

# case study

## Biofuel from duckweed

### Converting wastewater weeds into low carbon fuel

#### Project Summary

**Problem:** despite the need to establish a greater understanding of suitable plants for second generation biofuels relatively little attention has been paid to the potential of duckweeds. Duckweeds are common on waste water ponds associated with farms and food processing facilities, especially poultry production and are treated as a waste product.

**Solution:** to investigate the use of duckweed to treat wastewater and, given its rapid growth rates, examine the suitability for the conversion of biomass to biofuels.

#### Partnership

- University of East Anglia, 5 rated School of Biological Sciences and 5\*\* rated School of Environmental Sciences
- Banham Poultry Ltd, a company in Attleborough, Norfolk: Two sites currently produce nearly 400 million litres of nitrate-rich wastewater per year, which naturally sustains high growth of duckweed.

#### Inspiration

Poultry farms and processing plants generate millions of litres of wastewater that can support the growth of duckweed. Instead of having to expend energy to wastefully remove the weed, which often grows naturally on the wastewater, the Duckweed Bioalcohol project aims to exploit the high levels of weed biomass by converting it into bioalcohol, a vehicle fuel. In addition, by enhancing duckweed growth the project will reduce levels of inorganic contaminants in the water, particularly nitrate and phosphate.

The carbon in liquid biofuels originates from carbon dioxide in the atmosphere that is captured by growing plants via photosynthesis. Hence the CO<sub>2</sub> emissions from biofuels effectively recycle atmospheric CO<sub>2</sub> on a short-term cycle. In contrast to the combustion of fossil fuels, net CO<sub>2</sub> emissions to the atmosphere are greatly reduced.

#### Innovation

This 12-month demonstration project aims to boost use of biomass-derived bioalcohol as a vehicle fuel by:

- showing the feasibility of the duckweed-to-bioalcohol process
- encouraging the use of duckweed to treat wastewater and then turn the duckweed into bio-alcohol. The process both improves the quality of the wastewater and generates a viable alternative to more traditional fossil fuels

#### Development

This demonstration project will have minimal short-term impact on net CO<sub>2</sub> emissions. Given, however, the enormous interest in energy crops, there is very significant potential for carbon saving. For example, using fewer than 15 hectares to grow duckweed for bioalcohol would reduce anthropogenic climate change by saving the equivalent of a typical household's annual carbon emission.

