

Providing new life to waste: cleaning of leachates and recycling industrial materials in wetland construction

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Introduction:

Constructed wetlands, CW, are becoming more and more popular as a wastewater treatment option for small municipalities, and have also been proposed as leachate treatment alternative for horticultural sector throughout the CLEANLEACH project. Life Cycle thinking, focusing on waste recovery (the use of demolition waste as a substrate and the use of brewery effluent as carbon source), has been applied in the design of the product in order to assure a more sustainable technique.

Objectives:

- To perform LCA of commercial CW used as leachate treatment system in the Nursery sector.
- To test different alternatives of waste reutilization.
- To provide advice for further improvements

Material and methods:

Location: Nursery Sala Graupera. Sant Andreu de Llavaneres (Catalunya, Spain). In an area of 920 m², where ornamental plants were grown.

Attributional LCA, classified as a C1 situation

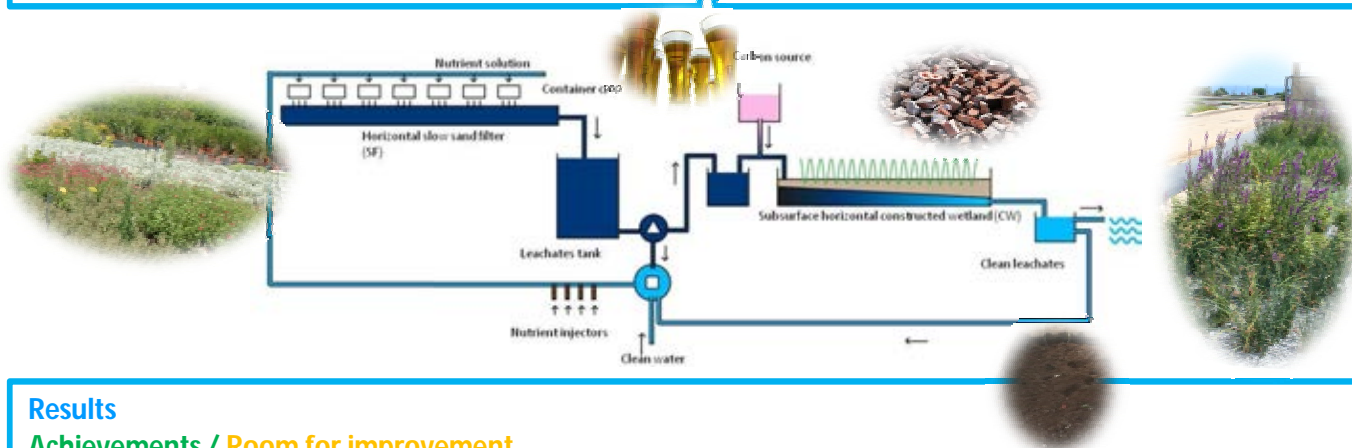
System boundaries: Infrastructure and management of the systems embracing leachate treatment plant. Crop management and crop commercialization were excluded of the assessment.

Functional unit: ha of crop.

Data: Primary data from commercial nursery and Secondary data ecoinvent database v3.1

Impact model categories: ILCD 2011 v1.06/EU27 2010

Software: SIMAPRO 8.0.5.13



Results

Achievements / Room for improvement

Improvement	Removal of leachates	Reduction water consumption	Improvement land use (biodiversity)	Reduction natural resources use	Reduction fertilizer consumption	Waste reutilization (transport distances)	Substitution plastic materials
10 %							
25 %							
50 %							
75 %							
100 %							

Conclusions:

LCA has demonstrated that the cleanleach approach contributed significantly to the reduction of resources and improvement of environmental impacts.

The importance of management factors in circular economies.

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Mainstreaming Life Cycle Management for sustainable value creation