



FOKKE, BOUDEWIJN

Independent soil consultant

BFSC

Introduction to the HCH in EU project

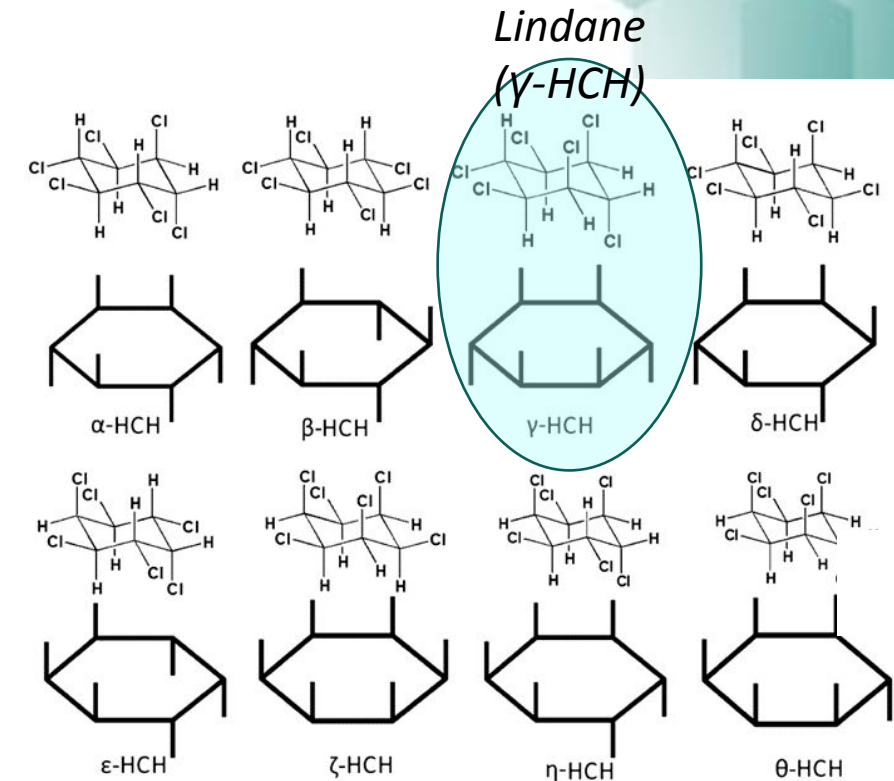


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Content of the presentation

Legacy of HCH production and use in the EU

- The HCH in EU project
- History
 - ✓ Production and use HCH and Lindane
 - ✓ Awareness of the legacy of production and use of Lindane and HCH
- Life cycle analysis of HCH and Lindane
- Project results
- Conclusive remarks



Source figure: Tanaka, K. (2015) Mini Review, γ -BHC: Its history and mystery – why is only γ -BHC insecticidal? Elsevier, Pesticide Biochemistry and Physiology 120 (2015) 91-100

The HCH in EU project

Project history and Objectives

- **History**

- ✓ 23-07-2019: Invitation to tender by European Commission, Directorate General Environment,
- ✓ 23-12-2019: Order to Project Consortium: TAUW bv, CDM Smith Europe GmbH and SARGA

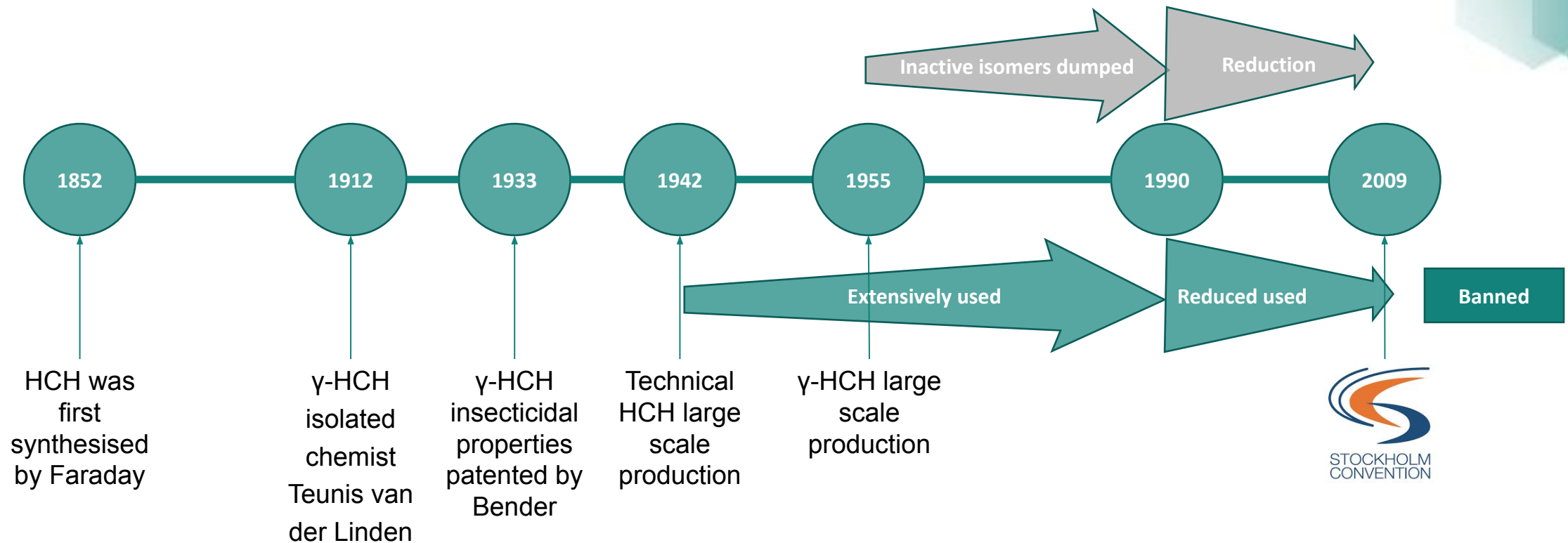
- **Objectives**

- ✓ Task 1: Obtain an overview of the legacy of Lindane and Technical HCH production in Europe
- ✓ Task 2: Assist six site authorities to sustainably manage HCH-contaminated sites

- **Additional**

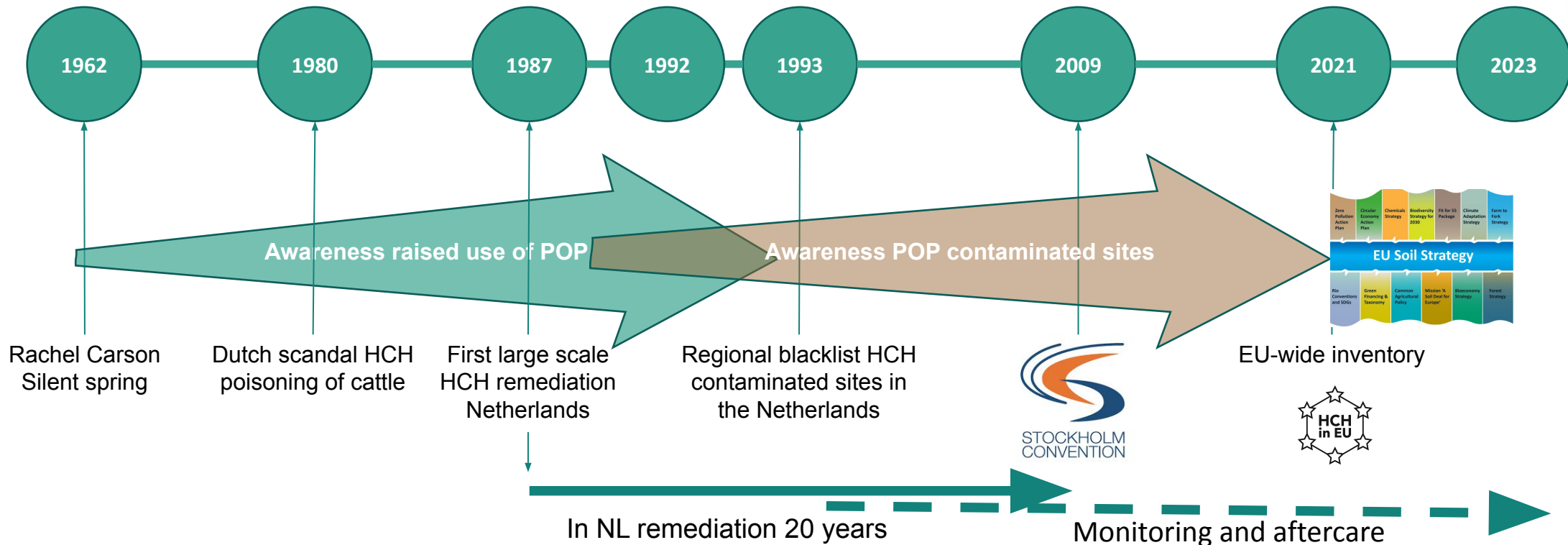
- ✓ Report use and legacy of Lindane & HCH in the EU
- ✓ Report Support in developing an EU-wide strategy for sustainably managing HCH-impacted sites
- ✓ Feedback on the selected remedial approach of the Vrakuňa site in Slovakia.

History production and use HCH and Lindane

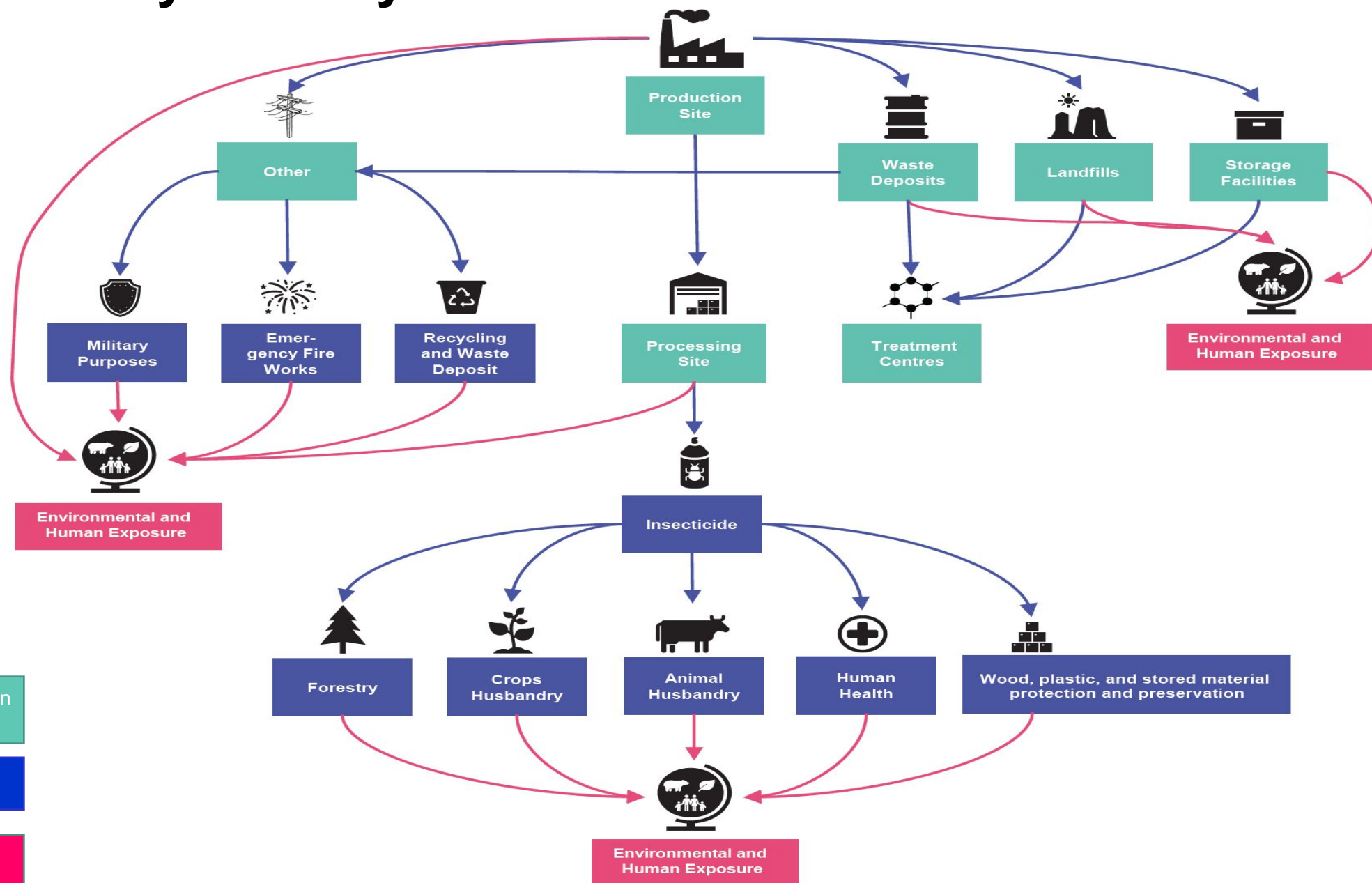


History awareness of the legacy of production and use of Lindane and HCH

IHPA fora 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - 14



The life cycle analysis of HCH and Lindane

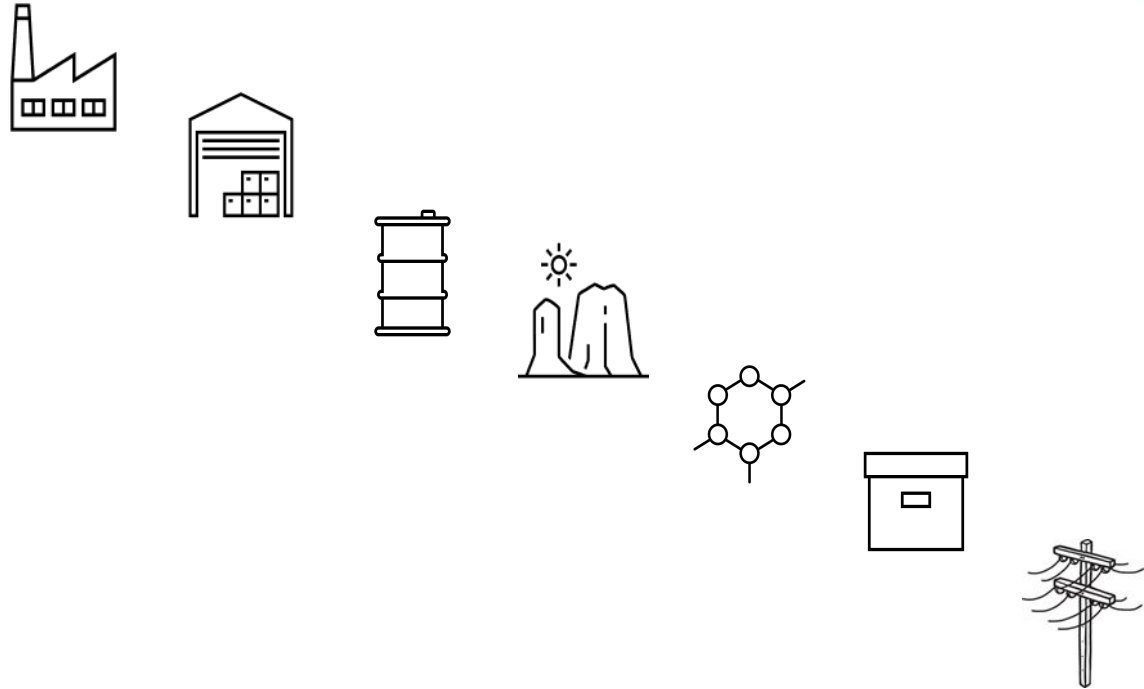


Project results

Task 1

27 EU countries 299 sites identified

1. 54 Production sites
2. 76 Processing sites - probably more
3. 59 Waste deposits
4. 29 Landfills
5. 16 Treatment centres
6. 34 Storage facilities
7. 31 Other sites - tip of the iceberg



Project results

Task 1

Production	Potential legacy							
	Pure waste	Hotspots	Contaminated topsoil	Contaminated subsoil	DNAPL	Contaminated groundwater	Contaminated sediments	Floodplain
Factory	x	x	x	x	x	x	x	x
Processing			x					
Waste deposits	x	x	x	x	x	x	x	x
Landfills	x	x			x	x		
Treatment centres								
Storage facilities	x	x	x	x				

Project results

Task 1

Use	Potential legacy							
	Pure waste	Hotspots	Contaminated topsoil	Contaminated subsoil	DNAPL	Contaminated groundwater	Contaminated sediments	Floodplain
Crop husbandry		x	x				x	x
Animal husbandry		x	x	x		x	x	
Health care								
Forestry		x	x					
Preservation of wood, plastic etc		x	x	x	x	x	x	
Reuse, recycling & military use		x	x					

Project results

Task 2

Site	Beneficiary/site owner	Detailed road map and action plan with the site specific issue addressed
Wintzenheim - France	ADEME	Contaminant migration from gravel pit filled with HCH from PCUK site (Huningue)
Mulde River - Germany	Landesanstalt	Dealing with widespread sediment contamination originating from Bitterfeld-Wolfen HCH production
Inquinosa Sabiñanigo - Spain	Government Aragon	Remedial actions to be taken at the Inquinosa former HCH production facility
Valle del Sacco Colleferro - Italy	Lazio Region	Sediment contamination originating from HCH production and storage
Hajek - Czech Republic	DIAMO	Contaminant migration from landfilled mine with HCH waste from Spolana Neratovice factory
Sardas landfill - Spain	Government Aragon	Approaches for non-treated matrixes, minimization of dispersion
O Porriño - Spain	Government Galicia	Contaminant migration from HCH production facility and wide spread distribution of HCH waste
Vrakuňa - Slovakia	Government Slovakia	Feedback on the selected remedial approach of the

Conclusive remarks

Lessons learned

- Lindane, as PCB, is applied in a variety of uses, materials and (consumer) products
- The HCH in EU inventory has an expiry date
- Only when there is legislation, enforcement and a financial instrument, HCH sites are sustainable management
- When there is no legislation and enforcement site development is often the only incentive to remediate
- Knowledge sharing and team work enforces the professionals tasked with HCH contaminated site management

Recommendations

- Detail the country specific inventory and keep updated
- Focus inventory on production, formulation, storage, dumped, landfilled, treatment, recycling sites and sites where used/applied
- Investigate and remediate especially when sites are redeveloped and/or used for other, more vulnerable, purposes
- Develop strategy and financial instrument on EU, Country, Regional and site level
- Extend the cooperation between professionals task with HCH contaminated site management (LINDANET)



THANK YOU FOR YOUR ATTENTION

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Back-up slides

Potential legacy use

- Crop husbandry
- Animal husbandry
- Forestry
- Preservation of wood, plastic, and stored material
- Reuse and recycling and military purpose
- Reuse and recycling and military purpose

Potential legacy use

Crop husbandry

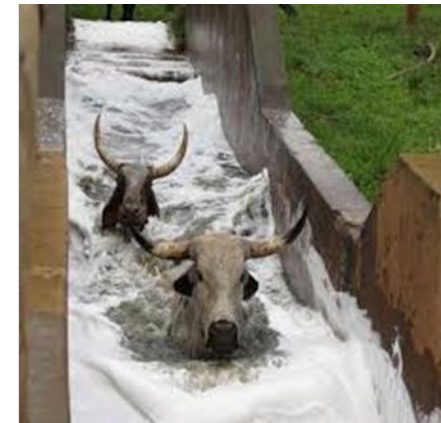
- Field crops
 - Vegetable crops
 - Fruit crops
 - Viticulture
 - Ornamentals
 - Pasture and Forage Crops
- **Hotspot areas:** sites where storage, formulation, filling and washing of pesticides tanks, land/spray machines and spraying planes
 - **Diffuse areas:** elevated concentrations in the topsoil, sediments, and drainage systems



Potential legacy use

Animal husbandry

- Domestic animals
- Livestock
 - ✓ Cows, goats, sheep
 - ✓ Pigs
 - ✓ Poultry
 - ✓ Rabbits
 - ✓ Fish (carp)
- **Hotspot areas:** sites used as storage, formulation, application/cattle dip areas and where drainage of the basin occurred
- **Diffuse areas:** elevated concentrations in the topsoil, sediments, and drainage systems



Potential legacy

Health care

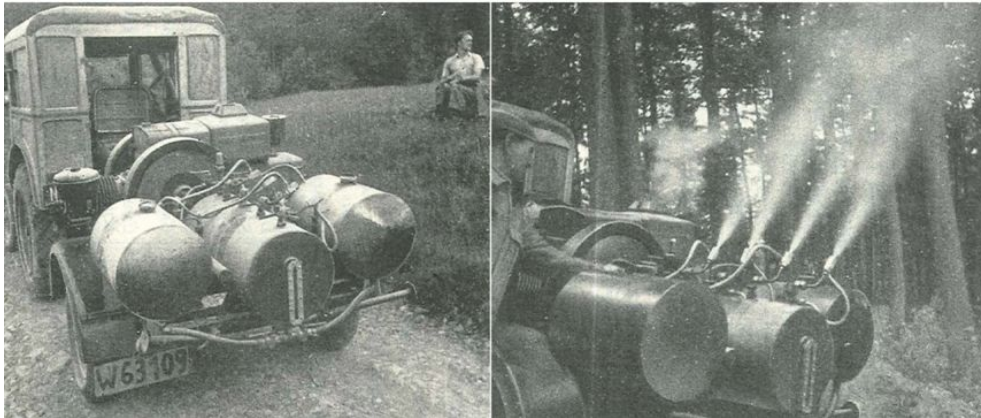
- Body treatment
- Indoor pest
- Outdoor pest
- Clothes fabrics
- **Hotspot areas:** not expected, areas of interest could be storage, transshipment, formulation and washing areas (tanks and machines)
- **Diffuse areas:** not expected



Potential legacy

Forestry

- Individual trees (as decoy)
- Rows and groups of trees
- **Hotspot areas:** storage and formulation areas and, when aerial foliar application is used, the spraying plane washing stations and the mixing tanks on airstrips
- **Diffuse areas:** elevated concentrations in the topsoil, sediments, and drainage systems used for forestry



Source figure: Sinreich, A., 1952, über die Wirkung neuzeitlicher Insektizide auf das Gliedertier bei Forstschädlingsbekämpfungen 153-165, Mitteilungen der forstlichen Bundes-Versuchsanstalt Wien, Volume 48 1952

Potential legacy

Preservation of wood, plastic, and stored material

- Dipping
- Immersion
- Deep impregnation
- Adding
- (Mixed) painting
- Smoking/fumigation
- Spraying
- **Hotspot areas:** sites used for the production, storage, application, formulation and washing
- **Diffuse areas:** elevated concentrations in top soils, sediments, and drainage systems

Potential legacy

Reuse and recycling and military purpose

- Recycling to make chlorobenzenes
- Reuse of (technical) HCH and Lindane waste to make water repellent concrete
- Reuse of HCH-isomers for military purpose
 - ✓ Smoke generating devices, up to 1977 in the former GDR, and the Soviet Army
 - ✓ Defoliation (Agent Orange, Vietnam War)
- Dumping of HCH waste in bomb craters

