

# ARAGORN: Pioneering sustainable solutions for Europe's contaminated soils


**3: Evaluation des risques sanitaires et environnementaux, 26 Mars 2025**

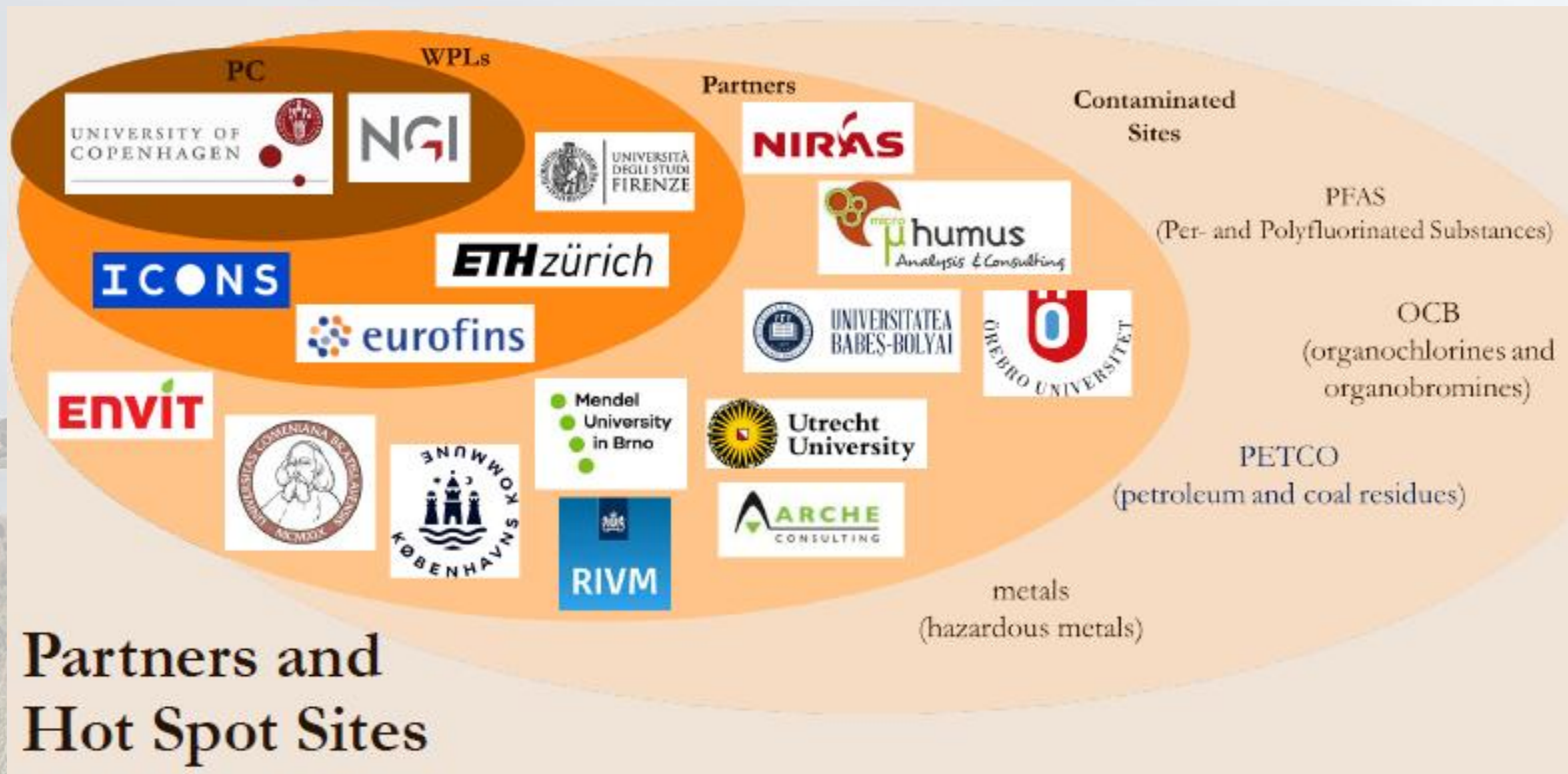
Ali Kanso<sup>1</sup>, **Alexandre Perlein<sup>1</sup>**, Gaylord Machinet<sup>1</sup>, Marco Uzielli<sup>2</sup>, Dorina Podar<sup>3</sup>, Gabrielle Dublet-Adli<sup>4</sup>, Anna Karrman<sup>5</sup>, Anela Kaurin<sup>6</sup>, Naila Hina<sup>7</sup>, Juliane Glüge<sup>7</sup>, Silke Gabbert<sup>8</sup>, Hans Pieter<sup>4</sup>, Xenia Trier<sup>9</sup>

1: Microhumus, 2: UNIVERSITA DEGLI STUDI DI FIRENZE (UNIFI), 3: UNIVERSITATEA BABES BOLYAI (UBB), 4: STIFTELSEN NORGES GEOTEKNISKE INSTITUTT (NGI), 5: OREBRO UNIVERSITY (ORU), 6: ENVIT, 7: Eidgenössische Technische Hochschule (ETH), 8: Rijksinstituut voor Volksgezondheid en Milieu, 9: KOBENHAVNS UNIVERSITET (UCPH)

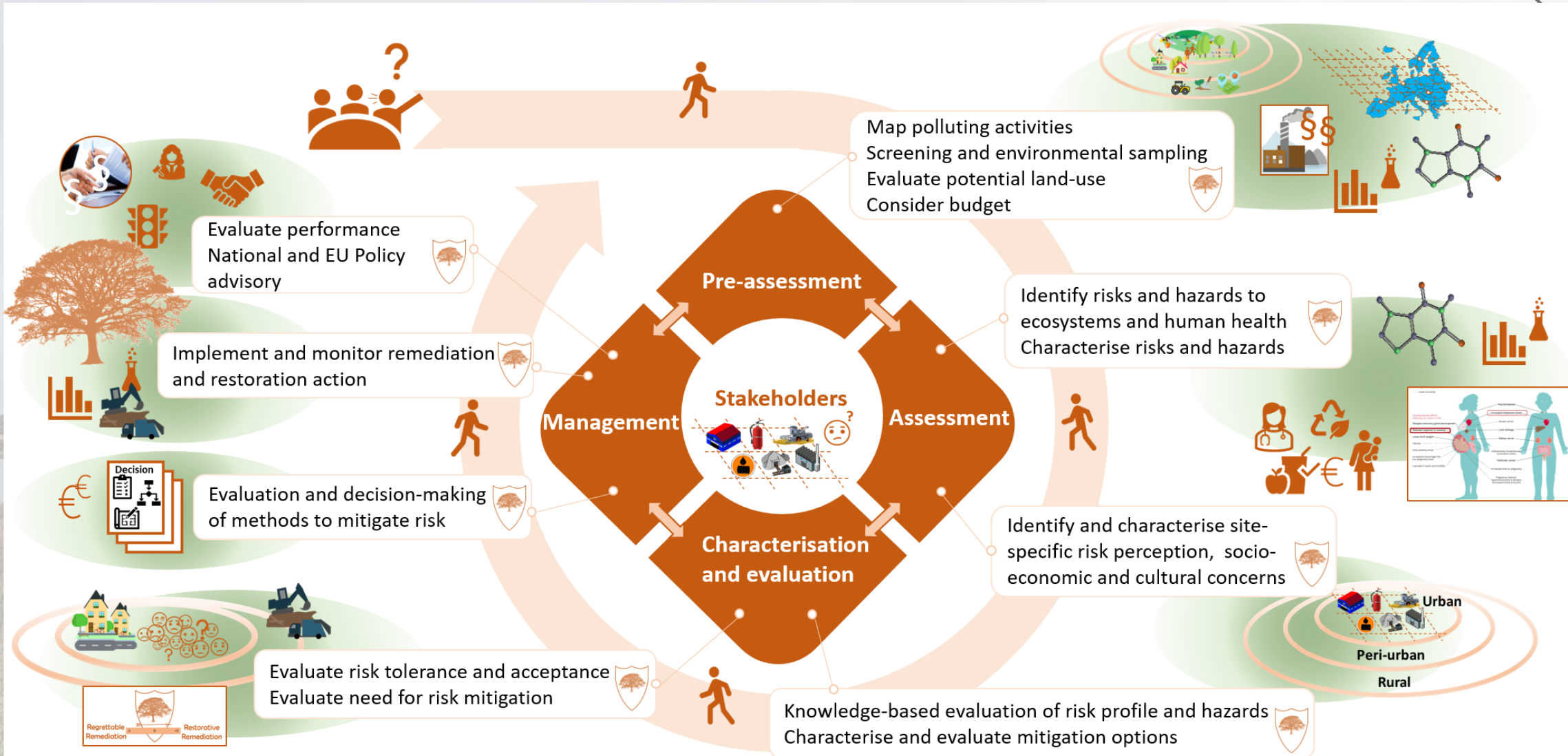
# ARAGORN CONSORTIUM



 17  
partners



# ARAGORN Vision



# ARAGORN Work Package



WP1: Mapping, assessment, planning and action strategies



WP2: Monitoring and sampling strategies



WP3: Remediation strategies



WP4: Resilience and nature-based restoration strategies



WP5: Co-creation, guidance and decision-making strategies



Project Duration: 4 years ; October 2023- September 2027

# What and for whom we in ARAGORN are making tools for?



ARAGORN will provide **land managers** of contaminated soils across Europe the guidance they need to characterize, remediate, and restore their land .....

ARAGORN will co-create with **land managers** across Europe the technical, socioeconomic, and decision-making guidance tools .....

ARAGORN will develop, apply, and transfer adaptable and effective tools, along with supporting guidance to **public and private land managers** across Europe .....

# What and for whom we in ARAGORN are making tools for?

5 target groups (A, B, C, D and E from the application):

E: Citizens,  
consumers etc.

D: Research,  
academia etc.



A: Land  
owners/managers

B: Consultants

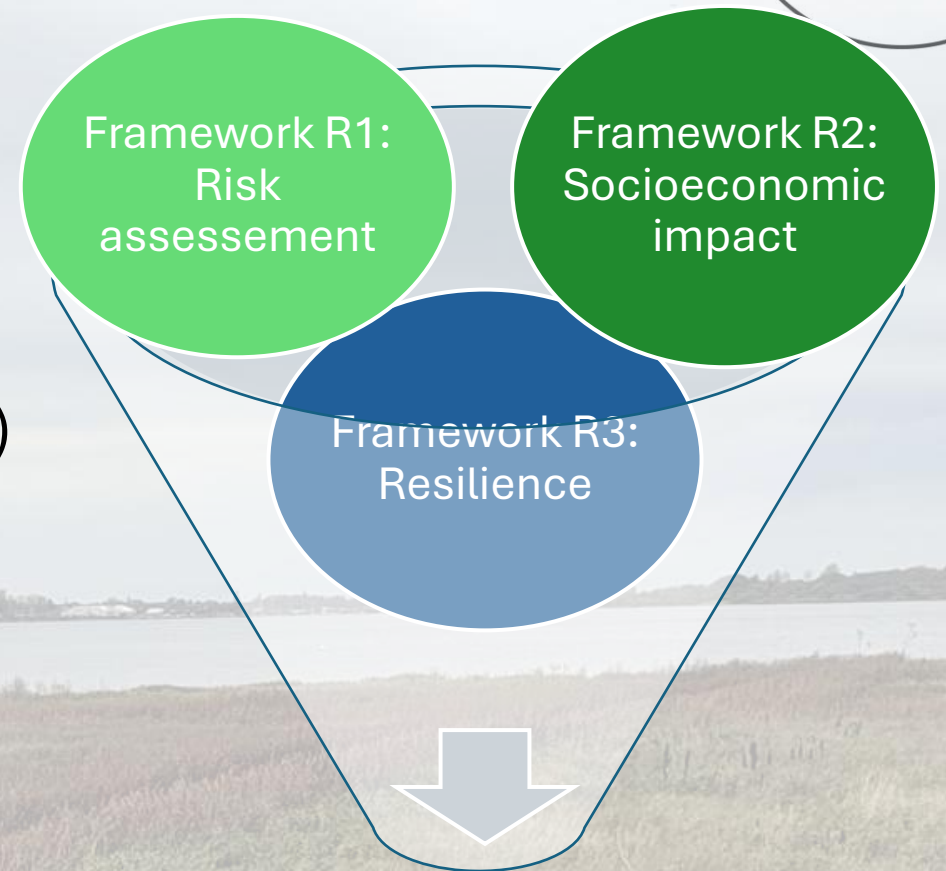
C: Regulators,  
authorities

# What and for whom we in ARAGORN are making tools for?

Holistic approach on restoration/remediation:

Three different frameworks:

1. Risk assessment (human and ecological risks)
2. Socioeconomic impact
3. Resilience post-remediation



**Tools to support decisions  
on remediation and/or  
restoration**

# What and for whom we in ARAGORN are making tools for?



Guidelines:

Technical perspective: 4 parts

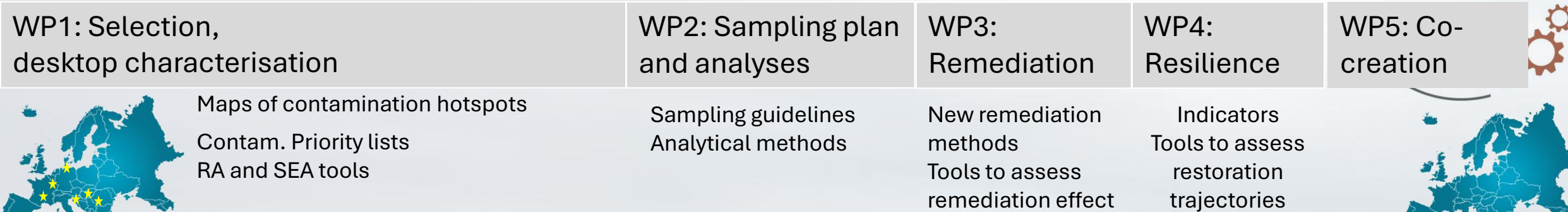
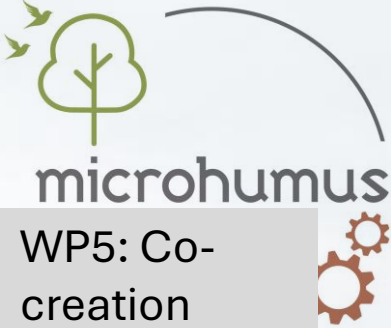
- a) Sampling and analytical methods
- b) Risk assessment
- c) Remediation techniques and effects
- d) Resilience of solutions

Socioeconomic perspective

Decision tree(s):

Systematic approach on how to evaluate and weight indicators from the different perspectives.

# Optimize sampling /analysis for WP1,2,3 & 4



**Metals:**  
Pb, Cd, As, Hg,  
Cu, Ni, Cr, Sb,  
Zn, Co, Mn

**PETCO:**  
PAH, C10-C40,  
BTEX, N-PAC

**OCBs:**  
PCBs, pesticides,  
chlorinated  
ethenes

**PFAS:**  
AFFF, Fluoropolym  
er  
manufacturing,...

**Moldova-Noua**  
**Pezinok**  
**Meza Valley**  
**Homecourt**  
**Trignac**  
**Turda**  
**Grindsted**  
**Korsør**  
**Blokkersdijk**

Spreading	HH	SEA	Analytical meth. development	Remediation development	Resilience assessment (WP4)	Co-creation
NA (air)	X <sup>★</sup>	?		X	X	?
Water (surface ) <sup>★</sup>	X <sup>★</sup>			X	X	
Water	X	?		X		?
NA	X		C10-C40 Bioavailability assessment	X	X	
NA (air) <sup>★</sup>	X <sup>★</sup>		C10-C40 Bioavailability assessment	X		
Water	X		NTS/Group based methods?	X		
Water	X		NTS/Group based methods?	X		
Water	X <sup>★</sup>		NTS/Group based methods?	X	X	?
Water	X		NTS/Group based methods?	X		?

Use/  
demonstrate  
ARAGORN  
tools

# Phytoremediation pot experiment (in progress)

After sowing t+5

Homécourt

Trignac

Moldova Noua



Without  
amendment



Amended

## Amendment tested for :

- Homécourt (bacterial + compost) to remediate TPH
- Trignac (compost) to improve plant cover development
- Moldova (compost + sedimentary rocks) to allow plant implementation

# More clearly defining the goal of making guidance towards the ARAGORN Decision Tree

**Risk Assessment  
of Remediation Alternatives**  
short term and long-term risks  
for different remediation  
scenarios



**Resilience Assessment  
of Remediation Alternatives**  
Multidimensional estimates of  
resilience of soils and  
biodiversity stressors

**Socio-economic assessments  
of Remediation Alternatives**

Refined estimates for site-specific env. sustainability and socio-economic assessments,  
incl. local cost-benefits for short-listed remediation options

-5



0



+5

**Regrettable Remediation**  
Return to co-creation based on  
lessons learned

**Restorative Remediation**  
Begin implementation of best scenario



# WP 1 Data collection

We already used the former Basol database to extract potential and polluted sites in France. They provided information on pollution (metal, petco ...) but not detailed ones (such as : pollutants concentrations, soil parameters....).

For France to go deeper, we are searching for remediated polluted site data on containing more detailed information:

- Remediation technique with pollutants concentrations before and after remediation
- Soil data
- if you know of other french data base
- They can be anonymised and will respect GRPD

For information on data collection you can contact us:

**Naila Hina : [naila.hina@usys.ethz.ch](mailto:naila.hina@usys.ethz.ch)**

**[a.perlein@microhumus.fr](mailto:a.perlein@microhumus.fr)**

# Thank for your attention



**For more information on ARAGORN Project contact :**

Xenia Trier: [xt@plen.ku.dk](mailto:xt@plen.ku.dk)

Hans Peter Arp: [Hans.Peter.Arp@ngi.no](mailto:Hans.Peter.Arp@ngi.no)

<https://aragorn-horizon.eu/>