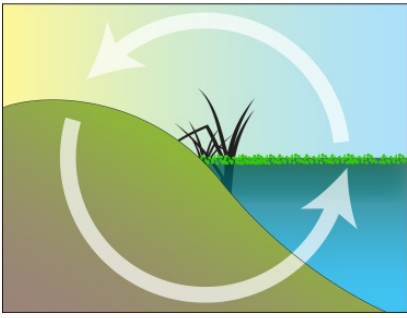


# ReBALAN:CE Recycling Biomass to Agricultural LAND: Capitalising on Eutrophication



We are building an interdisciplinary team of experts from across academic, policy and stakeholder organisations in order to prioritise and plan a response to the pressing science needs associated with resource recovery from waste. Specifically, we are exploring nutrient recovery from aquatic plant and algal biomass (AP&AB) production in nutrient enriched waters. Central to our project is the integration of economic, social, environmental and health-related dimensions that cut across traditional academic disciplines. Thus, **the overall aim of this project is to**

**facilitate the exchange of knowledge across the disciplinary boundaries of biology, soil and water science, microbiology, human behaviour, risk perception, waste management, economics and catchment management. In turn, we will develop a comprehensive, holistic and targeted programme of research to 'close the loop' on nutrient transfer from land to water.** This will be underpinned by quantifying the risks, opportunities and multiple benefits of recycling excessive AP&AB back to agricultural land.

The ReBALAN:CE project therefore, provides a unique opportunity to bring together a genuinely multidisciplinary team to explore AP&AB harvesting for nutrient recovery (under both natural and seed & cultivate conditions). Our first work-package (WP) is our current catalyst grant, which will provide an extensive critical literature review and highlight key opportunities linked to AP&AB recycling in agroecosystems. We anticipate subsequent WPs for our emerging research programme to include:

## WP2: Evaluating the potential for natural harvesting and seeding/cultivation of AP&AB in eutrophic waters

*A scoping and experimental assessment of the potential for plants and algae to sequester nutrients and other contaminants transferred from the terrestrial environment.*

## WP3: Assessing ecosystem disturbance versus potential for restoration ecology

*Field investigations using case study sites to explore the balance between potential environmental trade-offs from AP&AB harvesting against win-win scenarios of wider ecological restoration of impacted waterbodies.*

## WP4: Resource recovery from waste: (i) optimising nutrient & energy recovery through processing; & (ii) reapplication of material to land and implications for human health

*A series of experiments to: (i) evaluate the role of composting and anaerobic digestion of AP&AB; (ii) understand better the potential for AP&AB biochar and ash products in sustainable agriculture; and (iii) assess the potential of AP&AB for biofuel processing. We will also explore the implications for reapplication of processed AP&AB with regard to pathogen recycling through agroecosystems.*

## WP5: Ecosystem services and life-cycle assessment

*Aligning with WP6 this component of the research programme will embed an ecosystem services approach into ReBALAN:CE to ensure that the advantages of AP&AB harvesting are not solely quantified by cost alone and also account for improvements to recreational opportunities, environmental aesthetics, carbon sequestration and bioenergy production.*

## WP6: Economic viability and scaling-up

*Critical to the project is a cost:benefit analysis of the AP&AB harvesting process and an assessment of the opportunity for scaling up this resource recovery process across not only the UK but nations where rapid economic development and intensive use of water resources is impacting on the environment.*

## WP7: Stakeholder and end-user acceptance and uptake

*The experimental and field-based assessments will be anchored around stakeholder requirements and preferences that recognise not only issues of nutrient recovery effectiveness but also practicality and social acceptability. This WP will also align closely with WP6 to integrate direct (and indirect) economic benefits.*

## WP8: Translation of science to policy

*A dissemination WP to co-ordinate stakeholder engagement workshops to yield significant benefits to the research programme offering, and provide a clear pathway to integrate KE on resource recovery from waste in the UK context.*

For more information about the project or to register interest please visit [www.rebalance.stir.ac.uk](http://www.rebalance.stir.ac.uk) or contact Dr David Oliver ([david.oliver@stir.ac.uk](mailto:david.oliver@stir.ac.uk))