



**NICOLE**

Network for Industrially Contaminated Land in Europe



## Land Stewardship, the next step in sustainable land and brownfield management

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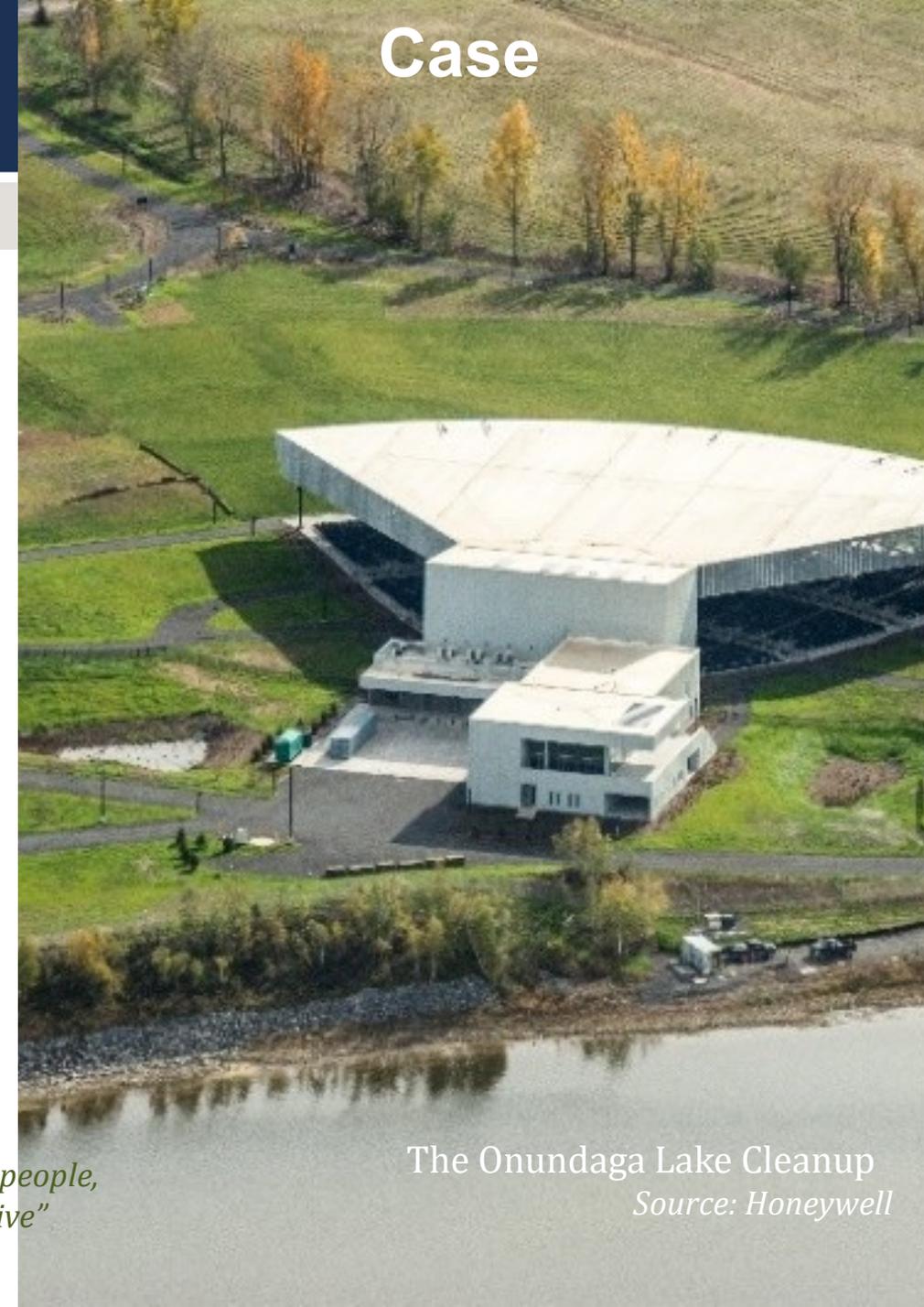
*Final Conference Greener Sites, Ryeka July 2019*



- NICOLE
- Cooperation NICOLE-Common Forum
- Definition, Stakeholders and Valuation
- The joint booklet
- NICOLE's Way forward, a quick guide

*"Land Stewardship is of all times: As long as there have been people, they knew they had to care for their land in order to survive"*

The Onundaga Lake Cleanup  
Source: Honeywell





## Network for Industrially Coordinated Sustainable Land Management in Europe

- A unique European network, linking soil professionals from Industry, consultancy, contracting and the academic world in a cooperative setting.
- A leading organisation in the development, promotion of state-of-the-art solutions for Sustainable Soil Management
- An association under Dutch law, with 27 members of industry, ca. 60 service providers and 3-4 members from academia.



**Risk-Informed and Sustainable Remediation**



**LAND STEWARDSHIP**  
Investing in The Natural, Social and Economic Capital of Industrial Land

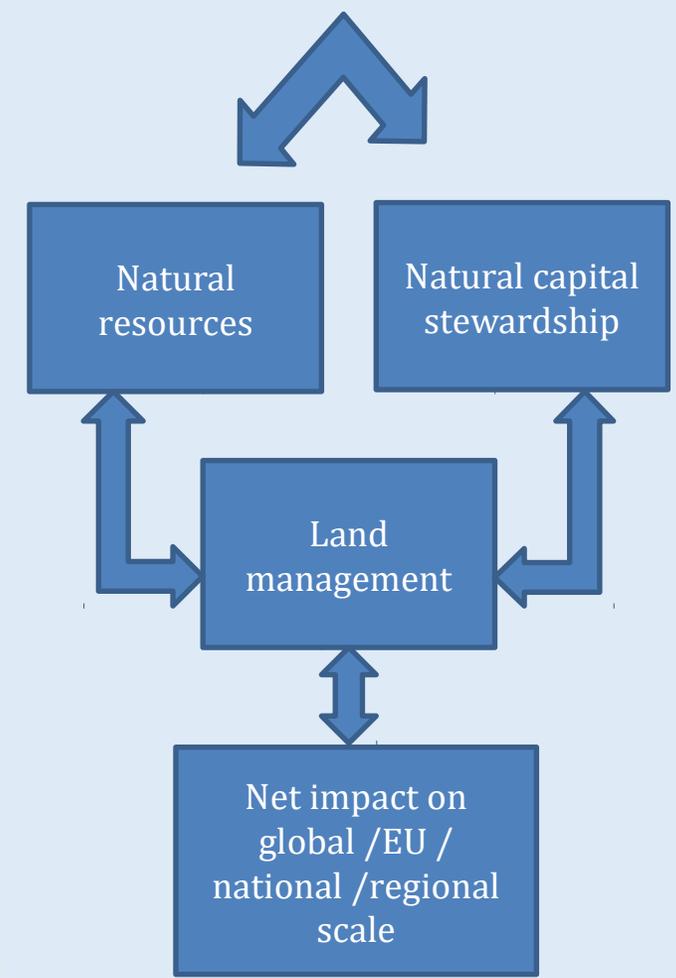
- Two workshops per year
- Meetings of Industry, Service Providers and Academia
- Working Groups: Land Stewardship, Mercury, Regulatory Issues, Asbestos, Emerging Contaminants, Innovation
- Innovation Award
- NICOLE monthly newsletter and website
- Publications, position papers and reports
- Collaboration with Common Forum and other networks





# Exploring Land Stewardship (LS)

- NICOLE:  
Sustainable Land management -> LS
  - Remediation
  - Redevelopment of Brownfields
  - (Temporary) use for nature or society
- Common Forum WG “Soil as a resource”
  - Circular and sustainable use
  - Land mostly privately owned; Public Private cooperation



Source: INSPIRATION-H2020

**A joint effort in a booklet that shows the benefits of the Land Stewardship concept**



# Land Stewardship

*“In its broadest sense, Land Stewardship is the recognition of our collective responsibility to retain the quality and abundance of our land, air, water and biodiversity, and to manage this natural capital in a way that conserves all of its values.....”*

Canadian Centre for Land Stewardship [www.landstewardship.org](http://www.landstewardship.org)

*“Land Stewardship (LS) is the collective recognition of the natural, social and economic capital that land possesses or may possess, and the possibilities that this recognition offers for unlocking that value”*

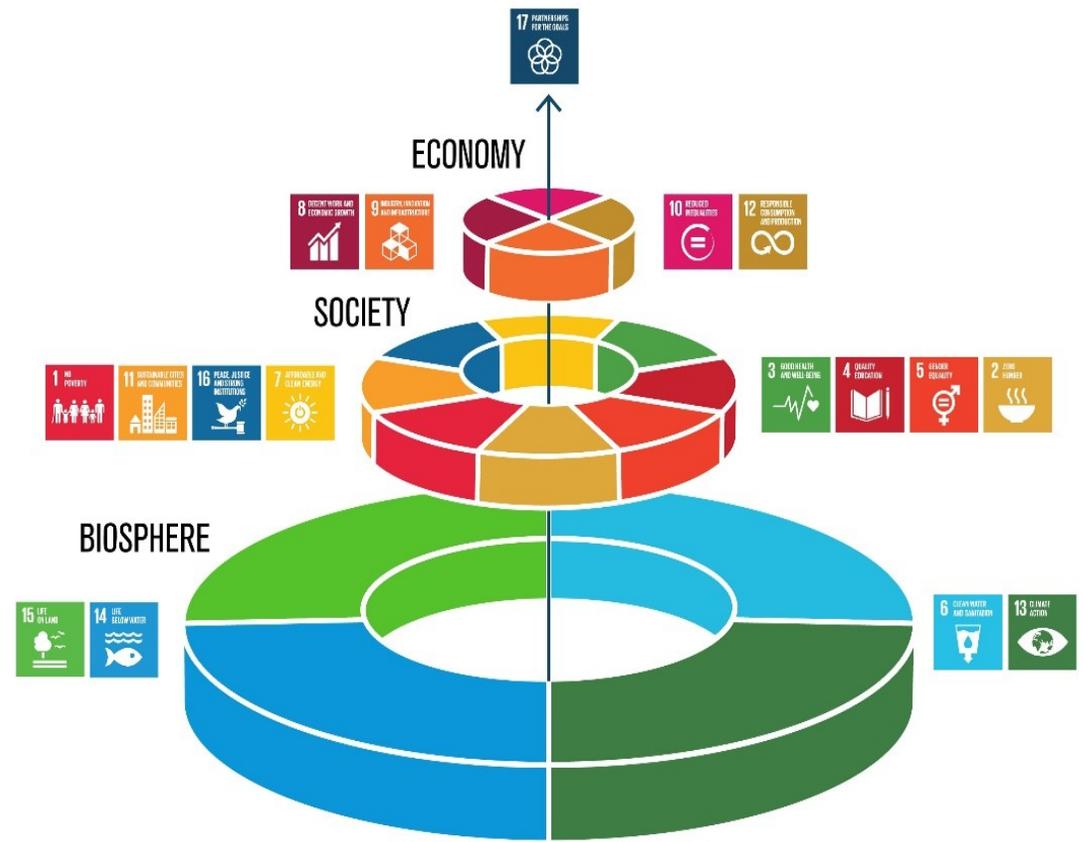
NICOLE 2019, [www.nicole.org](http://www.nicole.org)

*“Both public and private land owners strongly influence the quality, use and value of land, our planet is a common responsibility”*



Lady of the North  
Courtesy of The Land Trust, UK  
[www.northumberlandia.com](http://www.northumberlandia.com)

- LS is applicable to:
  - industrial land in use or brownfields,
  - diffusely degraded soils, nature, urban areas etc.
- LS is about natural capital and social and economic value that land brings to human wellbeing and welfare.
- LS offers tools for optimizing Land management by effectively visualizing:
  - The added overall value of investments to Land Owners;
  - The value of industrial use to society



Weddingcake SDGs  
Source: Stockholm resilience centre

*“Land stewardship is key in the transition towards a Circular Economy”*



# Key elements of Land Stewardship

- Stakeholder and community engagement beyond the fence
- Understand and visualize the natural and social values of Land for decision making and management
- Interdependency of land, society and economy
- Applicable along the full lifecycle; long-term horizon
  - Benefits of redeveloping derelict land
  - Enhancing the value and attractiveness of areas
  - Social and environmental benefits of use by industry
- There is not a single pathway to Land Stewardship; the route may vary in different regions and under different regulatory regimes



TERRA-project Belgium  
Courtesy of:  
Bekaert, Arcadis and ERM



“Xarxa de Custòdia del Territori” A network for land stewardship in Catalonia

- Options appraisal Sustainable Remediation
- Understand physical and time boundaries
- Checklist to understand options and opportunities
- Stepwise approach (SR approach)
  - Engage stakeholders
  - Agree options and indicators
  - LS: agree on valuation tools
  - Evaluating and recordkeeping
  - Communication

*“Land stewardship is a more mature way of looking at sustainability”*



**Risk-Informed and Sustainable Remediation**

Joint Position Statement by

**NICOLE and  
COMMON FORUM**

9 June 2013

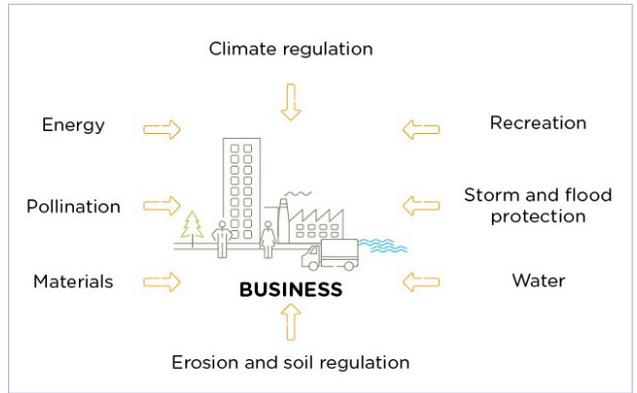
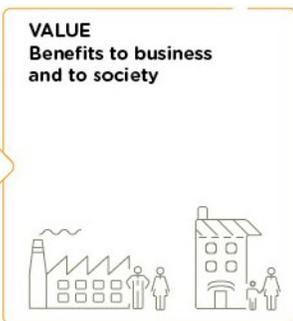
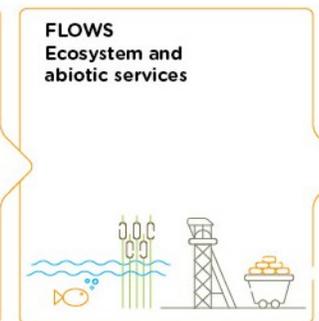
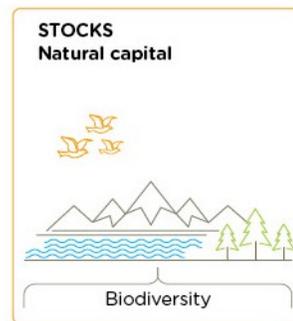


# Natural capital

➤ Elements of nature that generate value:

- Ecosystem
- Species
- Freshwater
- Minerals
- Clean air and water
- Capacity to produce goods and services

- Interdependency between business and natural capital
- Demonstrating Sustainable performance
- Valuation of all elements of natural capital
- Support long-term protection and sustainable use



Source: Natural Capital Coalition

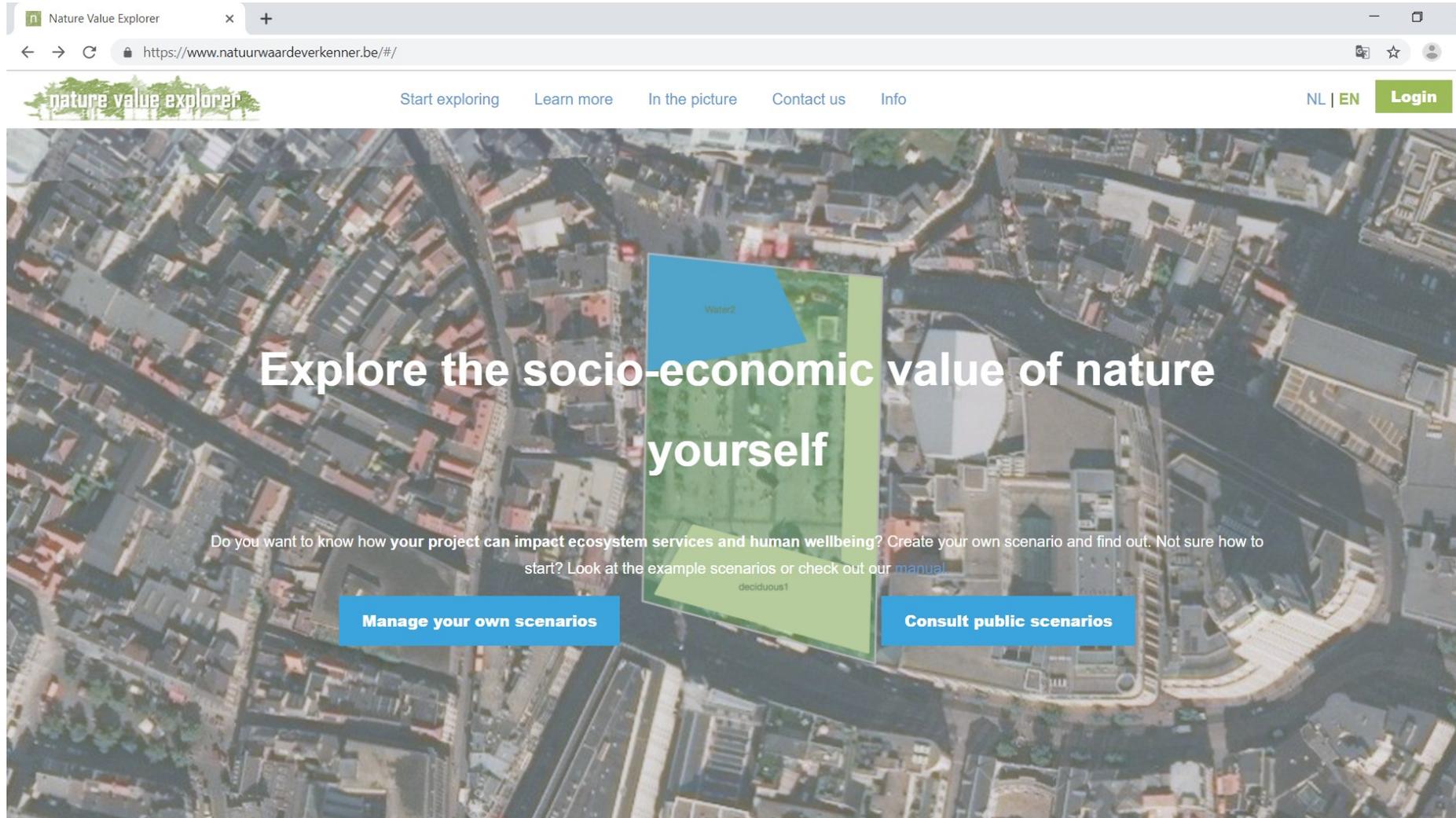


Source: PBL, WUR, CICES 2014

- Resources and relationships provided by people and society
- Value added by interactions between individuals, communities and organisations
- SC is part of an organisation’s ability to create value
- SC accounting, a variety of methods to measure impacts and dependencies
- SC accounting demonstrates the value of a company for the community



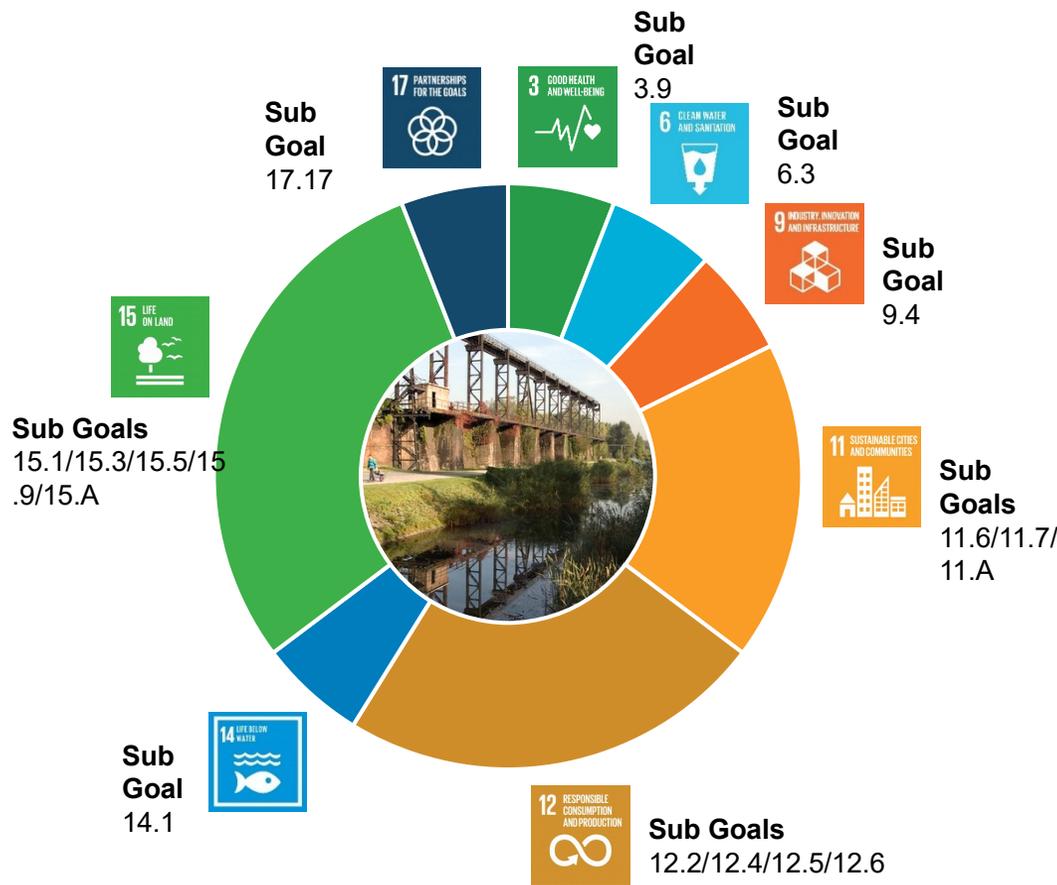
Case kindly provided by **ArcelorMittal** (taken from WBCSD Social Capital Protocol)



The screenshot shows the homepage of the Nature Value Explorer tool. The browser address bar displays the URL <https://www.natuurwaardeverkenner.be/#/>. The website header includes the logo, navigation links for "Start exploring", "Learn more", "In the picture", "Contact us", and "Info", and a language selector for "NL | EN" with a "Login" button. The main content area features a large aerial photograph of a city with a semi-transparent map overlay. The map overlay shows a green area labeled "deciduous1" and a blue area labeled "Water2". The main heading reads "Explore the socio-economic value of nature yourself". Below this, a paragraph asks: "Do you want to know how your project can impact ecosystem services and human wellbeing? Create your own scenario and find out. Not sure how to start? Look at the example scenarios or check out our [manual](#)". At the bottom of the main content area, there are two blue buttons: "Manage your own scenarios" and "Consult public scenarios".



# Linking LS to SDGs



### Goal 3: Good Health and Well-being

3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.

### Goal 6: Clean Water and Sanitation for All

6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

### Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation

9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities

### Goal 11: Sustainable Cities and Communities

11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.

11.A Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.



# Value and dilemmas of industrial sites



From landfill to nature reserve  
Case kindly provided by Solvay

- Industry responds to societal need for goods
- Brings welfare and employment

But....

- Industrial activity includes working under permits and possible impacts to the environment
- A balance between delivering value versus environmental protection and social impacts

Thus:

- Towards working with nature for remediation, temporary use for sports, nature etc.
- Redevelopment and value creation of derelict land and limiting the use of green fields



# The Booklet and ongoing work



- Released Booklet during Frankfurt NICOLE workshop June 21st 2018
  - Booklet is first reconnaissance and LS at early stage of development
  - 8 Case Studies
  - **Go and find it at the website [www.NICOLE.org](http://www.NICOLE.org)**
- Guidance or Road Map document
  - Questionnaire: “Why is LS of interest to the Industry?”
  - Development of a “Practical Guide to Land Stewardship”
- Promoting LS at Conferences and Workshops – Nicole, UN-FAO, Sustrem2018, Americana, AquaConsoil...

# Questionnaire: What is in it for a site manager?

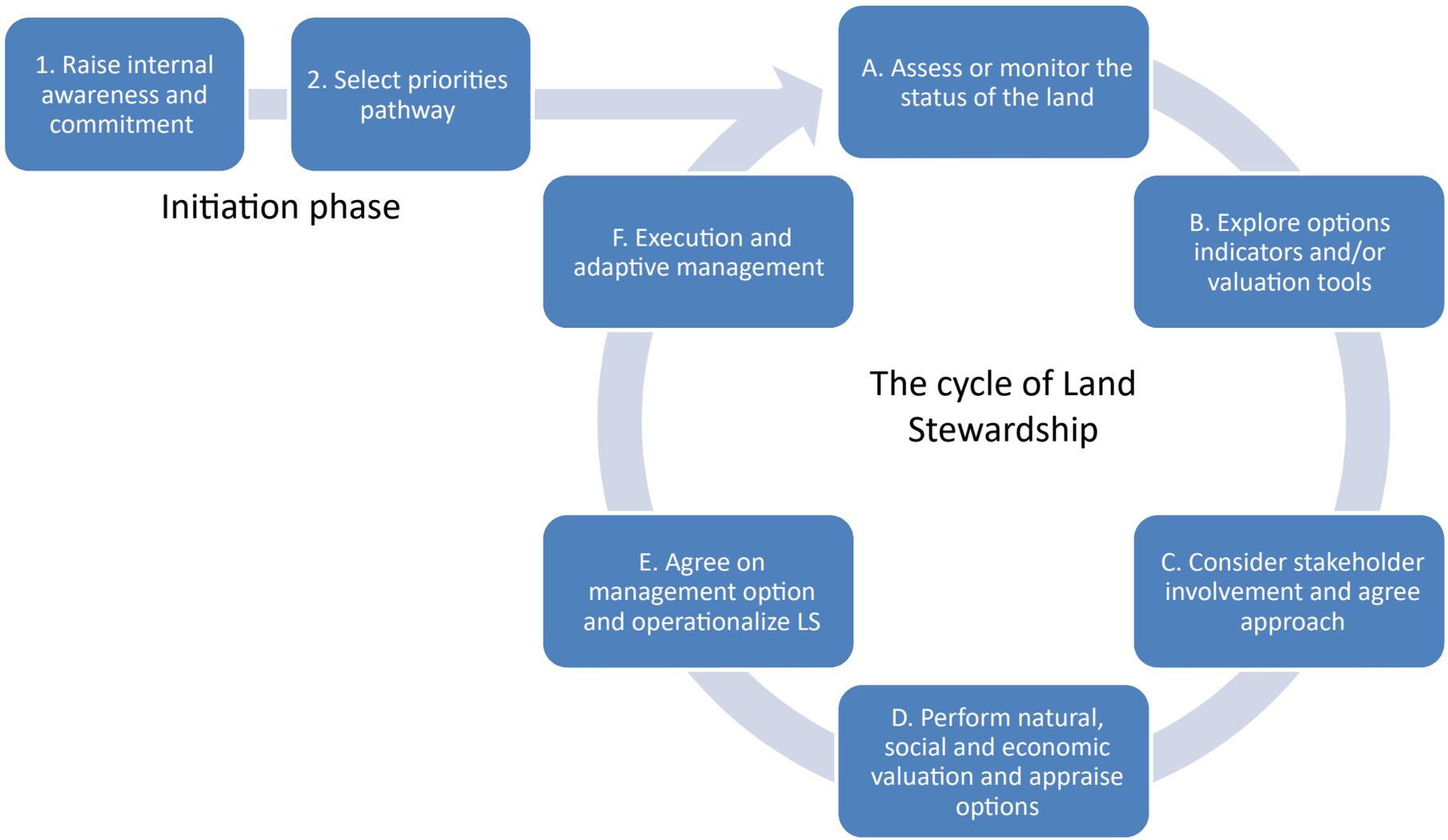
Adopting the concept of Land Stewardship also offers a great means for:

- Revealing the hidden values of the site (social importance, cohesion and welfare, temporary nature, etc.)
- Discussing the balance between impacts of industrial activity and the overall value and benefits with the community
- Decision making on optimizing the use and value of land, in times of operation, redevelopment or for remediation
- Strengthening the relationship with the neighbourhood community through communication on the broader values of the site





# Drafting a Quick guide or Road Map LS for NICOLE members



**1. Raise internal awareness and commitment**

Initiation phase

**2. Select priorities pathway**

The cycle of Land Stewardship

**A. Assess status of the land**

- 1. Land-use, quality soil, water, air, issues?
- 2. Sustainable Development Goals
- 3. Community relationship
- 4. Economic Performance (industrial/agricultural)

**B. Explore options and valuation tools**

- 1. Options re-development remediation land-use
- 2. Options for improvement
- 3. Explore toolkits valuation
- 4. Explore tools options selection

**C. Stakeholder Involvement**

- 1. Inventory and engagement
- 2. Exchange aims and dilemmas, awareness
- 3. Agree options and tools

**D. Determine Benefits and Impacts**

- 1. Determine Natural and social value
- 2. Impacts benefits activity
- 3. Visualize balance between investment vs value and benefits

**E. Agree Management option**

- 1. Stakeholder agreement preferred option
- 2. Evaluation, record-keeping
- 3. Contracts or declaration of intent
- 4. Communication and transition to LS

**F. Execution and adaptive management**

- 1. Design
- 2. Implement or execute
- 3. Operate
- 4. Evaluate
- 5. Adapt

## 1. Raise internal awareness and commitment

## 2. Select priorities pathway

### Initiation Phase: Awareness, commitment and priorities

**Objective:** The main objective of this first initializing step is to make the landowner aware of the benefits and importance of Land Stewardship and to make him decide to embrace the concept.

**Parties involved:** Land owner, possibly assisted by consultancy

**Explanation:** This step is a first exploration of the concept of Land Stewardship done solely within the organization of the Landowner, possibly assisted by his consultant. On headlines, it focusses on the consequences and benefits of Land Stewardship. What is there to be gained by the Land Owner? Based upon other examples of LS and generally available information like this guidance the Land Owner can decide to adopt the concept and start preparations. More motivation can be found in the fact that LS offers means to respond to requirements of Corporate Social Responsibility or Environmental and Social Governance.

**Literature:** NICOLE guidance & joint booklet

**Objective:** Taking the road of Land stewardship can be short and quick, or lengthy and in great detail. Dependent upon the size and setting the landowners is to decide how simple or extensive the implementation of LS should be. A first decision should be made on which tools and building blocks are useful.

**Explanation:** Depending on site specific conditions, determine suitable level of detail and define project objectives; facilitated by stepping stones. LS should also be applicable at smaller sites (fast & simple decision making), meaning that a fast track with only a few stepping stone to step can be chosen.

## A. Assess status of the land

1. Land-use, quality soil, water, air, issues?

2. Sustainable Development Goals

3. Community relationship

4. Economic Performance (industrial/agricultural)

## Stepping Stone A: Assess the status of the land

**Objective:** For the land owner to get a good overview of current environmental site conditions, sustainable and economic performance and relationship with its surroundings.

**Parties involved:** Site management/land owner, hired consultants or contractors

**Explanation:** Before any decision can be made upon the options that are possible for the further development of land or optimization of its value, it is crucial to have a good view on the current status of the land and its value. The output of this assessment highly determines the scope of remediation or redevelopment options, land use, investments and community acceptance. The assessment can amongst others comprise:

- Quality of soil, groundwater and water;
- Emissions to air, water and soil;
- Biodiversity and vitality of soil-groundwatersystem;
- Performance of Ecosystem services;
- Community perception;
- Etc.



One of the means to visualize the Sustainable performance of the site is the set of Sustainable Development goals, the SDGs. These are also monitored at a national, EU and global level. Looking at the economic performance of the site, this can be much broader than just the monetary profit, and can stretch as far as the contribution to welfare of the region.

**Literature:** Lombi, E., & Hamon, R. E. (2005). Remediation of polluted soils. Remediation of polluted soils Elsevier Ltd, Oxford, UK, 379-385.

<https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

## B. Explore options and tools

1. Options re-development remediation land-use

2. Options for improvement

3. Explore toolkits valuation

4. Explore tools options selection

## Stepping Stone B: Explore options and tools

**Objective:** Stepping stone B is non obligatory. It is meant for the landowners to get a better understanding of the possible options and tools for determining the consequences and benefits of LS. Again this is still an internal exercise before there is interaction with a wider stakeholder community.

**Parties involved:** Internal exercise before interacting with stakeholder community.

**Explanation:** In continuation of Step A, Step B utilizes the gathered information to determine redevelopment options and evaluates related tools for valuation and the selection of redevelopment scenarios:

Qualitative, using non-parametric or even narrative alternatives to metrics.

- Narrative analysis: the selection of a preferred option, from stakeholder discussions
- Ranking: evaluating alternatives as being “better”, “neutral” or “worse” for a specific indicator

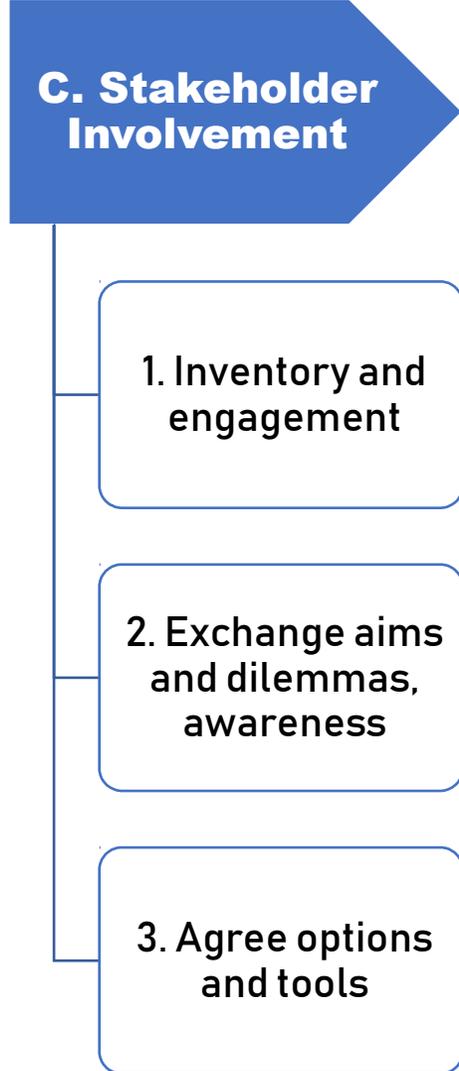
Semi quantitative, quantification of indicators or placing values and weightings on all options.

- Multi-criteria analysis, using weightings (stakeholder viewed importance for each sustainability indicator) and scores (relative performance per indicator) to evaluate each option.
- Pairwise comparison, using the weighing of benefits and burdens

Quantitative, requires metrics to be applied to the sustainable remediation indicators.

- Cost Benefit Analysis: calculations based on monetary values
- Life Cycle Assessment: the physical quantification of each unit that is produced
- Environmental Footprint Analysis: comparing the aggregate environmental footprint per option

**Literature:** ISO 18504:2017 International Standard 1<sup>st</sup> Edition. *Soil quality — Sustainable remediation*



## Stepping Stone C: Involving essential stakeholders

**Objective:** Stakeholder involvement is crucial for creating support for future decisions and often essential for strengthening the relationship with communities within close proximity of the site. This step encompasses the identification of external stakeholders that are needed for the decision-making, and consequently agree with them on the starting points of the assessment, in order to create maximum support.

**Parties involved:** Land owner management, project staff, external stakeholders.

**Explanation:** This step encompasses stakeholder identification and promotes open communication to reach an agreement on the aspects of project option evaluation. By creating opportunities for exchanging aims and dilemmas and keeping stakeholders informed and engaged in the decision making progress, potential causes of discontent during later stages of project finalization are limited.

Tools facilitate active stakeholder participation and provide frequent updates on project progress:

- Community Participation Working Groups (CPWGs)/workshops, supported by staff and technical experts from project management
- Roundtable discussions
- Speakers providing presentations on project options and progress
- Annual/monthly summary, presenting redevelopment progress and relevant materials
- Fact sheets, websites, electronic newsletters

**Literature:** Bartsch, C. (2003). Community involvement in brownfield redevelopment. Northeast-Midwest Institute.

## D. Benefits and impacts, valuation

1. Determine Natural and social value

2. Impacts benefits activity

3. Visualize balance between impacts vs value and benefits

## Stepping Stone D: Determine impacts and benefits of options, including natural, social and economic value

**Objective:** The key feature that distinguishes the Land Stewardship ethic from previous soil remediation- or regeneration principles is the recognition of natural and social value. In this step the objective is to assess the benefits and impacts of the options, including natural and social value by using appropriate indicators and valuation toolkits.

**Parties involved:** Land owner management, project staff, environmental consultants.

**Explanation:** Enabling the later selection of the preferred redevelopment option, indicators for benefits and impacts are determined (guided by the Sustainable Development Goal framework). Tools serve to provide a clear overview of each options' viability to reach the established targets of the redevelopment. Option viability can be evaluated based on the previously mentioned tools and agreement of starting points of the assessment between stakeholders and project management. Additionally it can be considered to take the SDGs into account, which enables a benchmarking against national and international sustainable development.

### Literature:

- Natural Capital valuation tools: Natural Capital Protocol, Natuurwaardeverkenner (VITO)
- Social Capital valuation tools: Social Capital Initiative (the World Bank)
- Brown, G. (2013). The relationship between social values for ecosystem services and global land cover: an empirical analysis. *Ecosystem Services*, 5, 58-68.
- ISO 18504
- SuRF-UK framework

## E. Agree Management option

1. Stakeholder agreement preferred option
2. Evaluation, record-keeping
3. Contracts or declaration of intent
4. Communication and transition to LS

### Stepping Stone E: Selection of the preferential option

**Objective:** Weighing the redevelopment options based on the overview of impacts and benefits, selecting the preferred redevelopment or management option and providing a key understanding of the motivations to stakeholders.

**Parties involved:** Preparations include internal management with consultants, subsequently external contractors are involved.

**Explanation:** This section of the framework represents the final stage of the decision making process prior to project implementation and execution. Providing an understanding of the evaluation/scoring process of each option and related risk level is key. If deemed necessary for the selected redevelopment option, contracts can be drawn up with outside parties. The step is finalized by clearly and understandably communicating the selected remediation option including motivations with all involved stakeholders. Possibly explain the rejection of alternative scenarios containing less optimal indicators, risks or time-frames, supported by stakeholder input in previous phases of the framework.

**Literature:**  
ISO 18504:2017 International Standard 1st Edition. Soil quality – Sustainable remediation

## F. Execution and adaptive management

1. Design

2.  
Implement  
or execute

3. Operate

4. Evaluate

5. Adapt

## Stepping Stone F: Planning, executing and evaluating the preferred land management option

**Objective:** This step addresses preparations for the physical implementation of the selected remediation and redevelopment option. Preparations may include landscape- and remediation planning. The final step in the adoption of land stewardship is evaluating the management process throughout the framework and utilizing the gained information for improving said management.

**Parties involved:** Internal management, remediation contractors

**Explanation:** This step encompasses the design of the selected redevelopment option and land use transition, shaped by the potential remediation actions based on site specific conditions. Exchange of stakeholder wishes and expectations in previous steps serves to complement landscape architecture and planning. In addition, strategic design of landscape features provides opportunities for creatively using existing assets or materials on the site that may have hindered earlier redevelopment efforts.

Monitoring project performance provides indicators and feedback for evaluation and the potential adaptation of initial management decision making. Adaptive management serves to improve current approaches by learning from the results from the finalized redevelopment project. Additionally, the adaptive approach serves as a strategy for addressing project uncertainties. In case unsatisfactory effects appear, alternative options can be explored to meet management objectives. In addition, approaches can be readjusted in case initial conditions have changed or new stakeholders become involved.

**Literature:** Brown, G. (2013). The relationship between social values for ecosystem services and global land cover: an empirical analysis. *Ecosystem Services*, 5, 58-68.



# NICOLE

Network for Industrially Contaminated Land in Europe



Thank you!

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group Land Stewardship