Rod Wilson

University of Exeter

@SAGB

Shellfish Association of Great Britain

THE CROWN ESTATE

Llywodraeth Cymru Welsh Government

Department for Environment Food & Rural Affairs

The FISHMONGERS' Company's FISHERIES CHARITABLE TRUST

SEPAmatic

Infrastructure and Environment

Crown Estate Scotland Oighreachd a' Chrùin Alba

seafish

Marine Management Organisation

UK Sustainable King Prawn Project (UKSKPP)

Prof. Rod Wilson

LONG TITLE: Transformational blueprint for a blue economy on UK terrestrial farms: integrating sustainable king prawn (shrimp) production in a changing agricultural landscape (BB/W018039/1 - £2.47M FEC)

University of Exeter
University of Reading
ROTHAMSTED RESEARCH
UKRI Biotechnology and Biological Sciences Research Council
TRANSFORMING UK FOOD SYSTEMS Strategic Priorities Fund

£319M p.a UK retail value imported

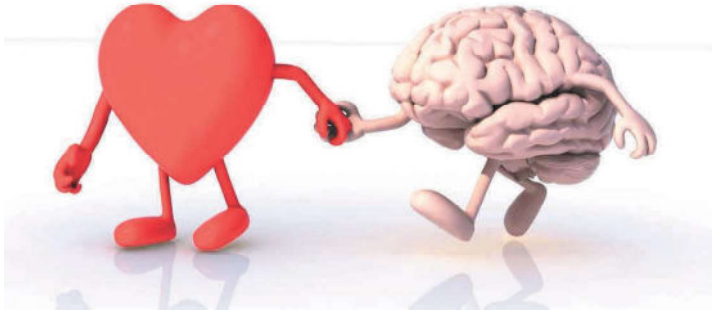
Popular, healthy seafood in UK:

High in protein

Low in fat and calories

Rich in vitamins, minerals & antioxidants

Promoting brain and heart health



£319M p.a UK retail value imported

Removing Mangrove = Removing Benefits:

Coastal Protection
Best CO_2 removal ecosystem on the planet
Nursery habitat for many marine species
Preventing saline intrusion to agricultural land

Other Cons of Outdoor Pond Culture:

Vulnerable to Weather/Storms/Predators
Pesticide Use; Antibiotic Use
Open to diseases (in and out)

Recirculating Aquaculture Systems (RAS)

Advantages:

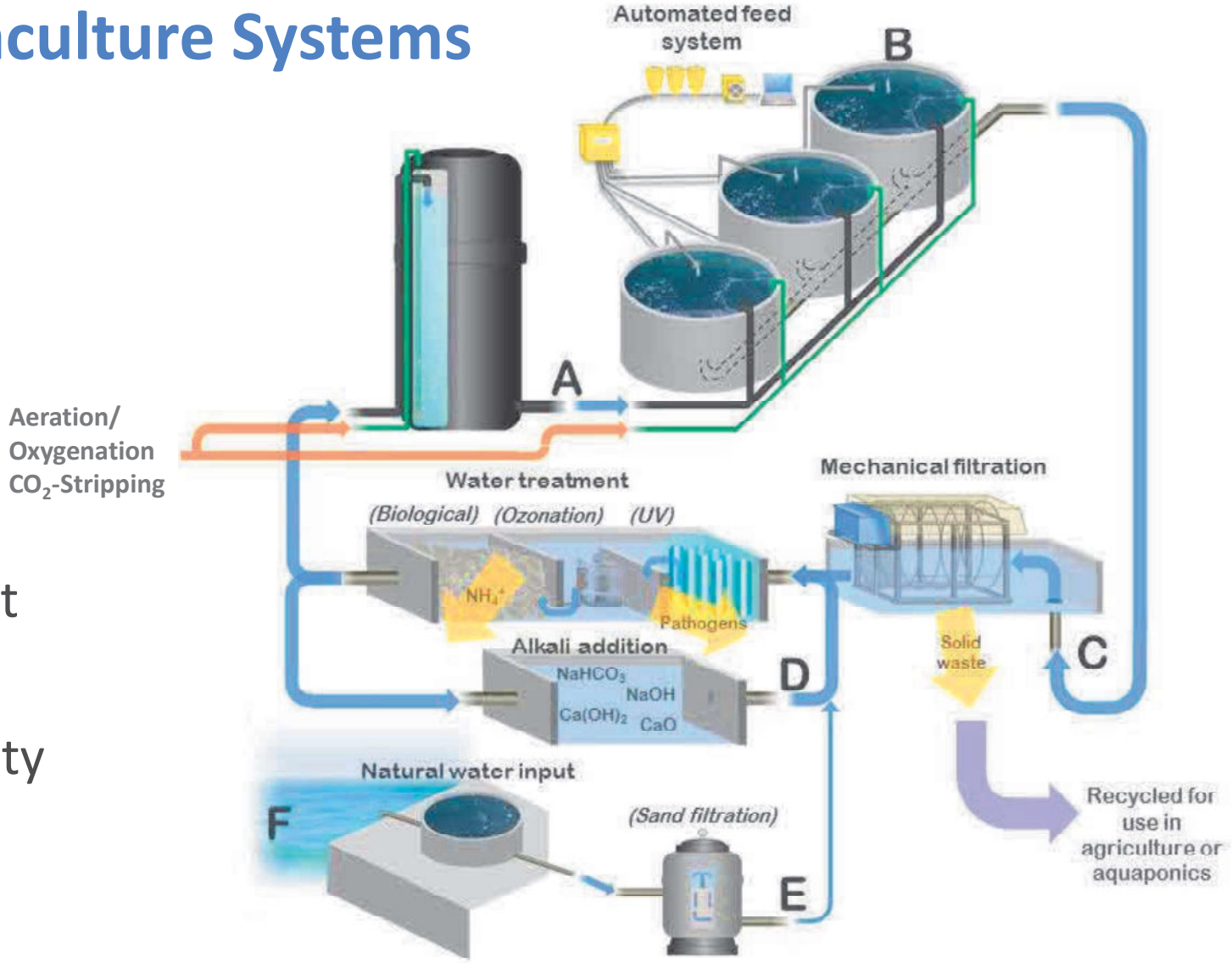
↓ Water use

↓ Environmental impact

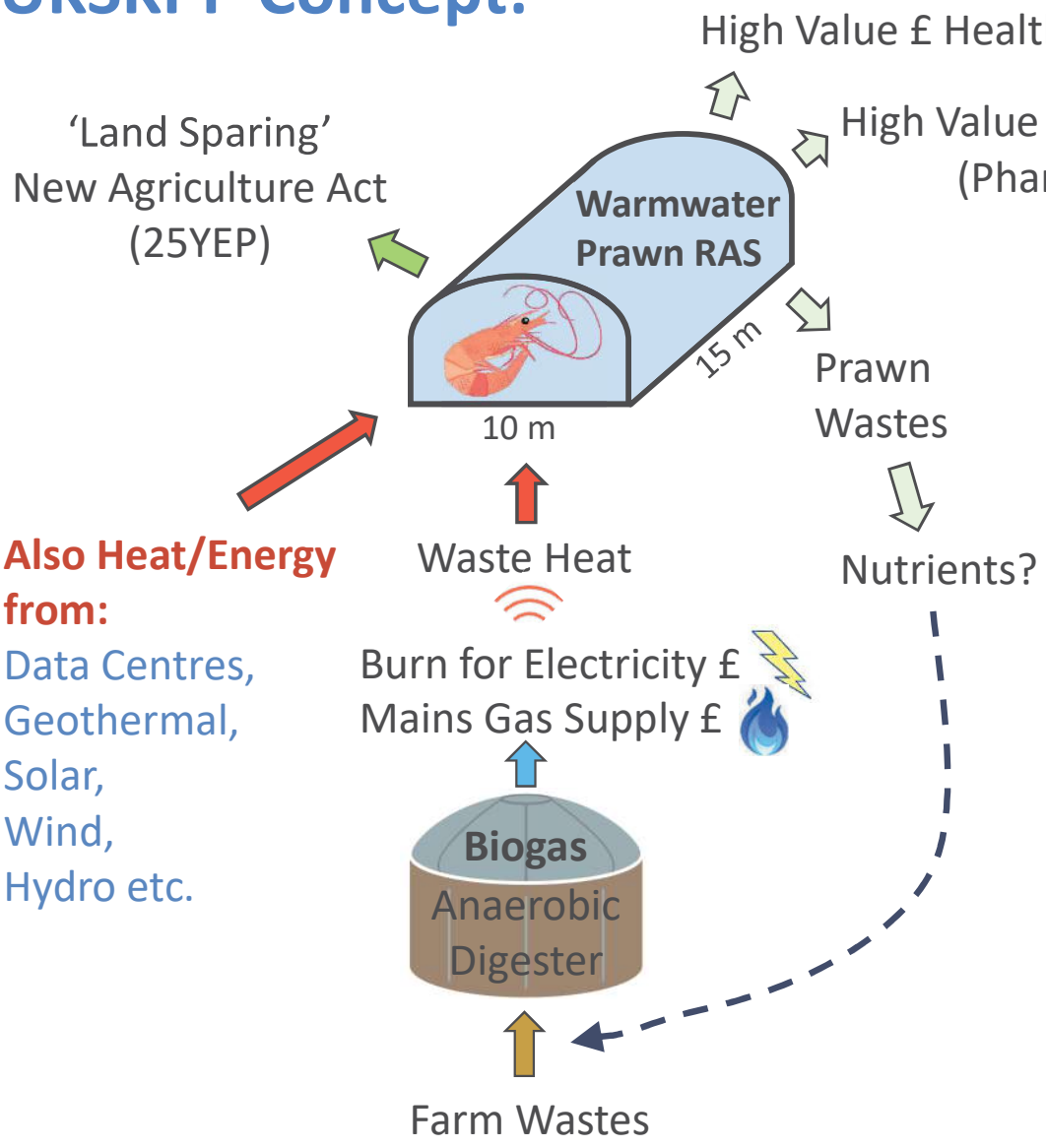
↑ Biosecurity

↑ Environmental Stability

> Locations



UKSKPP Concept:



Project Partners:

Renewable Energy

Ixora Energy
Making AD work for you

Seafood Retailers & Suppliers

Sainsbury's

LYONS SEAFOODS

Aquaculture/Nutrition

Cargill

RASTECH
Technology for Sustainable Aquaculture

FloGroFresh

THREE-SIXTY
AQUACULTURE

Scoping for UK Hatchery

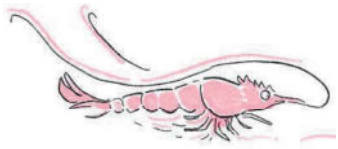
Cefas

PML Applications Ltd

ocean conservation trust

GW4 Water Security Alliance

4 Work Packages



WP1 - Two spatially explicit models:

1) **Economics of Prawn RAS + Farm AD**
2) **Ecosystem Services value ('Public Goods').**

WP2 - Optimise RAS environment & diet for prawn production, nutrition quality, chitosan; Develop water chemistry sensors (e.g. Ca^{2+})

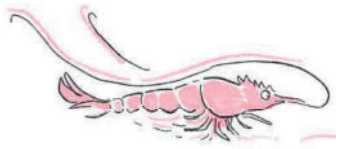
WP3: Demonstrator Farm Site
- for indoor prawn RAS
& circularity of waste streams

WP4 - Business Case for future UK Hatchery / R&D / Outreach / Workforce Training

WP1: Economic & Environmental Modelling







UoE - Prof Ian Bateman OBE, Dr Thiago Morello
UoR - Dr Yiorgos Gadanakis, Dr Jorge Campos-González

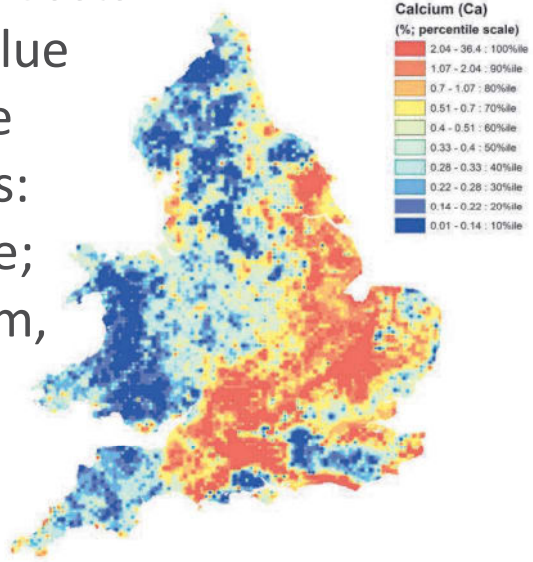
Sainsbury's LYONS SEAFOODS Ixora Energy Making AD work for you

WP1 - Two spatially explicit models:

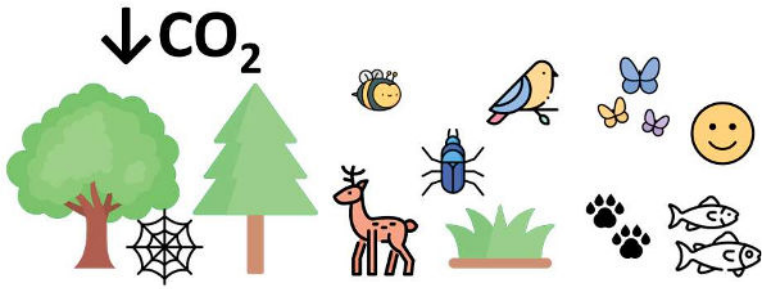
1) **Economics of Prawn RAS + Farm AD**
2) **Ecosystem Services value**

1) Model influences of:

- Capital & Operational Costs
- King prawn market value
- Chitosan market value
- Geospatial differences:
  e.g. existing crop value;
  e.g. local water calcium, alkalinity etc.



2) The new Agriculture Act, 25YEP
(Public Money for Public Goods)



Land-sparing for: ↑ biodiversity, ↑ recreation
↓ CO_2 (Reforestation),
↓ Water pollution, ↓ Flood risk
Boost circularity of food production & farm-based renewable energy sector

WP2 – Optimising RAS

Project Partners:

Cargill (Aquaculture Nutrition Co.)

RAStech (Aquaculture R&D)

FloGro Systems; 360 Aqua,

GW4 Environmental Sensors Group


Rob Ellis


Trystan Sanders


Kat Clayton


Alexis Perry


Owaen Guppy


Nick Smirnoff


Mike Allen

RASTECH Technology for Sustainable Aquaculture

Cargill

AIMS:

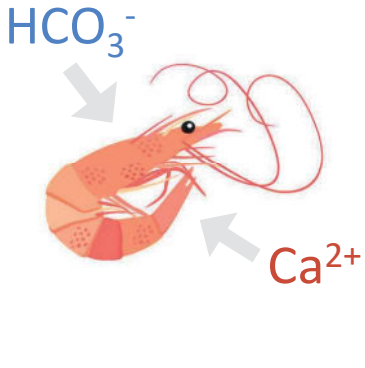
Optimise water chemistry in RAS for prawn health, production, nutritional value/taste, & chitosan (£).

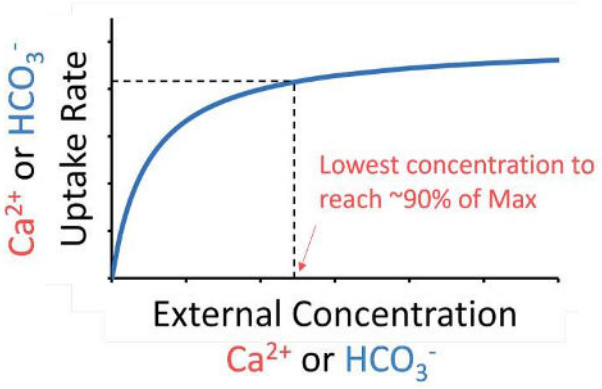
Focus on moulting ('weakest link'):

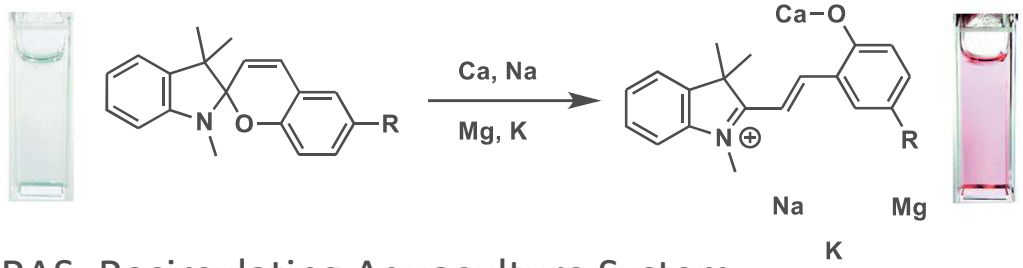
Calcium, Alkalinity, Salinity, CO_2

Diet - focus on novel antioxidants

Automation of water chemistry management – Developing novel sensors (e.g. for calcium)



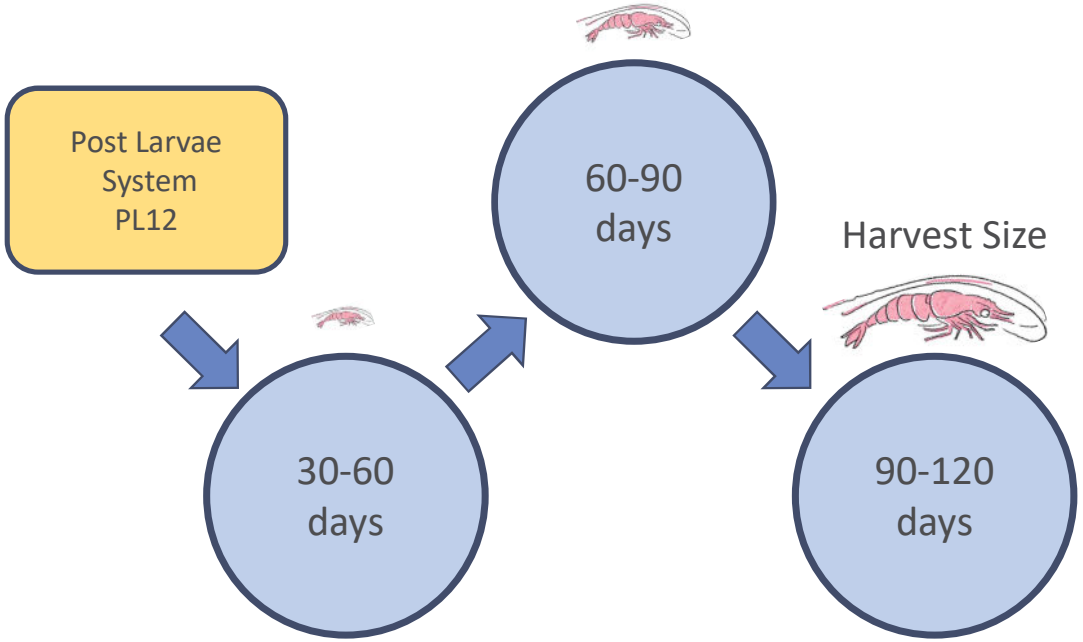




*RAS=Recirculating Aquaculture System

WP3: King Prawn RAS Demonstrator

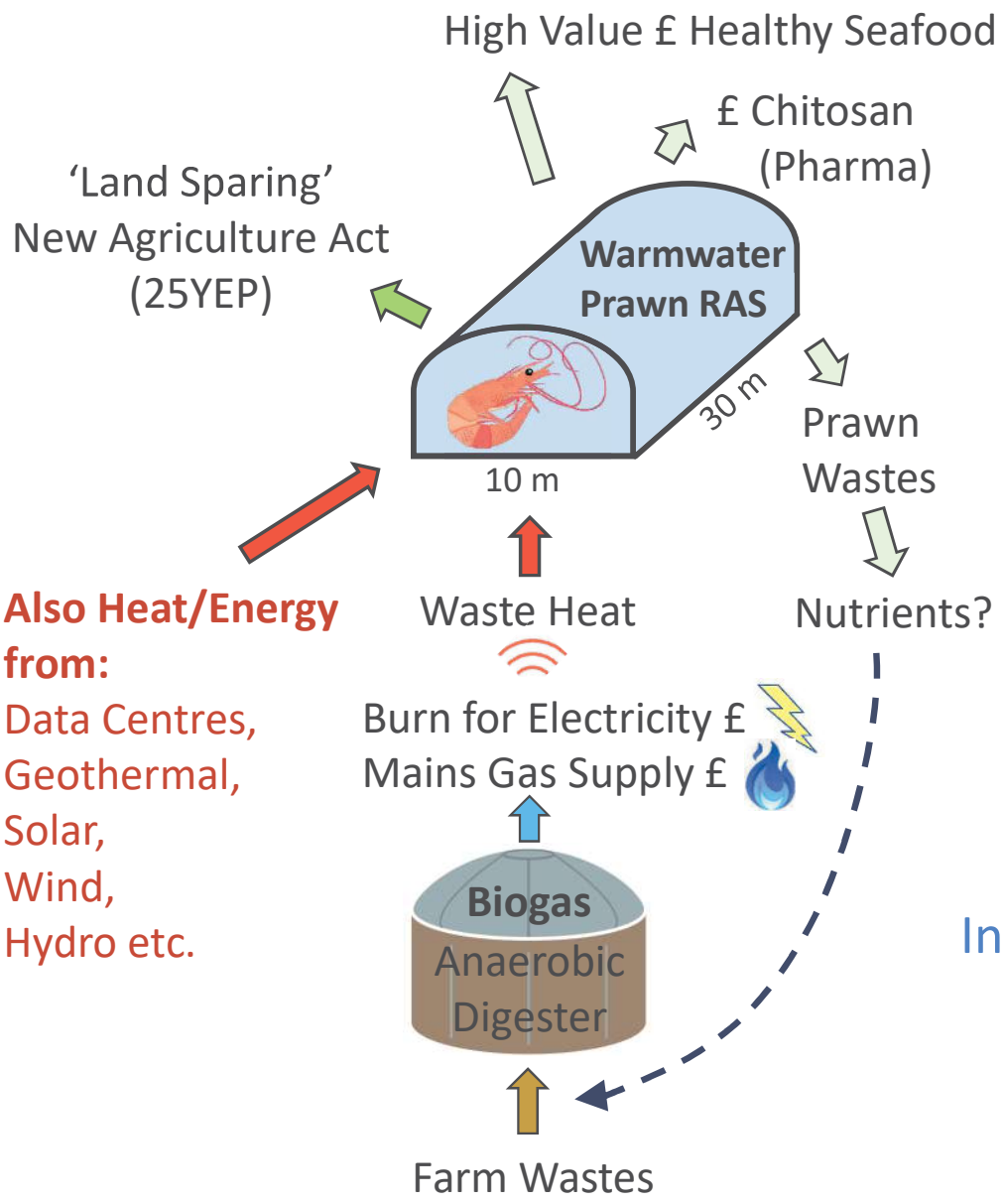
King Prawn Production Cycle



Rajesh Manchi
(PDRA)

Andrew Whiston
(Dir. RAStech)

Tours
(in-person & virtual)
available soon!



WP3: Circularity of wastes

ROTHAMSTED RESEARCH

University of Exeter

Robert Dunn

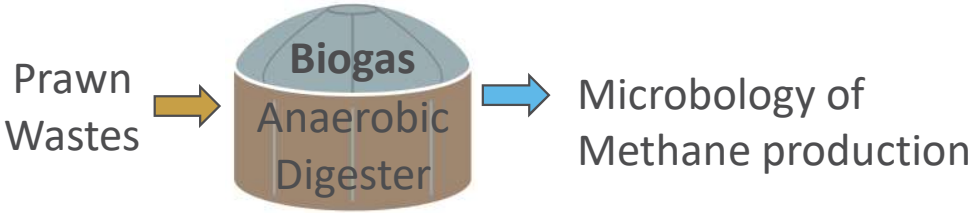
Martin Blackwell

Angus Buckling

Pawel Sierocinski

Testing liquid and solid prawn wastes as crop enhancers (& saline water remediation)

Influence on AD microbiome & methane production



WP4: Business Case for UK Prawn Hatchery (+++)

Sainsbury's

LYONS SEAFOODS

PML Applications Ltd

ocean conservation trust

Cefas

Rob Ellis

Bill Russell (Bus. Sch.)

Diana Tingley (Bus. Fellow & Project Manager)

RASTECH
Technology for Sustainable Aquaculture

FloGroFresh

THREE-SIXTY
AQUACULTURE

Thank You

https://sites.exeter.ac.uk/kingprawn

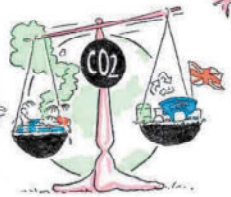
UK Sustainable King Prawn Project

1 What's the challenge?

King prawns are hugely popular in the UK, but available product can be unsustainable for various reasons

Removing mangroves to make space for outdoor prawn ponds reduces CO2 storage, makes coastlines and inland farms more vulnerable, and damages juvenile fish nursery areas.

Potentially uncertain qualities of outdoor farming practices can affect consumer perceptions.



The carbon footprint of overseas production and import may outweigh that of a locally-produced product.

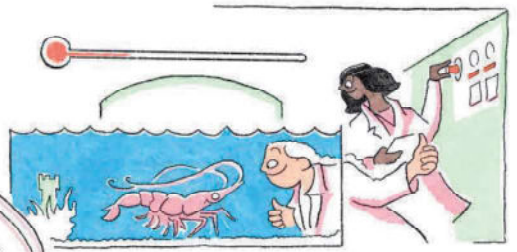
2 What's the solution?

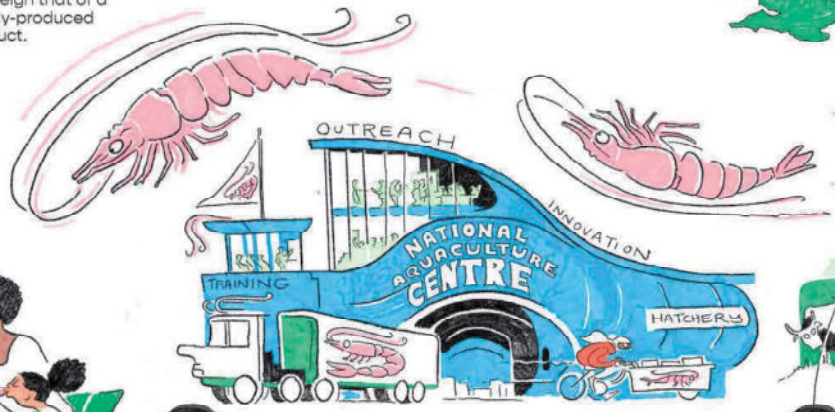
Can we produce king prawns on UK farms in a cost effective and sustainable way which benefits the environment, by using Recirculating Aquaculture Systems co-located with heat from Anaerobic Digestors?

3 How can we optimise?

—What is the optimal environment and feed needed to grow the healthiest and most nutritious prawns indoors on UK farms?

—Can we provide novel technology to improve the management of these environments?





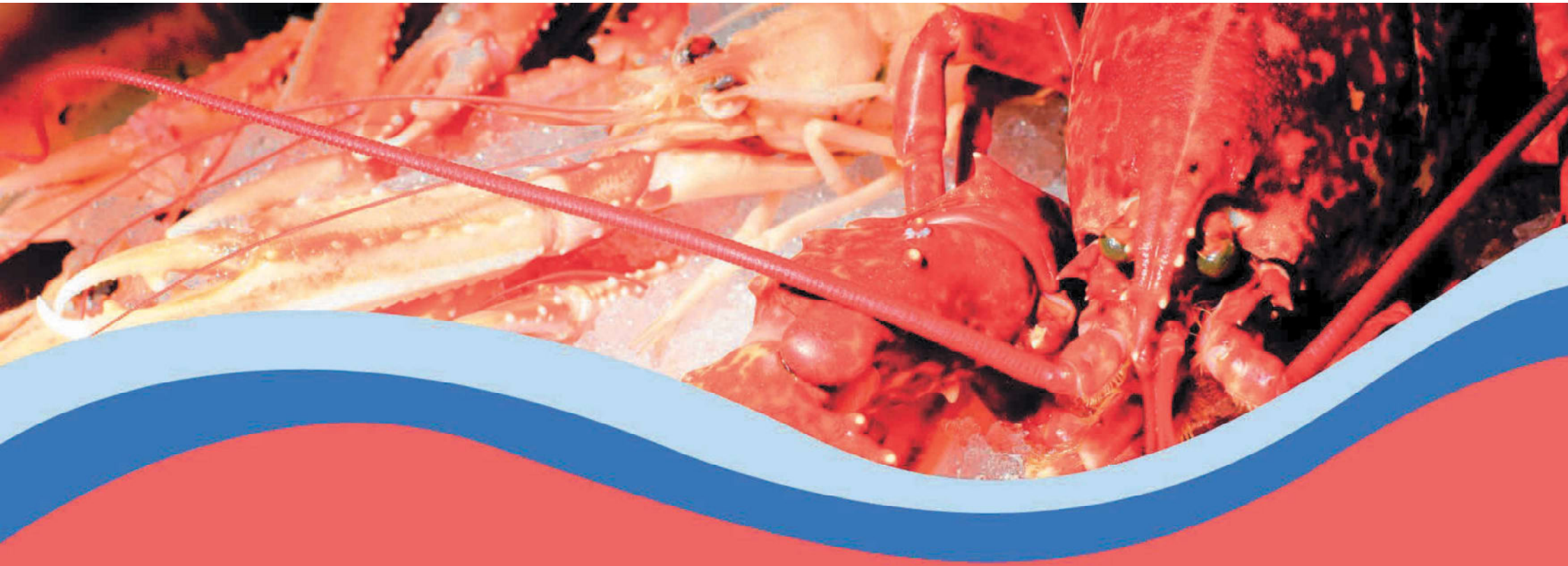
4 Trying it out for real!

—Can we deliver king prawn production on UK farms at a commercial scale?

—Can we maximise the circularity with potentially valuable waste products?

5 What else is needed?

—How could we deliver the wider infrastructure, innovation, training and outreach needed to establish a major UK home-grown king prawn production sector?



54th Annual Conference

Shellfish Association of Great Britain

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