

UK Sustainable King Prawn Project

Land-Based Seafood



SAGB 56th Annual Conference
Tue 14th July 2026



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Dr. Diana Tingley, Dr Jorge Campos-González, Dr Thiago Morello, Dr. Trystan Sanders, Dr. Owaen Guppy, Dr. Rajesh Manchi

Project Partners:

Renewable Energy



Seafood Retailers & Suppliers

Sainsbury's

LYONS SEAFOODS



Aquaculture/Nutrition



Cargill

FloGro Fresh

THREE-SIXTY



AQUACULTURE

Wider Sector Partners



PML | Applications Ltd



University
of Exeter



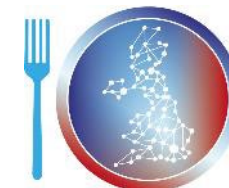
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RESEARCH



Biotechnology and
Biological Sciences
Research Council



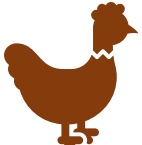
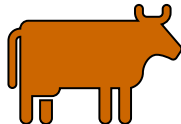
TRANSFORMING
UK FOOD
SYSTEMS
Strategic Priorities Fund

Aquatic Animal Protein FAR MORE Efficient to Produce than Terrestrial



By 2050 UK population will require **~1,230 more tonnes protein per day** (SAGB)

“This would be most efficiently and feasibly sourced from shellfish aquaculture” (SAGB)

				
Edible Meat (per 100 kg Feed)	56 kg	39 kg	19 kg	7 kg
Carbon Footprint (kg CO ₂ /kg Edible Meat)	5.1 kg	8.4 kg	12.2 kg	39.0 kg
Water Consumption (Litre/kg Edible Meat)	2,000	4,300	6,000	15,400
Land Use (kg protein /hectare)				

~8 - fold difference

50-400 - fold difference



UK Sustainable King Prawn Project



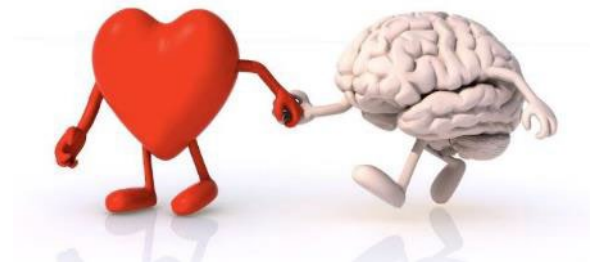
Popular, healthy seafood in UK:

High in protein, vitamins, minerals & antioxidants

Low fat & calories

Promoting brain and heart health

£319M p.a UK imports



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Traditional Prawn Ponds



Rod Wilson & Rob Ellis visiting
prawn farms in Thailand



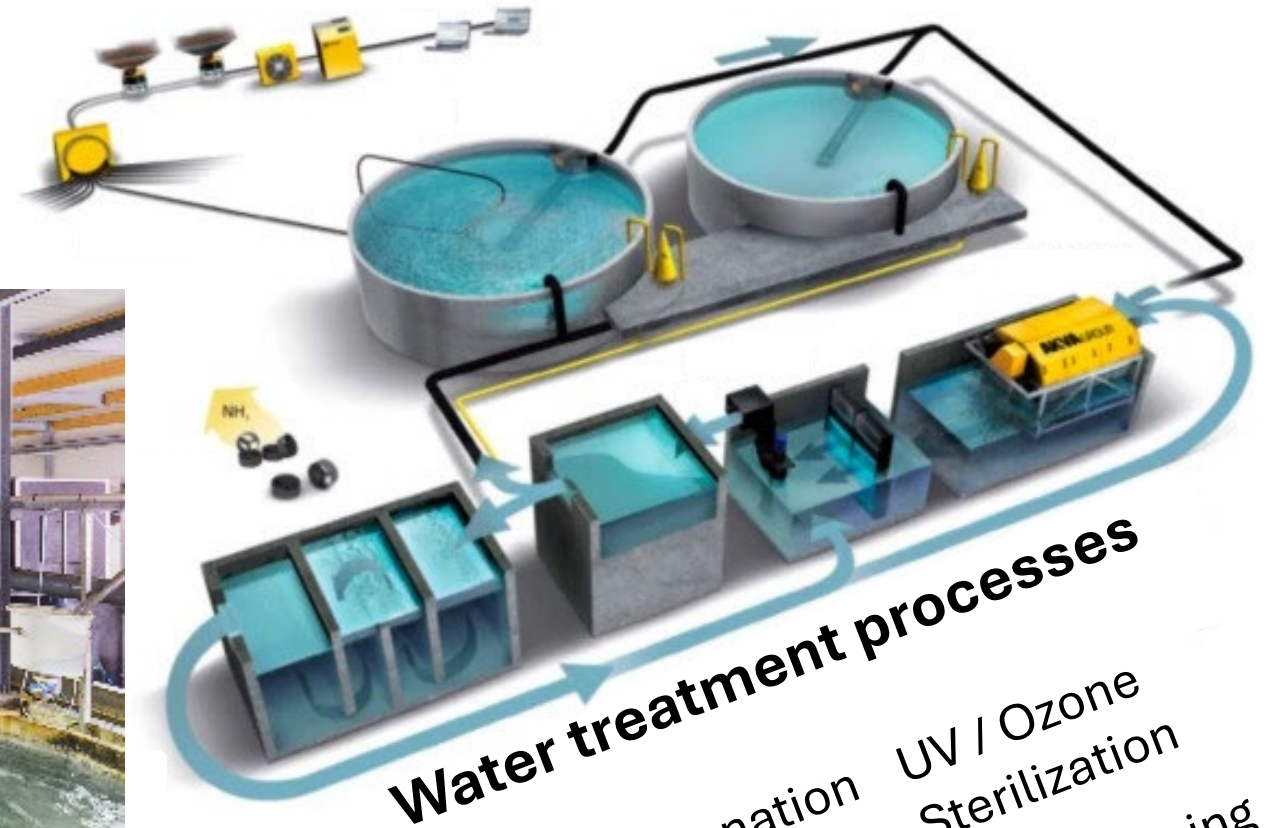
Coastal Mangrove Forest



Removing Mangrove = Removing Benefits:

- Best CO₂ removal ecosystem (per hectare)
- Nursery habitat for 10,000's of marine species
- Coastal Protection (storms & farmland salination)

Another Way ... Indoor Recirculating Aquaculture Systems (RAS)



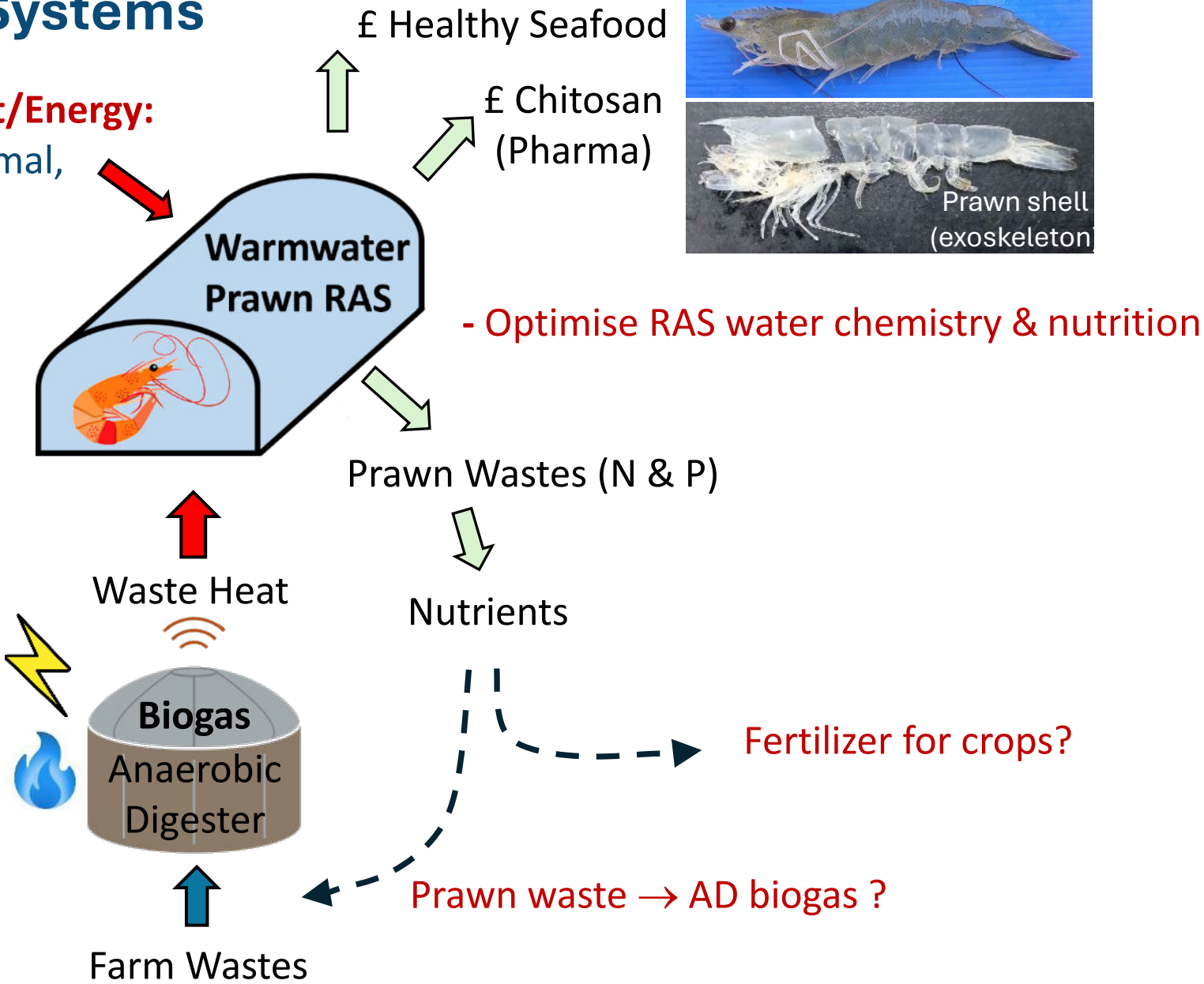
Water treatment processes

- Mechanical Filtration
- Biofiltration
- Oxygenation
- Chemistry Control
- CO₂-Stripping
- UV / Ozone Sterilization

Recirculating Aquaculture Systems (RAS)

Other Renewable Heat/Energy:

Data Centres, Geothermal, Solar, Wind, Hydro etc.



Moulting – the “bottleneck” in a crustacean’s life cycle (>50 x !)

Water



**Moulted (shed)
old exoskeleton**



Trystan
Sanders

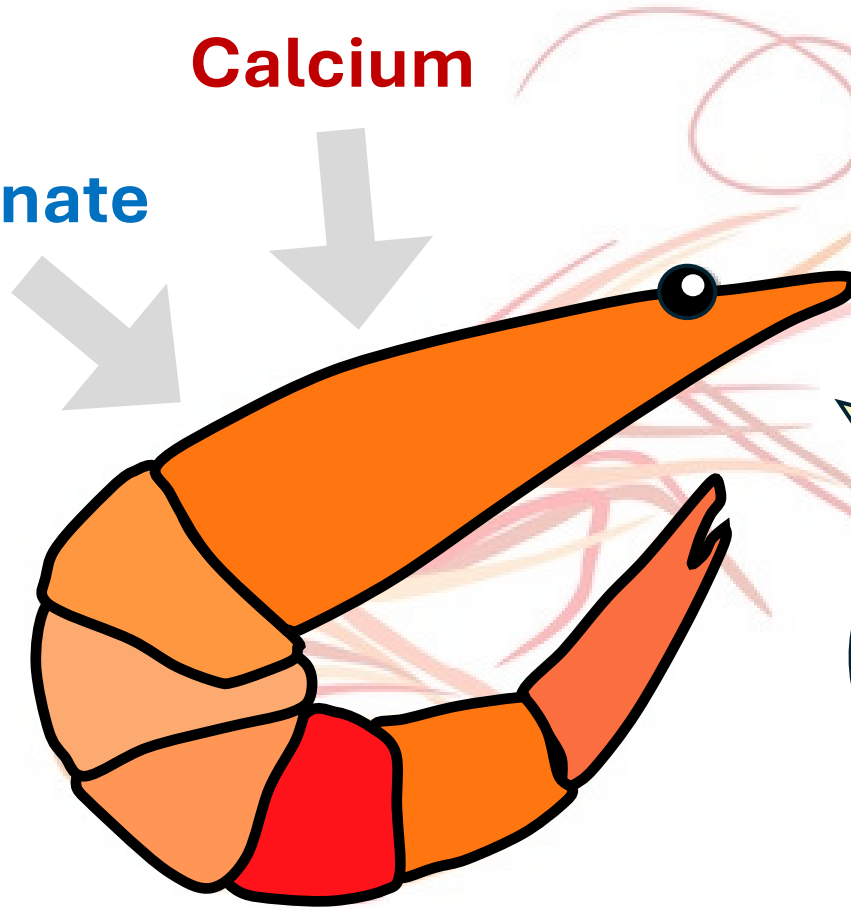


Kat
Clayton

Moulting – the “bottleneck” in a crustacean’s life cycle (>50 x !)

Calcium

Bicarbonate



Fully calcified
(hardened)
new shell



Trystan
Sanders

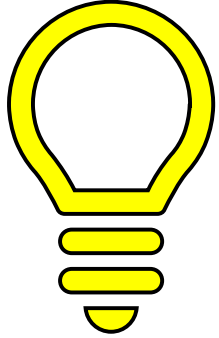


Kat
Clayton

Fastest calcium
uptake **ever recorded**
≡ growing all your
bones overnight!

Managing calcium is key – developing novel calcium sensor

UK Patent Filed 03/02/26: “Calcium Sensor” Application No. 2602434.9



UK Sustainable
King Prawn
Project
(BBSRC, £2.5M)



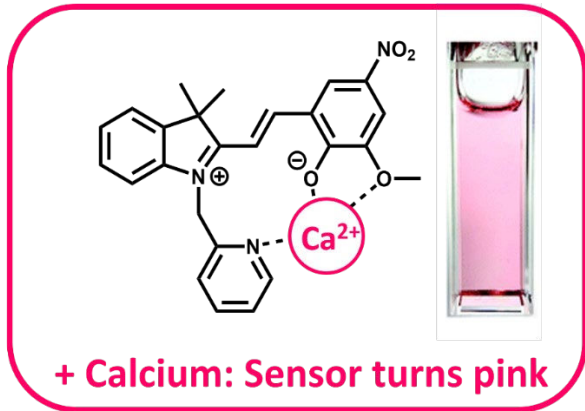
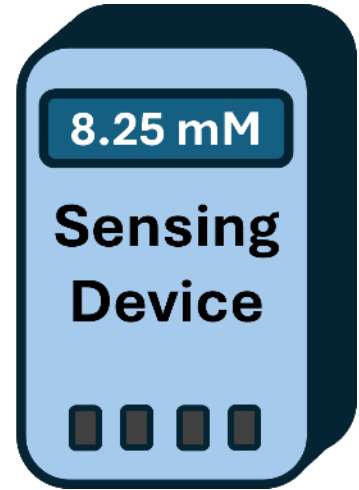
Business
Engagement &
Innovation Award
(UoE, £11.9k)



Impact
Accelerator
Award
(EPSRC £68k)



Follow-on Fund
(BBSRC £600k)



Alexis
Perry



Owaen
Guppy

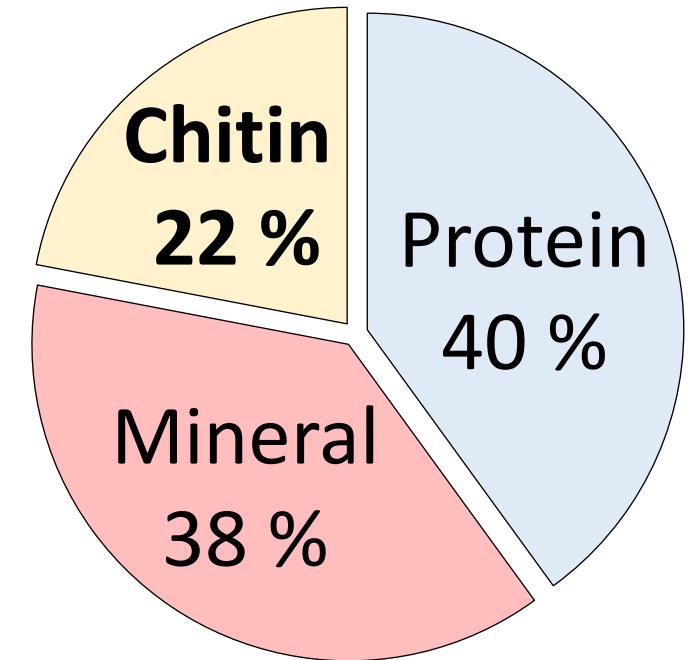
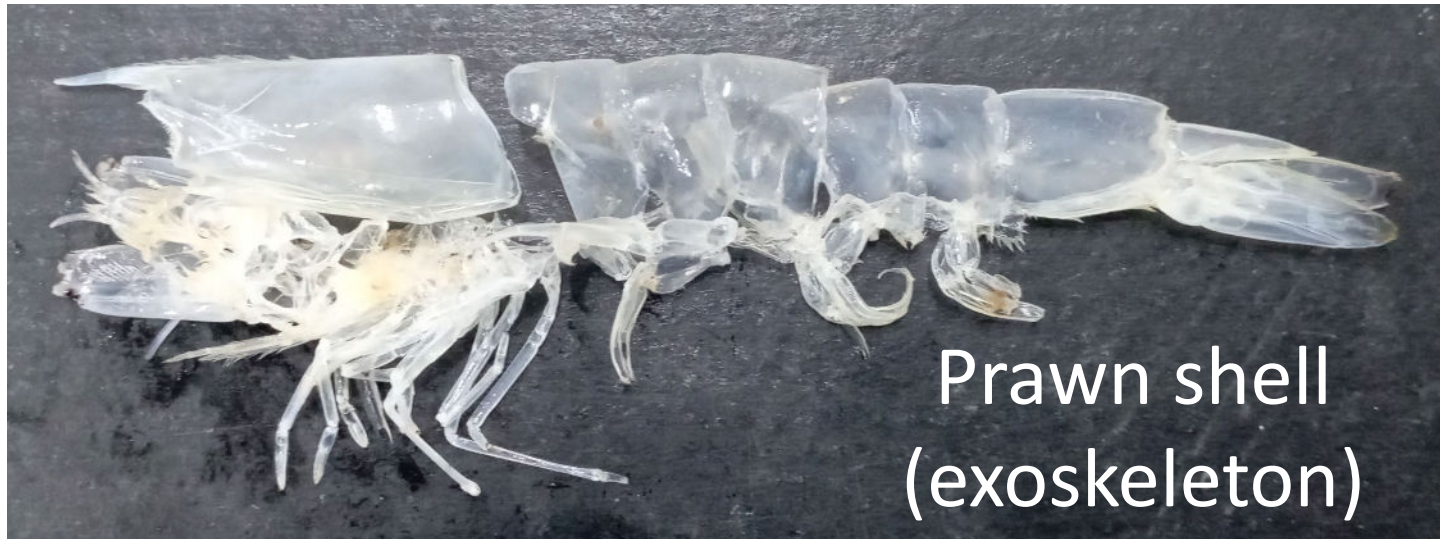


Matt Stevenson
(CEO at Seneye Sensors Ltd., Norwich)



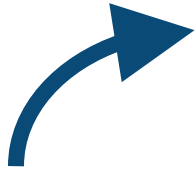
Academic research chemistry + industrial expertise = innovative solution to real-world problem

Key outcomes - Optimisation of production environment



Exoskeleton **chitin** unchanged at 4 % seawater (1.4 ppt)

Circularity of Prawn RAS Wastes



Robert
Dunn



Martin
Blackwell



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RESEARCH

Prawn waste successfully used as soil enhancer for growing rye grass

Compatibility of prawn waste with anaerobic digester biogas production.



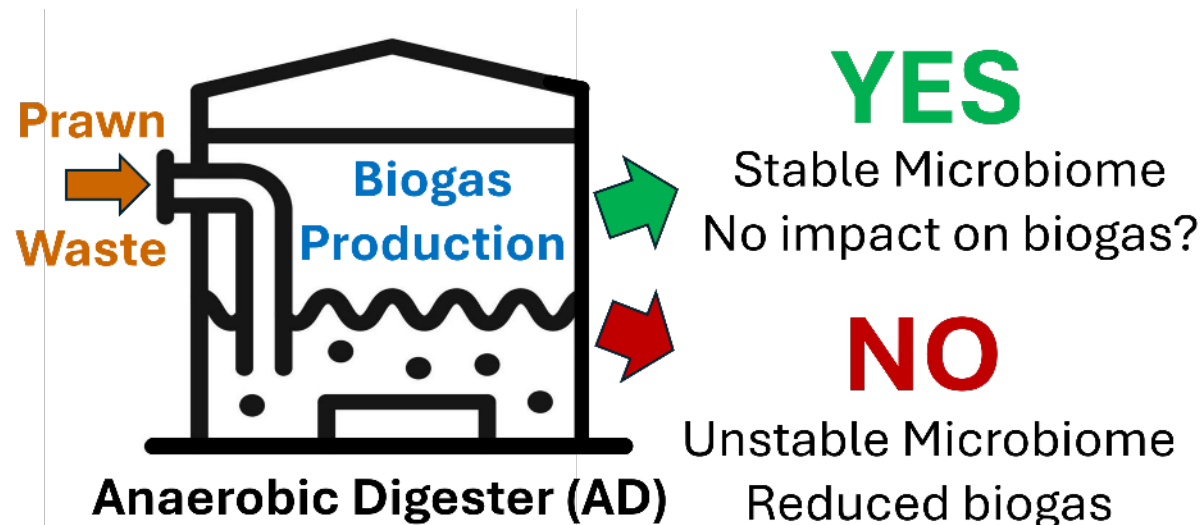
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Pawel
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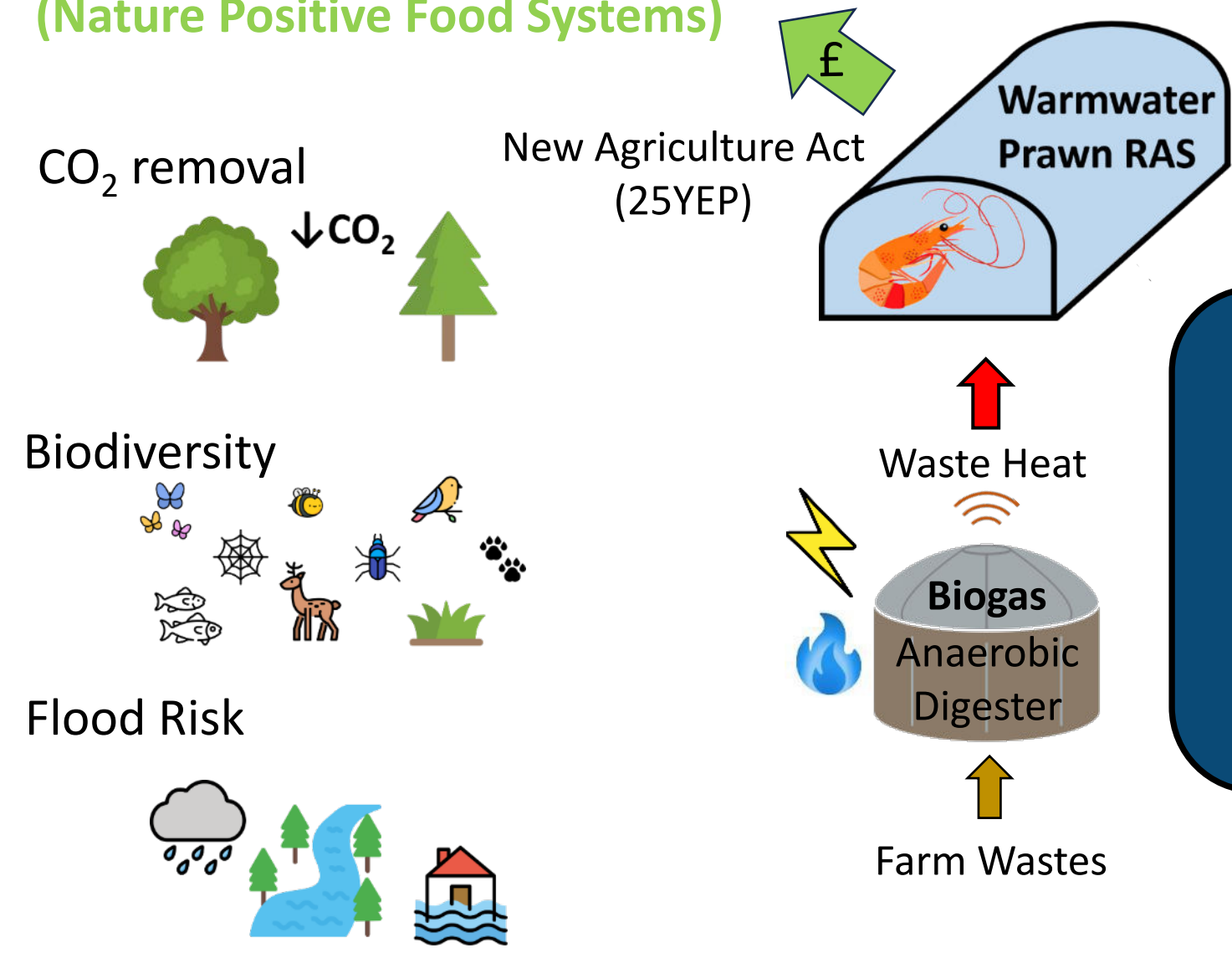


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Recirculating Aquaculture Systems (RAS)

“Public Money for Public Goods”
(Nature Positive Food Systems)



“RAS-RES”
Recirculating Aquaculture Systems
powered by
Renewable Energy Systems

= land-efficient, low-carbon
alternative to seafood imports

Environmental Economic Modelling

RAS efficiency spares land for environmental improvements

King prawn  RAS farms are
>50 x more efficient land use for
animal protein than beef



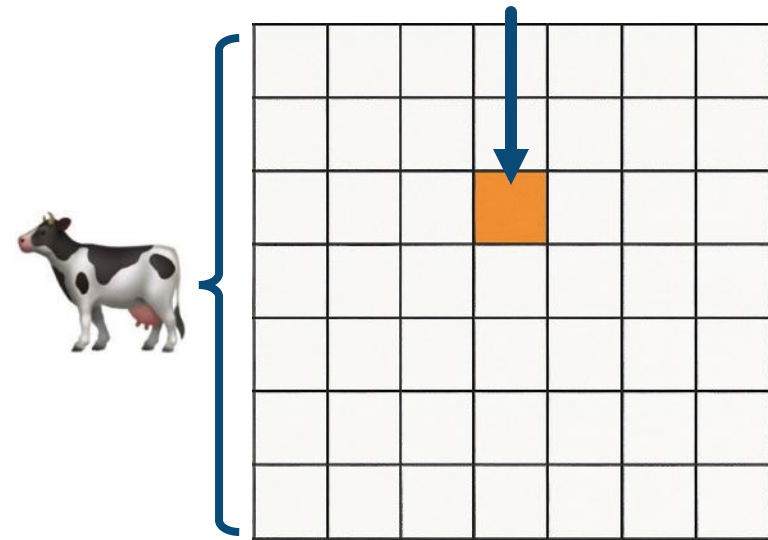
Prawn Recirculating Aquaculture System (RAS)



Ian Bateman
OBE



Thiago
Morello



(>5x calories/ha than crops) 

Huge potential for ‘sparing’ farmland for
nature positive improvements
...**without** reducing UK food production

Farming £ subsidies to promote nature positive land-use solutions

King Prawn Demonstrator RAS Farm (Near St. Andrews)



Rajesh Manchi
(PDRA)



Andrew Whiston
(CTO RAStech)

Watch 4-min
Demonstrator
video here



Overcoming barriers to UK expansion of RAS Seafood Production

Stakeholder engagement – Farming community

The image shows a panel discussion at The Regenerative Agriculture Festival. Four people are seated on a stage in front of a large screen displaying a presentation on RAS production modelling. The screen shows a diagram of a King Prawn RAS system, a flowchart of production modelling, and a logo for Groundswell. The event is taking place at Lannock Farm, Hertfordshire, on 1-2 July 2025.

UK King Prawn RAS - Production Modelling

King Prawn Demonstrator RAS (Near St. Andrews)

RASTECH

30 m

10 m

Warmwater Prawn RAS

Agricultural Census Financial Data

Supply-Side Model

Market Equilibrium

Supermarket Scan & Import Data

Demand-Side Model

Groundswell

The Regenerative Agriculture Festival

Lannock Farm, Hertfordshire (1-2 July 2025)

Hatchery workshop

Fishmongers Hall, London; Dec 2023



Hosted by:



Table 1: Photos of 'Post-it' notes added to Stakeholder and Business Environment Maps, by participant group.

Stage	Participant group 1	Participant group 2	Online participant group
Stakeholder Map (Hatchery)			
Stakeholder Map (Sector additions)			
Business Environment Map			

Welfare & Ethics workshop

Aviemore; May 2024



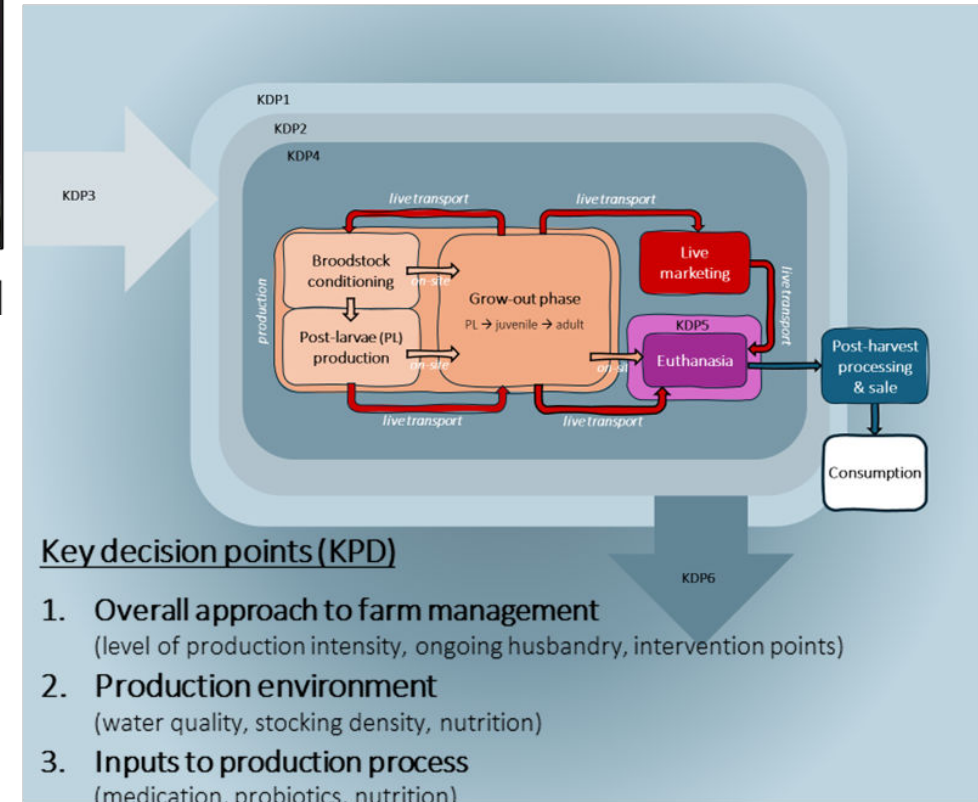
Attendees (*Joining online)

*Incorporated
within:*



Aquaculture UK
AVIEMORE, SCOTLAND
14-15 MAY 2024

King Prawn production cycle - Framework & Key Decision Points for Welfare & Ethics considerations



Key decision points (KPD)

1. Overall approach to farm management
(level of production intensity, ongoing husbandry, intervention points)
2. Production environment
(water quality, stocking density, nutrition)
3. Inputs to production process
(medication, probiotics, nutrition)
4. Humane treatment approach
(closely linked to Production Environment, live transportation)
5. Humane euthanasia approach
(level of suffering, taste, product quality, price)
6. Receiving environment
(for outputs from production process)

Key outcomes - Overcoming UK barriers

Farmers –

reliable availability of key resources
(larvae / trained and willing workforce)

“The UK prawn sector needs to become self-sufficient with a hatchery to reach scale.”
(Director - UK aquaculture producer)

Workers –

availability and appeal of training courses
suited to support expansion of the sector

“Aquaculture attracts marine graduates who don’t have the personality traits required for fish farming!” (CTO
Aquaculture farm)

Aquaculture innovators –

space to bring new innovation into
the aquaculture sector

“There is a clear niche for UK to be global leader in aquaculture innovation”.
(Aquaculture Innovator)

Public –

engaging and accessible information on
sustainable seafood sourcing and production

“Growing ‘happy king prawns’ could be the start of a bigger revolution providing an anchor-point for a new ‘economic ecology’ of innovative food production.” (Investor)

A proposed solution

National Centre for Land-Based Aquaculture

Visitor centre –

engage UK public, provide education and awareness of sustainable seafood

Hatcheries –

provide sustainable, reliable source of larvae

Innovation hub –

space to bring industry and academia together to innovate



Regulatory Support –

provide training and advice for regulators and new operators

Training centre(s) –

provide courses to the emerging aquaculture workforce in the UK

National Centre workshop

Plymouth; Apr 2025



Participant Group

Defra, Innovate UK Business Connect, Fishmonger's Company, Crown Estate, Rastech, Uni of Plymouth, North Devon Biosphere, Cefas, UK Agri-tech Centre, Environment Agency, Innovation Nursery/Eden Project, Cornish Seaweed Co, British Trout Association, Cornwall Council, Torridge District & North Devon Council

Hosted by:

NMA | NATIONAL
MARINE
AQUARIUM

Wider outcomes for land-based seafood generally:

Policy Paper

Launch Today !



Policy paper

INVESTING IN THE UK'S BLUE TRANSFORMATION:

A world leading opportunity to deliver innovative **land-based seafood** solutions

From left to right: King prawn (*Penaeus vannamei*), Shutterstock license; Rainbow trout (*Oncorhynchus mykiss*), Shutterstock license; Zingoni Diagonale; Sea lettuce (*Ulva lactuca*) cultivated in land-based Algal law system, Image by Ocean-Greens; Pacific oyster (*Magallana gigas*), Image by Potou Ricard from Pixabay.

Executive summary

The majority of global seafood consumption now comes from land-based seafood production (aquaculture) which needs to double by 2050 to meet rising demand. The UK has a unique opportunity to help meet this need by adopting and developing innovative land-based seafood production technologies, which can dramatically increase the supply and range of aquatic species farmed in the UK, both for domestic consumption and high-value export markets.

Widespread adoption of land-based seafood production technologies across the UK would create jobs, boost productivity, enhance domestic food security, support exports, drive international technology leadership and provide opportunities to meet sustainability targets.



UK Sustainable King Prawn Project



Land-Based Seafood



UKSKPP
Project Website



King Prawn Demonstrator
RAS Farm Video

Thank You



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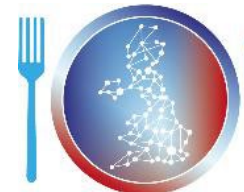
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