

Nutrient Recovery from Waste: Identifying the path to responsible innovation



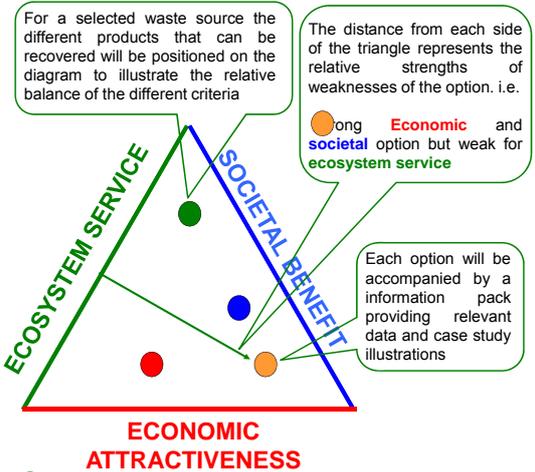
Ambitions of the Project

The ambition to view waste streams as a **resource** rather than a pollutant is increasingly evident. Successful illustration can be found with the continual progress being made in terms of biogas production from waste where output has increased from 392 GWh.year⁻¹ in 2005 to around 880 GWh.year⁻¹ today. However, under utilisation of waste streams in relation to **NUTRIENTS** remains significant and thus provides a timely opportunity to engender a paradigm shift towards a more resource efficient future.

Recent technological innovations enable recovery of nutrients through a variety of pathways based around biological (algae, coppice), chemical (adsorption onto waste materials, struvite) or physical (ion exchange) processes. Each option exhibits a unique balance between **ECONOMIC ATTRACTIVENESS** (effort required to make the product), **SOCIETAL BENEFIT** (human health, product receptivity and perception) and **ECOSYSTEM SERVICE** (bioavailability, plant uptake, biodiversity). Consequently, a more strategic vision is required to understand the paths to responsible innovation in the sector and engender the adaptive capacity required for a resource efficient future.

The overall aim of this project is to develop a prioritisation tool that informs the selection of the **APPROPRIATE** (fit for purpose) nutrient recovery routes.

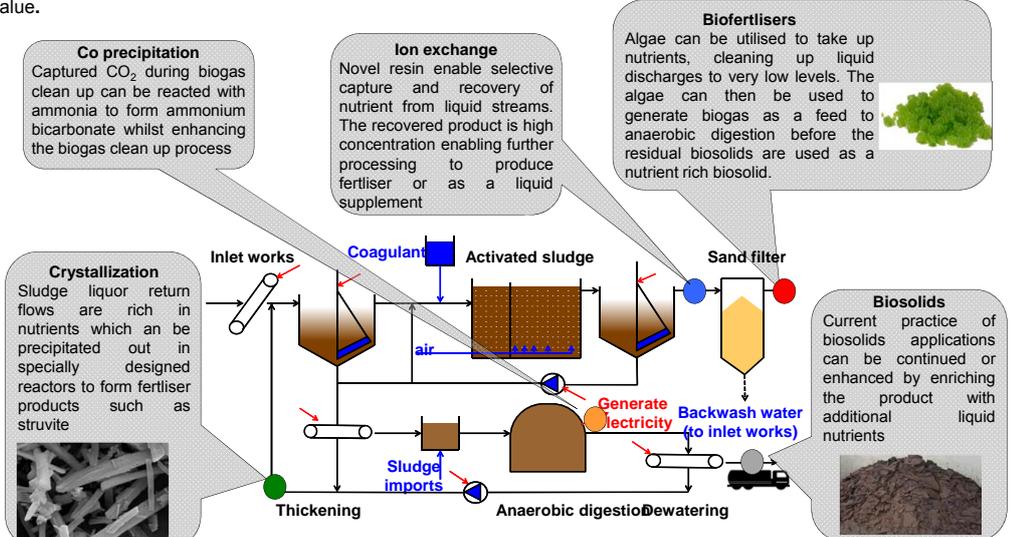
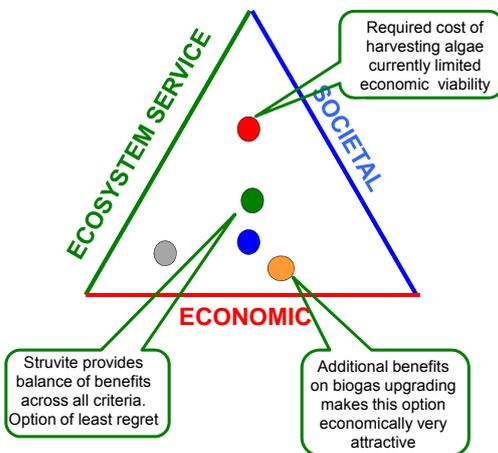
The output will be an open access tool that explores the trade offs between the three key criteria (economic, societal and ecosystem service) to enable informed structured discussion and support decision making at both a strategic and individual case study basis.



An illustrative case study: nutrient recovery from wastewater

A typical large sewage works enables recovery of nutrients from a variety of positions within the treatment train enabling the generation of a range of products from **highly processed crystal nutrients**, **high concentration liquid nutrients**, nutrient rich sludge and **bio fertiliser** such as **algae**. All require different levels of processes and generate a different profile of economic, societal, human health and ecosystem service value.

Output from the decision support tool
An illustration of the visualization of the different possible products that can be recovered from municipal wastewater demonstrates the types of options available.



What's next?

The project team are currently preparing the full proposal. As part of this the team is planning a series of workshops with different stakeholders from the different waste sectors to listen and learn. The feedback will form a critical part of shaping the full proposal ensuring the developed tool reflects stakeholder preferences and delivers the required support to guide responsible innovation in a style that is helping and engaging.

The workshops are due to be held in September at the **Burlington Hotel in Birmingham** with a day focused on the food, water and waste sectors. Each will contain a couple of informative talks followed by an open discussion. All are welcome so please register your interest.

 To express your interest to be involved, help shape the tool or generally be kept informed please register with Sam Colling:
E-mail: s.colling@cranfield.ac.uk

Want to get involved?
Levels of engagement

ACTIVE: Keen to provide case study data and/or shaping development of project

ENGAGED: Keen to be involved in the discussion to help shape the success of the tool and help actively promote nutrient recovery

INFORMED: Want to be kept informed and have access to the tool and its findings

Link to Cranfield.ac.uk school of applied science

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