urban Planning (No.32/2009/QH12)⁴⁸, issued at 1. November 2009 stipulates in Article 39 that a Strategic Environmental Assessment is a content of urban planning. The article also defines that the SEA of an urban plan should include information about the soil environment and proposals on solutions to prevent and overcome impacts, and to develop environmental monitoring plans.

In 2011, Vietnam also issued with Circular No. 01/2011/TT-BXD⁴⁹, dated January 27, 2011, a circular guiding strategic environmental assessment in the construction and urban planning. The circular applies to domestic and foreign organizations and individuals involved in the formulation, appraisal, approval and management of construction planning. Article 3 outlines that SEA is a content of a construction plan, while Article 5 defines the steps of an SEA. Further articles deal with the content of the SEA, its objectives and the formulation of solutions for preventing, minimizing and redressing impacts.

With the legal framework outlined above, the SEA is a part of urban planning and construction planning. SEA for urban and construction planning also needs to identify objectives and main environmental issues related to construction planning and has to include a description of the soil quality, changes in soil quality and soil retention in the region potentially affected. This nexus makes it a window integrating the consideration of (potentially) polluting sites into urban planning. With mutual references in all related laws and regulation, and the issuing of Decision No. 01/2011/TT-BXD, explicitly guiding

⁴⁸ Socialist Republic of Vietnam (2009)

⁴⁹ Socialist Republic of Vietnam (2011)

SEA in construction planning and urban planning, there exists a suitable legal framework to think construction planning and soil contamination in conjunction, using the method of SEA.

This is further accelerated by one of the stated objectives of SEA in urban planning, namely that comprehensive solutions should be presented to prevent, reduce and remediate environmental impacts (Article 39, Law on Urban Planning).

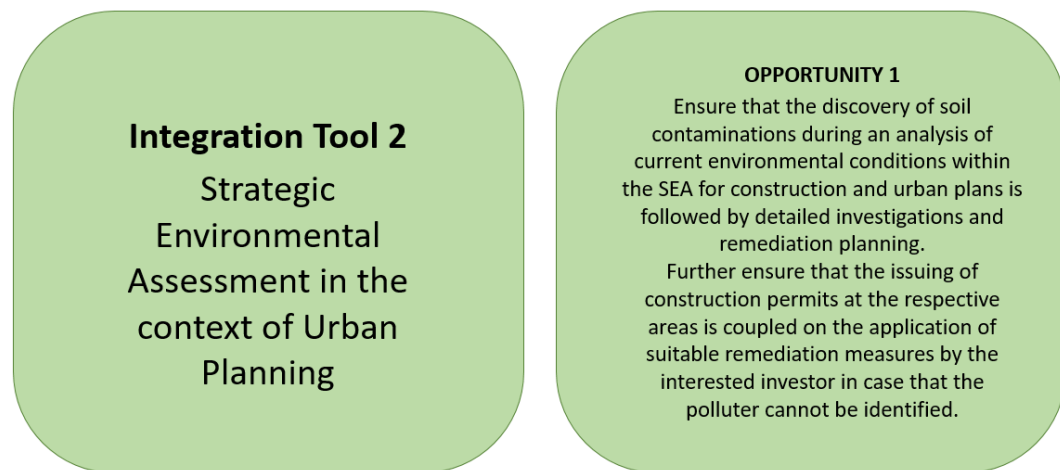


Figure 17: Identified opportunities within Integration Tool 2: SEA in urban planning

OPPORTUNITY 1: Ensure that the discovery of soil contaminations during an analysis of current environmental conditions within the SEA for construction and urban plans is followed by detailed investigations and remediation planning. Further ensure that the issuing of construction permits at the respective areas is coupled on the application of suitable remediation measures by the interested investor in case that the polluter cannot be identified.

The SEA in urban planning includes, according to Article 8 of Decision No. 01/2011/TT-BXD, an analysis of current environmental conditions and developments. This can be an opportunity to progress in the measurement and remediation of (potentially) contaminated sites if it can be ensured that the related data and information is not only used for the definition of environmental impacts of the implementation of the construction planning, but as basis for further measures to manage soil contamination.

To seize this opportunity, it might be an option to legally define that a detailed investigation and – in case of the confirmation of the initial suspicion – a remediation planning is an obligatory part of the construction plan when signs for soil contamination are discovered in the context of the analysis of current environmental (soil) conditions within the SEA. In relation to the proposal at page 43, it might also be discussed that if soil contaminations are discovered at (future) building sites within an SEA process, and polluters cannot be identified, the investor can be encouraged to contribute to remediation measures, for example by including them as obligatory and additional treatment measures in the SEA report; or by coupling the issuing of construction permits at the respective areas on the application of suitable remediation measures that need to be applied and (partially) financed by the interested parties.

Such a procedure would also support to meet social issues, including community health, listed as objectives of the construction planning as outlined in Article 7, Decision No. 01/2011/TT-BXD.

Seizing this opportunity requires the close collaboration between MONRE, MPI (Ministry of Planning and Investment) and MOC at the national and their counterparts like DONRE, DPI and DOC at the provincial level.

4.2.3 Integration tool 3: Information sharing via E-Government

Digital technologies make the sharing of data between authorities and other relevant actors much easier. With the use of digital databases and data- and information sharing software or data bases, knowledge about contaminated sites can be spread fast and easily – without delay and almost without cost. Those opportunities should be seized, as cooperation and an efficient flow of information between the relevant authorities (e.g. environmental agencies and spatial planning authorities) is indispensable for handling contaminated sites effectively.⁵⁰ Additionally, citizens, farmers, investors and enterprises can use soil evaluations as a basis for their work and decision-making. Therefore, barriers to sharing data regarding contaminated sites should be removed to achieve common benefits.

At page 51f., the most important laws regulating the use of E-Government in the management of contaminated sites and the land use planning are summarized. Based on an assessment of these laws and regulations, two opportunities to strengthen the E-Government structure for the management of contaminated sites could be identified.

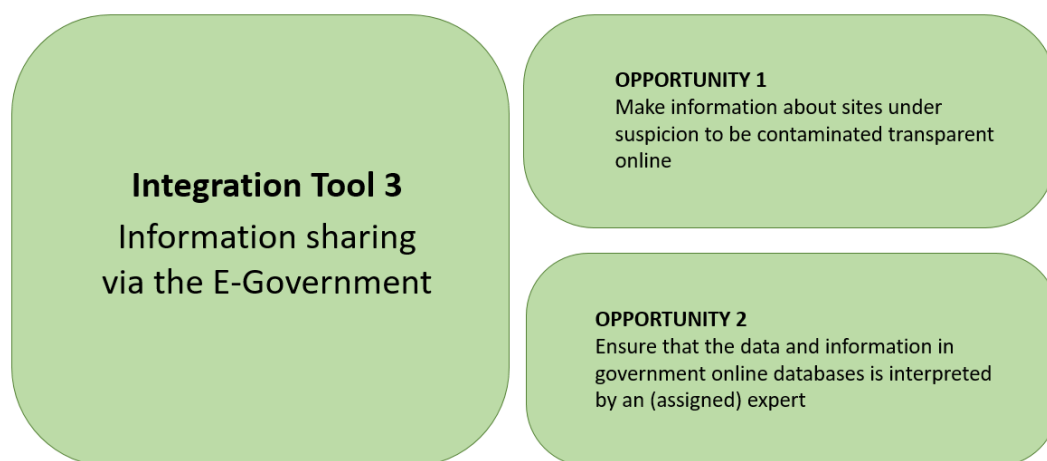


Figure 18: Identified opportunities within Integration Tool 3: Information sharing via the E-Government

OPPORTUNITY 1: Make information about sites under suspicion to be contaminated transparent online

The importance of also integrating sites "suspected to be contaminated" in cadasters for land use and urban planning without having further evidence was

⁵⁰ Kovac et al.(2019), p. 2.

already outlined at page 58f. Consequently, their consideration in the city development should go along with making their status transparent for inhabitants, tenants and potential tenants via digital means. In this way, interested parties and inhabitants can be aware of possible risks nearby, and (interested) tenants are informed that certain sensitive uses should be avoided at their place or a more detailed investigation of the contamination should be carried out. It is always advisable to link the publication of the list of sites under suspicion to be contaminated to a contact person from the responsible public authority, or an assigned expert who can give further details and advice.

OPPORTUNITY 2: Ensure that the data and information in government online databases is interpreted by an (assigned) expert

The availability of soil contamination data is the basis to understand risks originating from a certain site and is also an important prerequisite to initiate further activities to carry out detailed investigations and to plan suitable remediation activities. Regarding interagency databases, it is thus important to share the measurement results with other authorities and to link the data and information to the in-depth interpretation and assessment of an assigned expert. For example, this can be in a form of a report. Only with the interpretation of an expert, the shared information is detailed and understandable enough to derive individual recommendations for actions especially for Departments responsible for urban and land use planning.

5. Conclusion and outlook

In Vietnam, the legal framework on contaminated site management and their consideration in land use planning is constantly upgraded. The latest renewals of the respective laws and regulations have been initiated by the reviewed LEP in late 2020. All in all, the assessment of current and draft laws and regulations about the identification, assessment and remediation of contaminated sites and related damages, and the consideration of contaminated sites in land use planning, including E-Government, shows that there exists a solid legal framework supporting contaminated site management.

Regarding the **identification, assessment and remediation of contaminated sites** and the calculation of environmental damages, ten opportunities could be defined to support the implementation of contaminated site management. Opportunities include, among others, the classification of risks on a case-by-case basis, the application, extension and constant updating of the comparison table for remediation methods and the further assessment of legal options to hold different actors responsible for damage compensation for soil pollution. The establishment of expert working groups on contaminated site management and the development of organizational structures to establish an admission system for experts in risk assessment and remediation planning are further opportunities to ensure that the management of contaminated sites follows high quality standards and the use of modern technologies.

Regarding the **contaminated sites / land use planning nexus**, three integration tools have been recognized that support the consideration of contaminated sites in urban and land use planning, thus offering opportunities to ensure good health: The Statistical Inventory and Mapping of the Land Use Status for Land Use Planning and Urban Planning, the Strategical Environmental Assessment in the context of Urban Planning and information-sharing via E-Government.

Identified Opportunities related to the **Statistical Inventory and Land Use Mapping** are the consequent financial support of the preliminary investigation process outlined in Circular 25/2019 in the form of financial support and capacity building for provincial authorities, the consistent application of legal derivability of urban planning from regional and provincial planning in the provinces and the consideration of (potentially) contaminated sites in the statistical inventory and mapping of the land use for land use planning.

If the method of **Strategical Environmental Assessment** is wisely applied in the context of Urban Planning, it can support detailed investigations and remediation measures in urban areas. An opportunity lies in the discovery of soil contaminations during an analysis of current environmental conditions within the SEA for construction and urban plans. Through suitable regulations, it might be assured that investors are obliged to carry out detailed investigations in such a case and could get encouraged to carry out remediation measures by coupling construction permits on their application.

E-Government is rapidly developing in Vietnam and thus represents an important integration tool. An opportunity is the disclosure of information about sites under suspicion to be contaminated on an online platform for inhabitants and authorities

alike. The second opportunity targets the inter-agency exchange of data and information about soil quality and contamination. Here it should be verified that data and information on soil contamination is always shared with the interpretation of an assigned expert to avoid wrong conclusions and inappropriate actions.

It can be resulted that Vietnam possesses a stable and extensive legal framework for contaminated site management. Further capacity-building in provincial authorities and a better cooperation with planning authorities are key to work towards a comprehensive management of contaminated sites in the provinces and thus the successful reduction of risks for human health originating from contaminate sites.

References

Brandt, Edmund (1993): Altlastenrecht. Ein Handbuch. Müller, C. F.

Bund/Länder-Arbeitsgemeinschaft Bodenschutz (LABO, 2020): Bundesweite Kennzahlen zur Altlastenstatistik. Link: https://www.labo-deutschland.de/documents/Kennzahlen_der_Altlastenstatistik_2020_n.pdf (accessed 30.07.2021)

Federal Republic of Germany (1999a): Federal Soil Protection and Contaminated Sites Ordinance (Bundes-Bodenschutz- und Altlastenverordnung - BBodSchV) Link: <https://www.gesetze-im-internet.de/bbodschr/> (accessed: 29.07.2021)

Federal Republic of Germany (1999b): Law for the Protection against Harmful Soil Changes and for the Remediation of Contaminated Sites (Federal Soil Protection Act or Bundesbodenschutzgesetz - BBodSchG) Link: <https://www.gesetze-im-internet.de/bbodschr/> (accessed: 29.07.2021)

Federal Environmental Agency of Germany (2014): Methodensammlung Boden - / Altlastenuntersuchung 6/2014. Link: <http://www.umweltbundesamt.de/themen/boden-landwirtschaft/kommissionen-beirae/fachbeiratbodenuntersuchungen-fb> (accessed 23.07.2021)

Government of Canada (2012): Spring Report of the Commissioner of the Environment and Sustainable Development. Link: https://www.oag-bvg.gc.ca/internet/English/parl_cesd_201205_03_e_36775.html#ex8 (accessed: 29.07.2021)

Kovac, Sarah; Hantsche, Louisa; Zschesche, Michael (2019): Analyse der aktuellen Rechtsvorschriften zur Registrierung von Altlasten in Vietnam, Gutachten

Mark, Harald; Konopatzki, Patrick; Kovac, Sarah (2018): Registration of Contaminated Sites in Vietnam. Part 1: Basic Information. Bochum/Berlin: MSP Bochum/UfU

Sanden, Joachim; Schoeneck, Stefan (1998): Bundes-Bodenschutzgesetz: Kurzkomentar. Müller (C.F.Jur.), Heidelberg; 1. Aufl. Edition

Socialist Republic of Vietnam (2009): Decision No.32/2009/QH12, Law on Urban Planning. Link: [https://hanoi.eregulations.org/media/Law%20on%20Urban%20Planning%202009%20\(Eng\).pdf](https://hanoi.eregulations.org/media/Law%20on%20Urban%20Planning%202009%20(Eng).pdf) (accessed: 29.07.2021)

Socialist Republic of Vietnam (2010): Decision No. 60/2010/QH12: Mineral Law. Link: <https://vanbanphapluat.co/law-no-60-2010-qh12-on-mineral-law> (accessed: 29.07.2021)

Socialist Republic of Vietnam (2011): Circular No. 01/2011/TT-BXD guiding strategic environmental assessment in the construction planning and urban planning. Link:

<http://extwprlegsl.fao.org/docs/pdf/viel02726.pdf> (accessed: 29.07.2021)

Socialist Republic of Vietnam (2013): Decision No.45/2013/QH13 Land Law.

Link: <https://vietnamlawenglish.blogspot.com/2013/11/vietnam-land-law-2013-law-no-452013qh13.html> (accessed: 29.07.2021)

Socialist Republic of Vietnam (2014a): Decree No.43/2014/ND-CP detailing a number of articles of the Land Law. Link:

<https://danang.eregulations.org/media/ND%2043CP%20hd%20Luat%20dat%20dai%2014%20E.pdf> (accessed: 29.07.2021)

Socialist Republic of Vietnam (2014b): Decree No. 127/2014/ND-CP regulating the requirements applicable to environmental monitoring service activities. Link:

<https://vanbanphapluat.co/decreed-no-127-2014-nd-cp-the-requirements-applicable-to-environmental-monitoring-service-activities>. (accessed: 29.07.2021)

Socialist Republic of Vietnam (2015a): Circular 38/2015/TT-BTNMT on environmental rehabilitation and recovery in the mining exploitation activities. Link:

<https://thuvienphapluat.vn/van-ban/Tai-nguyen-Moi-truong/Circular-No-38-2015-TT-BTNMT-environmental-remediation-and-restoration-in-mineral-mining-activities-293297.aspx> (accessed: 29.07.2021)

Socialist Republic of Vietnam (2015b): Circular No. 60/2015/TT-BTNMT on Land surveying and assessment techniques. Link: <https://thuvienphapluat.vn/van-ban/Bat-dong-san/Thong-tu-60-2015-TT-BTNMT-ky-thuat-dieu-tra-danh-gia-dat-dai-300364.aspx> (accessed: 29.07.2021)

Socialist Republic of Vietnam (2015c): Decree No. 03/2015/ND-CP on the determination of environmental damage. Link: <https://thuvienphapluat.vn/van-ban/EN/Tai-nguyen-Moi-truong/Decree-No-03-2015-ND-CP-on-environmental-damage-assessment/268104/tieng-anh.aspx> (accessed: 29.07.2021)

Socialist Republic of Vietnam (2015d): Decree No. 19/2015/ND-CP on detailing the implementation of a number of articles of LEP. Link: <https://vanbanphapluat.co/decreed-no-19-2015-nd-cp-detailing-the-law-on-environmental-protection> (accessed: 29.07.2021)

Socialist Republic of Vietnam (2016): Circular No. 30/2016/TT-BTNMT on management, improvement and remediation of residue-contaminated sites. Link:

<https://vanbanphapluat.co/circular-30-2016-tt-btnmton-management-improvement-and-remediation-of-residue-contaminated-sites> (accessed: 29.07.2021)

Socialist Republic of Vietnam (2017): Law No. 21/2017/QH14 on Planning: Link: <https://thuvienphapluat.vn/van-ban/Xay-dung-Do-thi/Luat-quy-hoach-322935.aspx>.

(accessed: 29.07.2021)

Socialist Republic of Vietnam (2019a): Circular 25/2019/TT-BTNMT detailing the implementation of a number of articles of the government's decree no. 40/2019 /ND-CP.

Link: <https://vanbanphapluat.co/circular-25-2019-tt-btnmt-elaborating-decree-40-2019-nd-cp-environmental-monitoring-services> (accessed: 29.07.2021)

Socialist Republic of Vietnam (2019c): Conclusion 56-KL on continued implementation of the 7th central resolution on proactively responding to climate change, strengthening resource management and environmental protection. Link: <https://thuvienphapluat.vn/van-ban/Tai-nguyen-Moi-truong/Ket-luan-56-KL-TW-2019-ve-tiep-tuc-thuc-hien-Nghi-quyet-ve-chu-dong-ung-pho-voi-bien-doi-khi-hau-422857.aspx> (accessed: 29.07.2021)

Socialist Republic of Vietnam (2019d): Decree No.40/2019/ND-CP on amendment and addition to a number of articles of decree detailing and guiding the LEP. Link: <https://thuvienphapluat.vn/van-ban/tai-nguyen-moi-truong/Nghi-dinh-40-2019-ND-CP-huong-dan-thi-hanh-Luat-bao-ve-moi-truong-413905.aspx>. (accessed: 29.07.2021)

Socialist Republic of Vietnam (2019e): Decree No.08/VBHN-BTNMT 2019 guiding the 2014 LEP. Link: <https://thuvienphapluat.vn/van-ban/Bo-may-hanh-chinh/Van-ban-hop-nhat-08-VBHN-BTNMT-2019-Nghi-dinh-huong-dan-Luat-Bao-ve-moi-truong-427537.aspx>. (accessed: 29.07.2021)

Socialist Republic of Vietnam (2019f): Decree 158/2016/ND-CP guiding the Mineral Law Link: <https://thuvienphapluat.vn/van-ban/Tai-nguyen-Moi-truong/Nghi-dinh-158-2016-ND-CP-huong-dan-Luat-khoang-san-332220.aspx>. (accessed: 29.07.2021)

Socialist Republic of Vietnam (2019g): Directive No. 15/CT-TTg of the Prime Minister on investigation of land and mapping land's current situation in 2019. Link: <https://english.luatvietnam.vn/irective-no-15-ct-ttg-dated-june-17-2019-of-the-prime-minister-on-investigation-of-land-and-mapping-lands-current-situation-in-2019-173713-Doc1.html>. (accessed: 29.07.2021)

Socialist Republic of Vietnam (2019h): Resolution No. 17/NQ-CP on some key tasks and solutions to develop E-Government in the period of 2019 – 2020 and towards 2025. Link: <https://thuvienphapluat.vn/van-ban/Cong-nghe-thong-tin/Resolution-17-NQ-CP-2019-regarding-key-tasks-and-measures-development-the-electronic-Government-412831.aspx>. (accessed 29.07.2021)

Socialist Republic of Vietnam (2020a): Decree No. 148/2020/ND on amendments and supplements to several Decrees, providing detailed regulations on the implementation of the Law on Land. Link: <https://vanbanphapluat.co/decreed-148-2020-nd-cp-amendments-to-several-decrees-providing-detailed-the-law-on-land>. (accessed: 29.07.2021)

Socialist Republic of Vietnam (2020b): Resolution No. 67/NQ-CP 2020 formulating the national master plan on land use in 2021 - 2030. Link: <https://english.luatvietnam.vn/esolution-no-67-nq-cp-dated-may-12-2020-of-the-government-on-approving-the-task-of-formulating-the-national-master-plan-on-land-use-for-the-2021-20-183353-Doc1.html>. (accessed: 29.07.2021)

Socialist Republic of Vietnam (2020c): Revised Law on Environmental Protection No. 72/2020/QH14. Link: <https://english.luatvietnam.vn/aw-on-environmental-protection-no-72-2020-qh14-dated-november-17-2020-of-the-national-assembly-195564-Doc1.html>. (accessed: 29.07.2021)

Socialist Republic of Vietnam (2021a): Draft Decree No./2021 detailing a number of articles of the 2020 Law on Environmental Protection (not yet issued).

Socialist Republic of Vietnam (2021b): Resolution 06/NQ-CP dated January 21, 2021 on the Action Plan to continue implementing Resolution 24-NQ/TW on proactively responding to climate change, enhancing natural resource management and environmental protection.

State Government of NRW (2002): Verordnung über Sachverständige und Untersuchungsstellen für Bodenschutz und Altlasten - SU-BodAV NRW. Link: https://recht.nrw.de/lmi/owa/br_bes_text?anw_nr=1&gld_nr=2&ugl_nr=2311&bes_id=7384&menu=1&sg=0&aufgehoben=N&keyword=Altlastenerlass. (assessed: 26.07.2021)

State Government of NRW (2005, 2021): Decree on the Consideration of areas with soil contamination, in particular contaminated sites, in urban land use planning and in the building permit process (Contaminated Sites Decree). Link: https://recht.nrw.de/lmi/owa/br_bes_text?anw_nr=1&gld_nr=2&ugl_nr=2311&bes_id=7384&menu=1&sg=0&aufgehoben=N&keyword=Altlastenerlass (assessed: 26.07.2021)

Online Sources:

LABO: <https://www.labo-deutschland.de/Ausschuesse.html> (accessed 19.07.2021)

LABO: <https://www.labo-deutschland.de/Ausschuesse-ALA.html> (accessed 19.07.2021)

LABO: <https://www.labo-deutschland.de/Ausschuesse-BORA.html> (accessed 19.07.2021)

LABO: <https://www.labo-deutschland.de/Veroeffentlichungen-Altlasten.html> (accessed 26.07.2021)

ITV: <https://www.itv-altlasten.de/publikationen/arbeitshilfen-und-richtlinien/> (accessed 26.07.2021)

Umweltbundesamt: <https://www.umweltbundesamt.de/en/topics/soil-agriculture/soil-protection/soil-protection-law#national-law> (accessed 26.07.2021)

Annex: Draft strategy to put focus opportunities into practice

Based on a comparison of the legal framework on contaminated site management with similar legal regulations in Germany and NRW, ten opportunities to strengthen and further develop the identification, assessment and remediation of contaminated sites in Vietnam have been identified. They are presented in chapter 3.2 of this study. Among the identified opportunities, two Focus Opportunities have been selected based on their complexity of implementation and their potential to strengthen the existing management procedures. They are elaborated in more detail on the next pages.

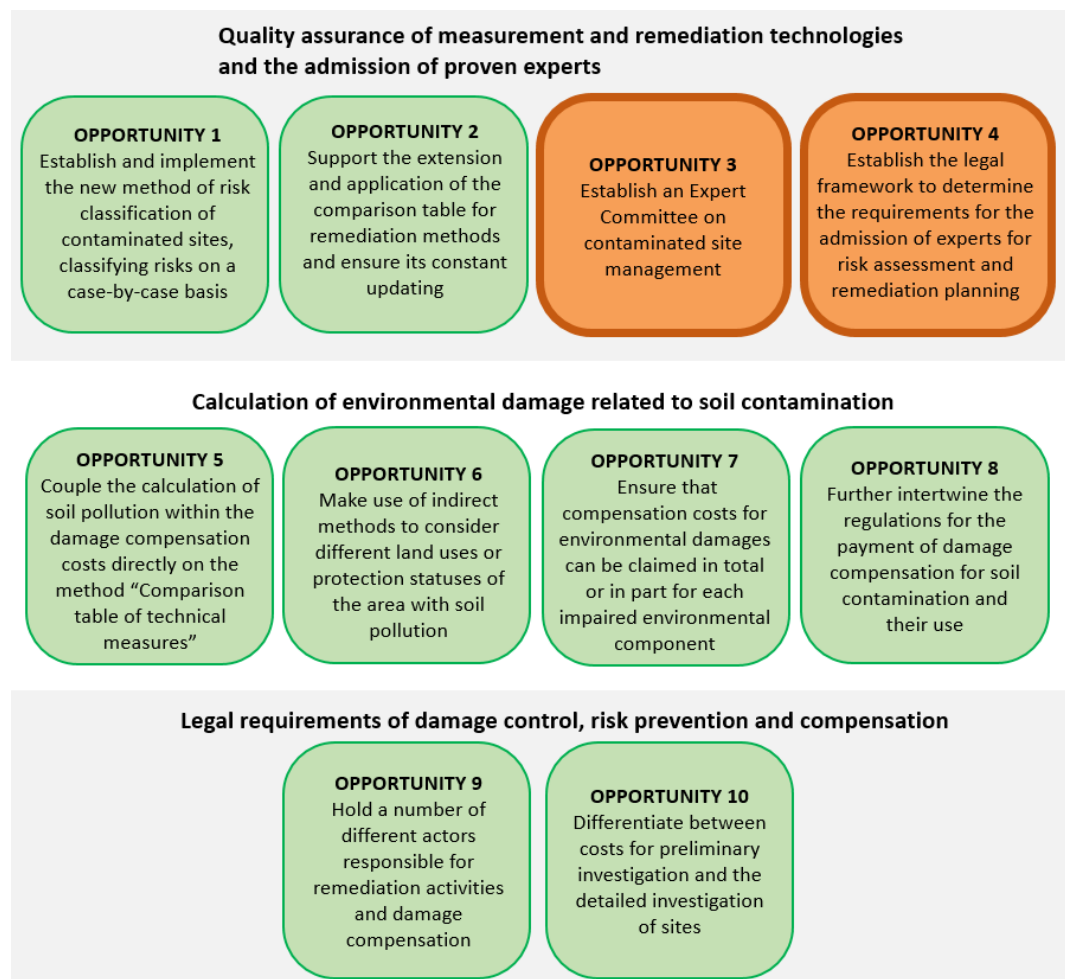


Figure 19: Focus opportunities to strengthen contaminated site management in Vietnam. Own figure.

Appendix 1: Focus opportunity 3 to establish an expert committee on contaminated site management

OPPORTUNITY 3

ESTABLISH AN EXPERT COMMITTEE ON CONTAMINATED SITE MANAGEMENT

- **Members:** Legal and technical experts from MONRE, experts from the provinces with large industrial hubs and many handcraft and recycling villages, experts from universities and further relevant institutes
- **Objective:** Constant and regular exchange of technical methods and experiences between experts, with a main focus on capacity building and awareness raising among experts at the local and province level. Focus might be the discussion on newest technologies and developments, but also on how to make best use of scientific information in practice.
- **Structure and operation:** Development of working groups with a thematic focus under a flexible coordination. Regular meetings. Joint definition of topics for discussion and elaboration, and joint prioritization of topics for publications.
- **Adoption of results:** Ensure that results and publications from the expert committee are shared among experts in provincial and national authorities, but also among experts in scientific institutes and universities

Figure 20: How to establish an expert committee on contaminated site management

Objective:

Constant and regular exchange of technical methods and experiences between experts, with a main focus on capacity building and awareness raising at the local and province level. The focus might be on discussing newest technologies and developments and how to best use scientific information in practice.

Members:

- Legal and technical experts from MONRE
- Experts from recycling villages, major cities and provinces with large industrial hubs and handcraft
- Experts from universities and further relevant institutes
- Member of the VEPF
- Member of education institutions (Universities, InNET)

Structure and operation:

Management Board consisting of two persons for the organization of the Committee and its Working Groups, including the preparation and follow-up of working group meetings, the organization of publications and statements and other coordination, as well as public relation work and knowledge transfer with further experts and government agencies.

Working Groups with a thematic focus on the topics that need capacity building and knowledge exchange between national and province level the most. Working groups consists of around 20 experts from different sectors and governance levels with known practical and scientific experience in the topic. For example, groups can meet regularly in a digital format four times a year and once a year or every two

years in presence. They discuss newest developments regarding the focus topic and publish their results and proposals, e.g. as technical guidelines, manuals or comments. Thereby, the working group jointly defines their topics of discussion, in coordination with other working groups and the management of the Expert Committee.

Stakeholder for the Committee Establishment:

Ensure that results and publications from the expert committee are shared through knowledge transfer among experts in provincial and national authorities and in scientific institutes and universities.

Step by Step:

Table 1: Proposed steps and responsibilities for the establishment of an Expert Committee on Contaminated Site Management

Activity	Responsible organization
Identify persons organizing the Committee's establishment (Founding Committee) via stakeholder analysis	MONRE /VEA
Invite to a planning meeting to establish the Committee	MONRE / VEA
Prepare a draft statute of the Expert Committee	MONRE and legal experts
Carry out a meeting to present the idea of an Expert Committee, to found the establishment body, to define lead person(s), to organize further meetings and to present a draft statute	MONRE / VEA and invited experts
Carry out a 2 nd meeting: Discussion and decision on the statute of the Expert Committee	Founding Committee
Take administrative and legal steps to officially register and announce the Expert Committee	Founding Committee
Organize a 2-day meeting and event with experts for knowledge sharing and the definition of working groups	Head of Founding Committee
Organize and implement an expanded expert meeting to define working groups, including their members, meeting schedules and regulations and define the members of the management board. Define suitable candidates to invite to the meeting via stakeholder analysis	Head of Founding Committee
Provide legal and administrative advice to support the tasks and establishment of the working groups	Management Board

Appendix 2: Focus opportunity 4 to establish the legal framework to determine the requirements for the admission of experts for risk assessment and remediation planning

OPPORTUNITY 4

ESTABLISH THE LEGAL FRAMEWORK TO DETERMINE THE REQUIREMENTS FOR THE ADMISSION OF EXPERTS FOR RISK ASSESSMENT AND REMEDIATION PLANNING

- **Legal framework** that experts who are responsible to assess risks and develop remediation activities need to be certified and regularly proved to possess a pre-defined legal and scientific background.
- **Legally define analytical methods, equipment and skills** that admitted experts for risk assessment and remediation planning need to possess to gain an operating license.
- **Education and training** to realize courses and regular official audits orienting on international standards (DIN/ES/ISO) for admitted experts, and legally define that the issuing of licenses depends on regular successful participation.

Figure 21: Establishment of the legal framework to determine the requirements for the admission of experts for risk assessment and remediation planning

Objective:

Lay the legal foundation to establish high-quality education, testing and approval structures and certification mechanisms for admitted experts for risk assessment and remediation planning to ensure that their professional work is independent and follows high level standards.

Legal Framework:

The legal framework should at least consist of a regulation defining:

- Prerequisites for the admission as expert for risk assessment and remediation planning
 - Professional expertise and experience
 - Personal reliability
 - Liability insurance
 - Regular participation in education and training
 - Regular internal quality assurance
- Guidelines for the establishment of admission and testing structures of admitted and future experts
- Institutions and organization involved in the testing and admission of experts
- An overview of methods and skills to be tested and standardized procedures to refer to

Step by Step:

Table 2: Proposed steps and responsibilities for the establishment of the legal framework to determine the requirements for the admission of experts

Activity	Responsible organization
Establish a regular working group to develop the legal draft, consisting of experts from various fields, including soil contamination management, environmental education and training, law, laboratory analysis etc.	MONRE /VEA
Build focus groups to collect knowledge and elaborate guidelines and regulations in different legal aspects including expert admission, training structures for admitted experts, structures for admission and testing of admitted and future experts, methods and skills to be tested and standardized procedures to refer to etc.	MONRE / VEA and other
Develop a draft decree	MONRE and legal experts
Carry out an exchange and feedback round with (international) experts and other departments	MONRE / VEA, other experts
Prepare the final version of the regulation and organize its enforcement	MONRE /VEA, legal experts
Establish a working group monitoring progresses in the establishment of the structures and guidelines defined by the regulation and organizing activities to support its implementation	MONRE /VEA

Proposed activities to elaborate regulations for every aspect:

Analytical Methods, equipment and skills:

- Evaluate regulations on contaminated site assessment and remediation in general and on expert admission from other countries to identify latest technologies and prerequisites that other countries with high standards already apply
- Integrate the Expert Committee (Focus Opportunity 3) in the elaboration of a list of necessary and desired skills, equipment, experiences and knowledge
- Consider international standards (DIN, EN, ISO etc.) for equipment and procedures which experts need to follow
- Ensure that the list of methods, equipment and knowledge is updated by regular expert reviews

Education and training:

- Identify and draw structures to ensure the involvement of existing educational institutions, such as InNET for trainings of officials, and universities for students, to create course material and organize regular courses, workshops and trainings that are designed to gain admission or are defined to refresh trainings
- Identify and draw structures to ensure that topics defined as necessary to gain the expert admission for risk assessment and remediation planning are accessible for interested candidates, for example via master courses at universities

Admission and Certification:

- Build on expert groups, institutes and other existing infrastructure to define the location of the expert testing and admission committee
- Define guidelines to ensure the independence of the admission committee
- Define necessary administrative steps for a correct certification process defined by the Vietnamese law and identify authorities that need to be involved
- Define regulations that ensure the regular participation of admitted experts in refresher courses with regular testing