Circular Grass Initiative - Executive Summary

Problem statement

Circular economy, or the cyclical use of resources, is promoted for its potential contributions towards sustainable development. One of the biggest obstacles for gaining political and societal support for circular economy initiatives is the difficulty in monitoring and communicating their impacts. In the existing literature, there is a lack of consensus about the best way to approach the assessment of circular economy initiatives. Therefore, the research aimed to contribute to a better understanding on how to assess potential impacts, successes and barriers related to circular economy through the assessment of a case study[i] in the Amsterdam Metropolitan Area (AMA), the Circular Grass Initiative (CGI). The CGI was initiated in early 2018 with the purpose of increasing the value and circularity of residual grass in the AMA. Furthermore, by understanding these assessment components in the CGI, this research intended to contribute to the efficacy of future assessments of circular economy initiatives in the AMA.

Therefore, the following main research question has been proposed:

What are the potential impacts of the "Circular Grass Initiative" in the AMA and what can be done to support the implementation of the initiative?

As well as the following sub-questions to steer the main research question:

1. *What are the potential impacts of a successful Circular Grass Initiative on grass biomass valuation, environment and employment in the AMA?*
2. *What are barriers impeding the implementation of the Circular Grass Initiative?*
3. *How can the role of the Amsterdam Economic Board evolve to support the progression of Circular Grass Initiative?*

Methods

For this research, different methods were used. In the first stage of the research, interviews were conducted and open access data was analyzed. The resulting information was used to identify possible alternative business cases within the CGI, including grass-based insulation material, composite panels and potting soil. In addition, the interviews helped to identify relevant subsystems for assessing potential impacts of the business cases compared to the baseline scenario of grass composting as well as barriers inhibiting the business cases. In the second stage of this research, a multi-criteria analysis (MCA) was

conducted. The MCA made it possible to compare the different business-cases, as defined in the first stage, to the current way of processing grass waste in the AMA (i.e. the baseline scenario). In order to make this comparison, both the different business-cases and the baseline scenario were rated according to different criteria in their corresponding subsystems.

Main results

Based on the integration of the four subsystems in the multi-criteria analysis, all of the alternative cases offer some level of improvement to the baseline scenario (Table 1). However, the benefits of the insulation material and composite panels are significantly higher than the application of grass fibers to potting soil in every sub-system. For example, in the environmental subsystem, the benefits of insulation material and composite panels are the same (Table 2). Moreover, the potting soil case obtained a negative score in the economic subsystem due to its unclarity in terms of economic feasibility. For composite panels and potting soil technology is the most limiting barrier, while the conservative culture in the building sector provides the most limiting barrier for insulation material. Thus, it can be claimed that, based on the criteria developed through the research process, using grass residuals for the fabrication of insulation material or composite panels stand to offer greater benefits to the AMA than the baseline scenario.

Table 1: Final results from the multi-criteria analysis integrating all subsystems for each business case. The colors correspond to the best option(s) (green- large improvement, yellow- moderate improvement, orange- no significant change)

	Insulation material	Composite panels	Potting soil
Environmental Subsystem	+1.4	+1.1	+0.9
Economic Subsystem	+0.2	+0.2	-0.4
Employment Subsystem	+1.6	+1.6	+0.6
Barrier subsystem	-1.3	-1.5	-1.5
Final Score	+1.9	+1.4	+0.4

Table 2: Results Environmental subsystem. The colors represent the rating of each business case to the baseline scenario in regards to each criteria (green- large improvement, yellow- moderate improvement, orange- no significant change).

Sustainability criteria	Insulation Material	Composite Panels	Potting Soil
1. Position in biomass sustainability pyramid	++ Multiple levels up	++ Multiple levels up	++ Multiple levels up
2. Level of Circularity (10 R's)	+ One level up, prevention of raw material use and increased circularity	+ One level up, prevention of raw material use and increased circularity	+ One level up, prevention of raw material use and increased circularity
3. Impact on CO_2-eq	++ Strong reduction CO_2 emissions	++ Strong reduction CO_2 emissions	+/- No changes in CO_2 emissions
4. Impact on water use	+/- No changes in water use	+/- No changes in water use	+ Reduction in water use

[i] Case study by Copernicus Institute of Sustainable Development – Utrecht University