DORSET
Local Enterprise Partnership

ONEHEALTH 2022

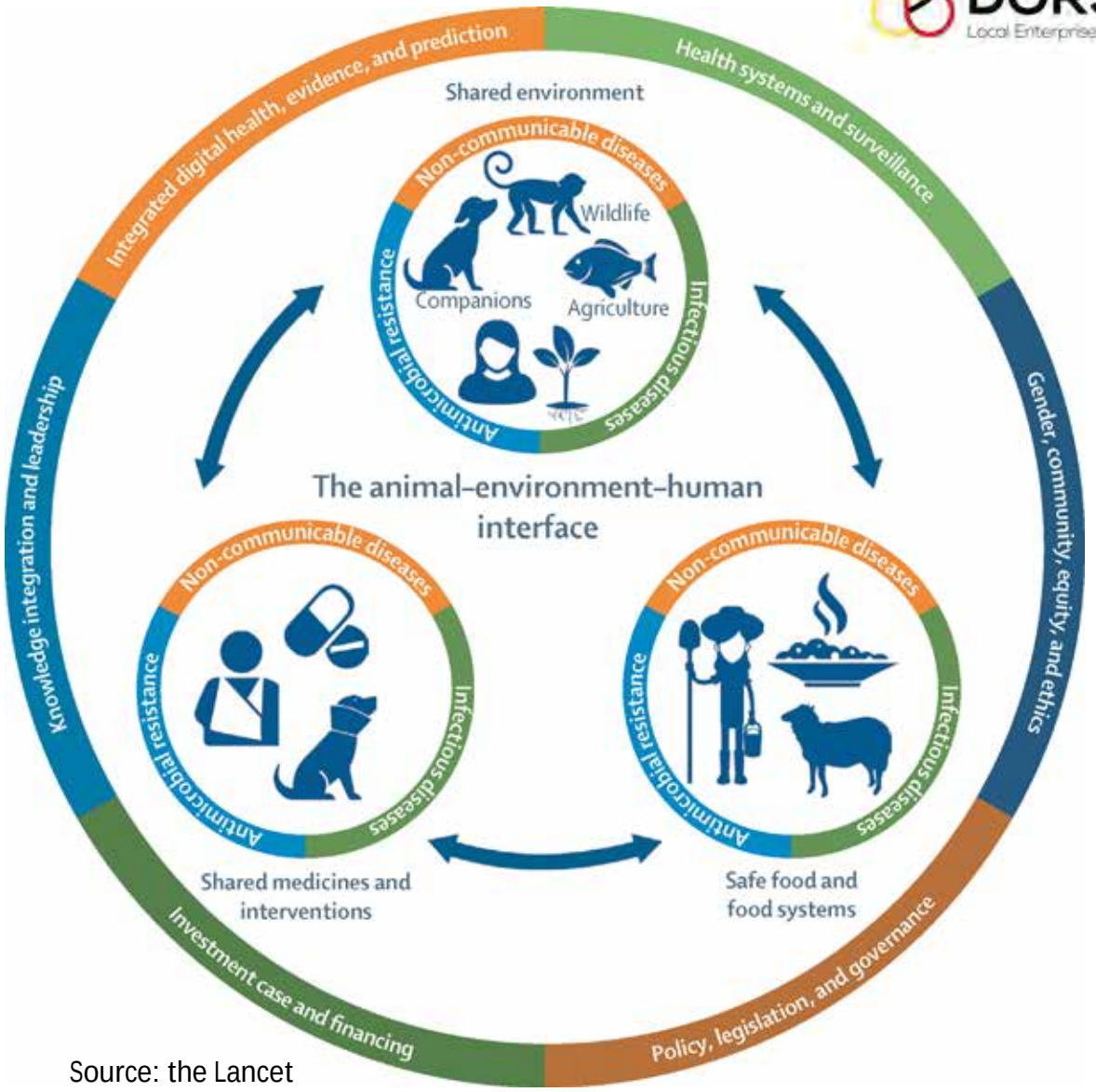
Sustainable Agri-Innovation & FoodTech

10th March 2022

DORSET GATEWAY

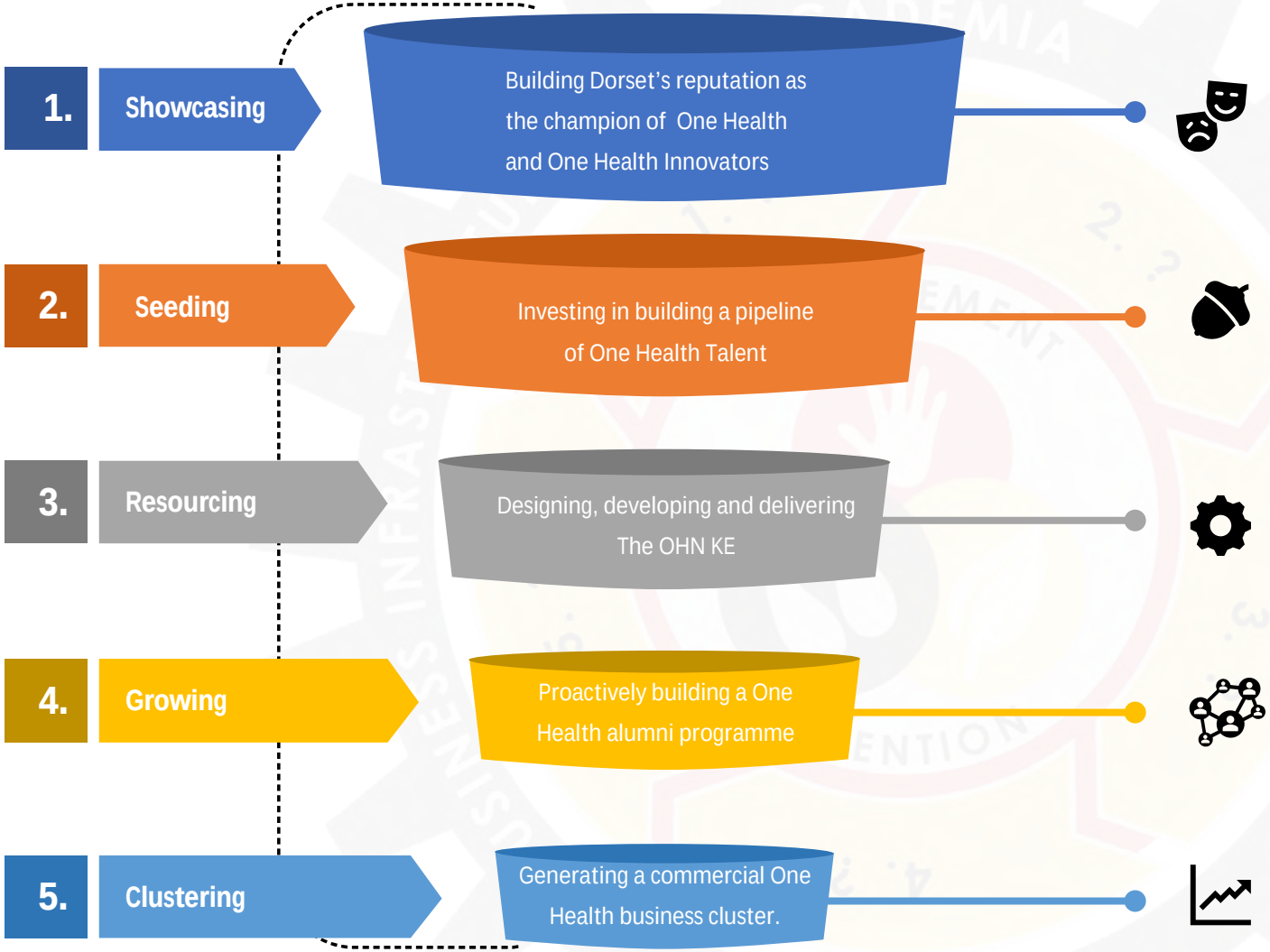
One Health:

A recognition that achieving sustainable good human health is not just about medicines and medical devices, but also about many **connected** factors, working together, which determine the foundations of a healthy nation, e.g. – ensuring the quality and security of our food supply, boosting positive socio-economic factors, exchanging One Health knowledge between academia and industry and across international borders. Tackling climate change by reducing carbon-footprints.



Source: the Lancet

AMBITION: ONE HEALTH PROGRAMME 2022-2040



Outputs: a) annual showcase conferences; b) Weekly social media – showcasing companies, publishing One Health stats and celebrating Dorset-based One Health companies' successes; c) Public talks/ presentations, etc.

Identify/engage with up to 30 new One Health companies per year.

A transdisciplinary knowledge exchange model – physically located in the KM University Centre and Rural Business Hub - to be accessed by One Health companies with the aim of accelerating their business growth.

An alumni network made up of those that have been part of the One Health Programme.

All of the above generating a commercial One Health business cluster (some virtual – regional, national and international – and some in Dorset and close borders).

2040: £100M+ generated from OH businesses in Dorset and close borders and a new local, regional, nation and international One Health business cluster/eco-system generating circa £12 billion in exports annually.

DORSET
Local Enterprise Partnership

SUPPORTING INNOVATION...

UNIVERSITY CENTRE
&
RURAL BUSINESS DEVELOPMENT HUB

KINGSTON MAURWARD

PROFESSOR MICK FULLER
Professor in Plant Physiology

UNIVERSITY OF PLYMOUTH

Keynote:

Integrating Agritech into the One Health Agenda

Integrating Agri-Tech into the One Health Agenda

Prof M.P. Fuller
Dr H.Z. Rihan
Dr R. Jackson
Yve Metcalfe-Tyrell

UNIVERSITY OF PLYMOUTH
Sustainable Earth Institute

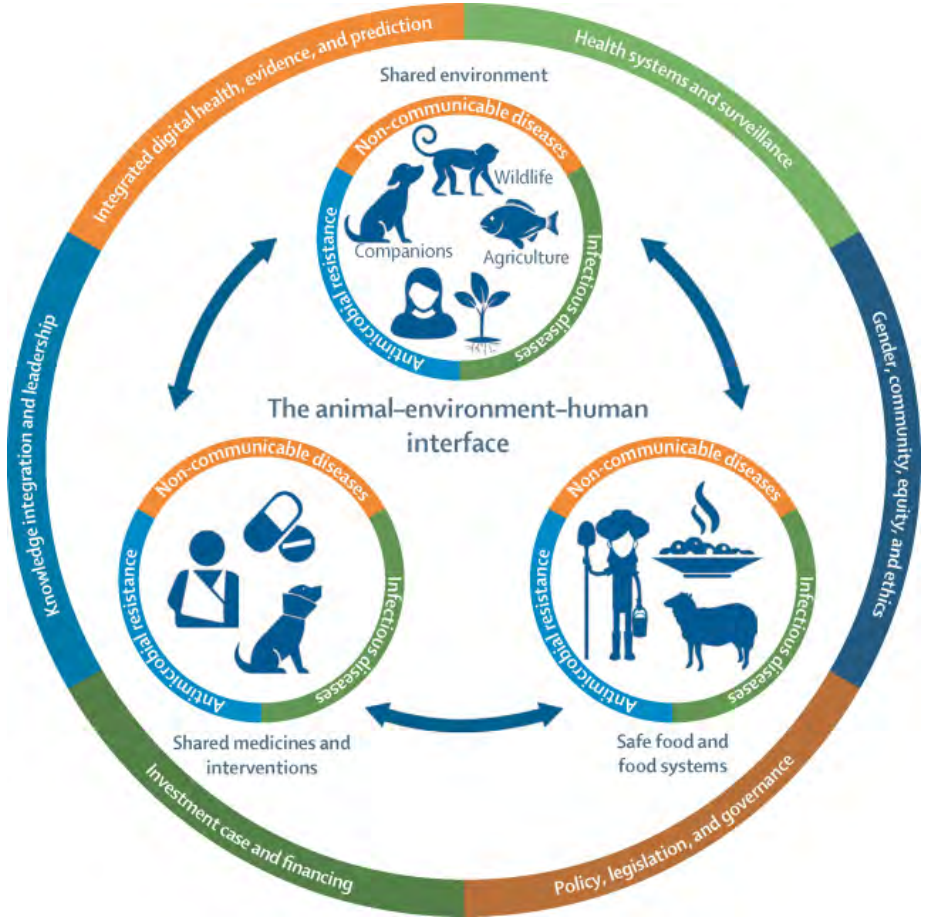
European Union
European Regional Development Fund

AGRITECH
CORNWALL

The Lancet - One Health Commission

Reconnecting for our future - Amuasi, Horton & Winkler 2020

UNITED NATIONS



World Health Organization

SUSTAINABLE DEVELOPMENT GOALS

G20

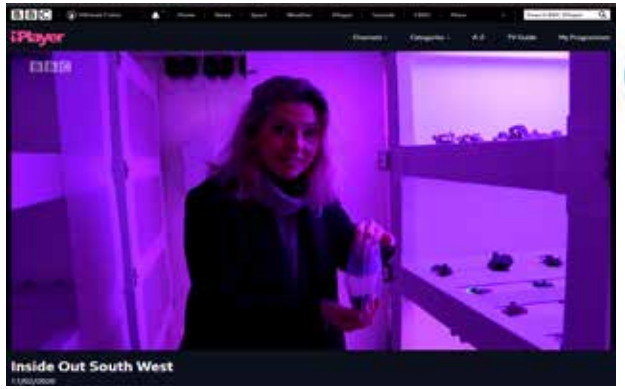
Agri-Tech – Plant Factories

Plant Factories

Controlled Environment Growing: Hydroponics, LED lights, Clean Room Technology, Robotics enabled



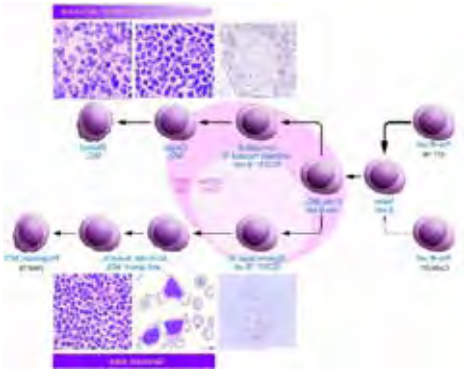


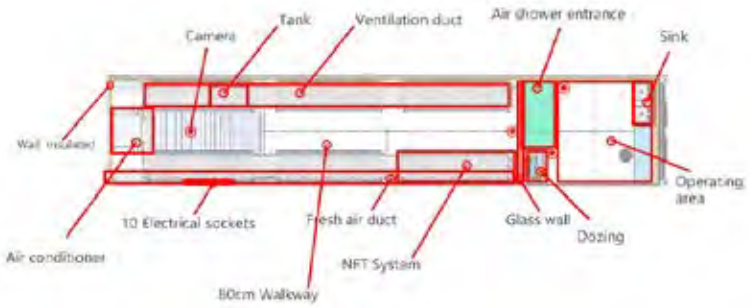




PLANT FACTORY PLYMOUTH

Controlled Environment Agriculture for Pharmaceutical Crops
Mantle Cell Lymphoma suppression





CHAP
CROP HEALTH & PROTECTION

PHYTOME
LIFE SCIENCES

FUTURFARM
Plant Factory and Hydroponic Innovation

AntiBio
TECHNOLOGIES

Gi

Kernock Park Plants

UNIVERSITY OF PLYMOUTH
Sustainable Earth Institute

European Union
European Regional Development Fund

AGRITECH
CORNWALL

University of Jeddah

King Saud University

King Abdulaziz City for Science and Technology

Cornish Essential Oils Limited

SOLAGROW

where innovation comes to light

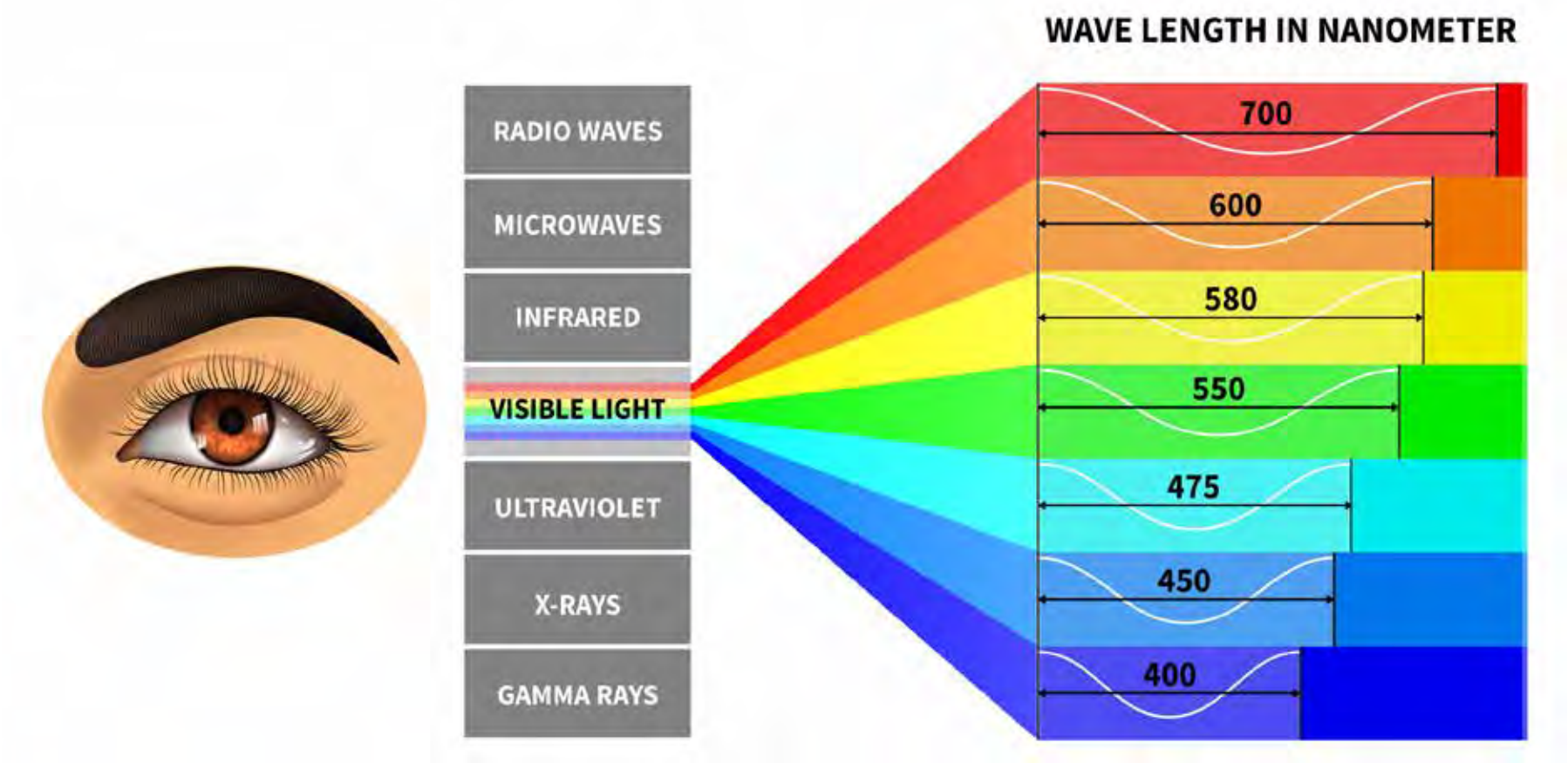
The importance of Plants in Pharmacology

- 40% of the drugs on the Pharmacy shelves are derived from Plants
- Over 35,000 plants have been screened for their medicinal benefits
- Safe and effective and prescribed by medical professionals

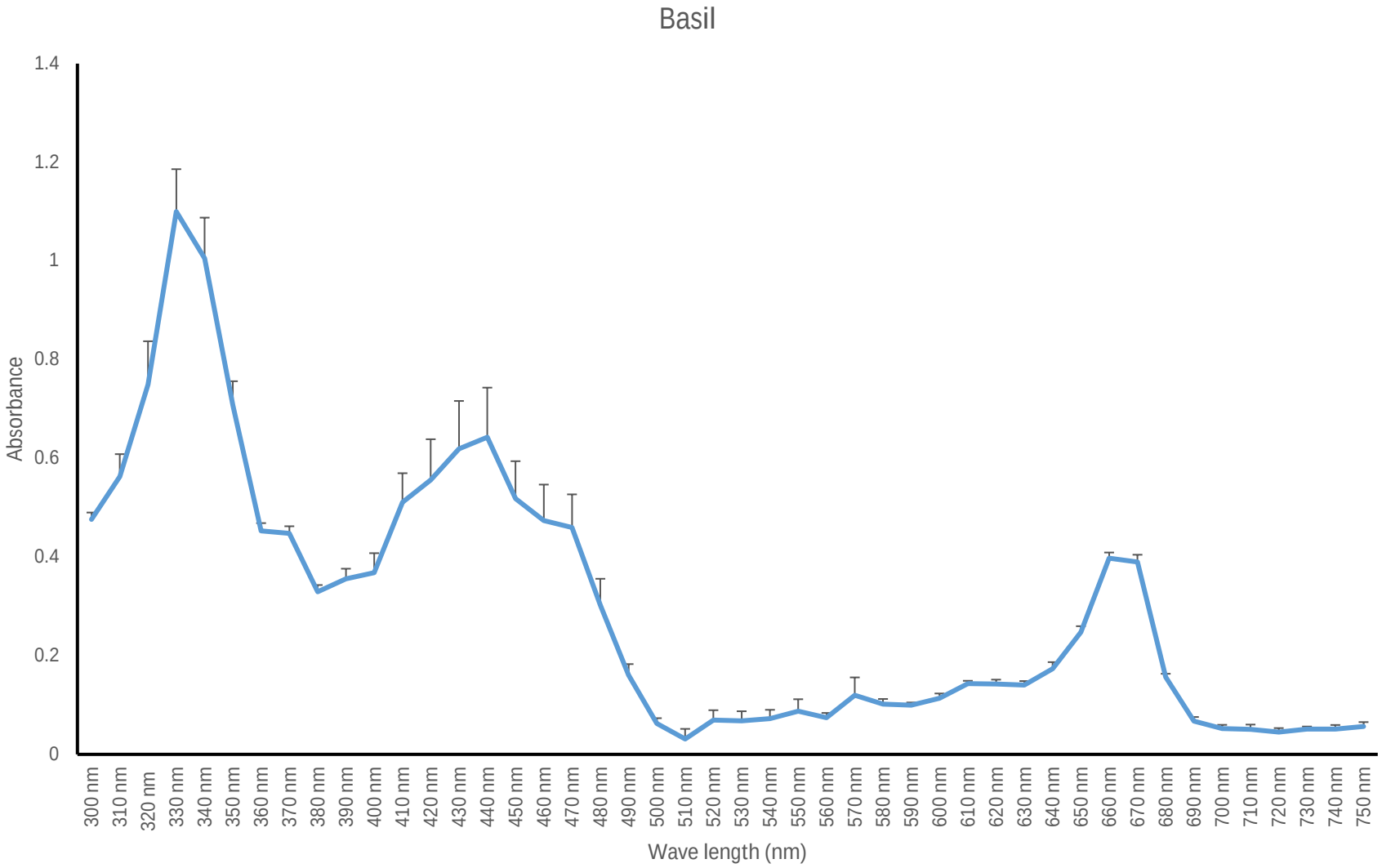
Plant	Medicine	Use
Willow	Asprin	Pain
Foxglove	Digitalin	Cardiac
Coffee	Caffeine	Inflammation
Poppies	Cocaine	Pain
Yew	Taxol	Chemotherapy
Periwinkle	Vinblastine	Cancer
Cannabis	CBD	Epilepsy, Pain

Lemon Balm (sedative) grown in the Plant Factory Plymouth

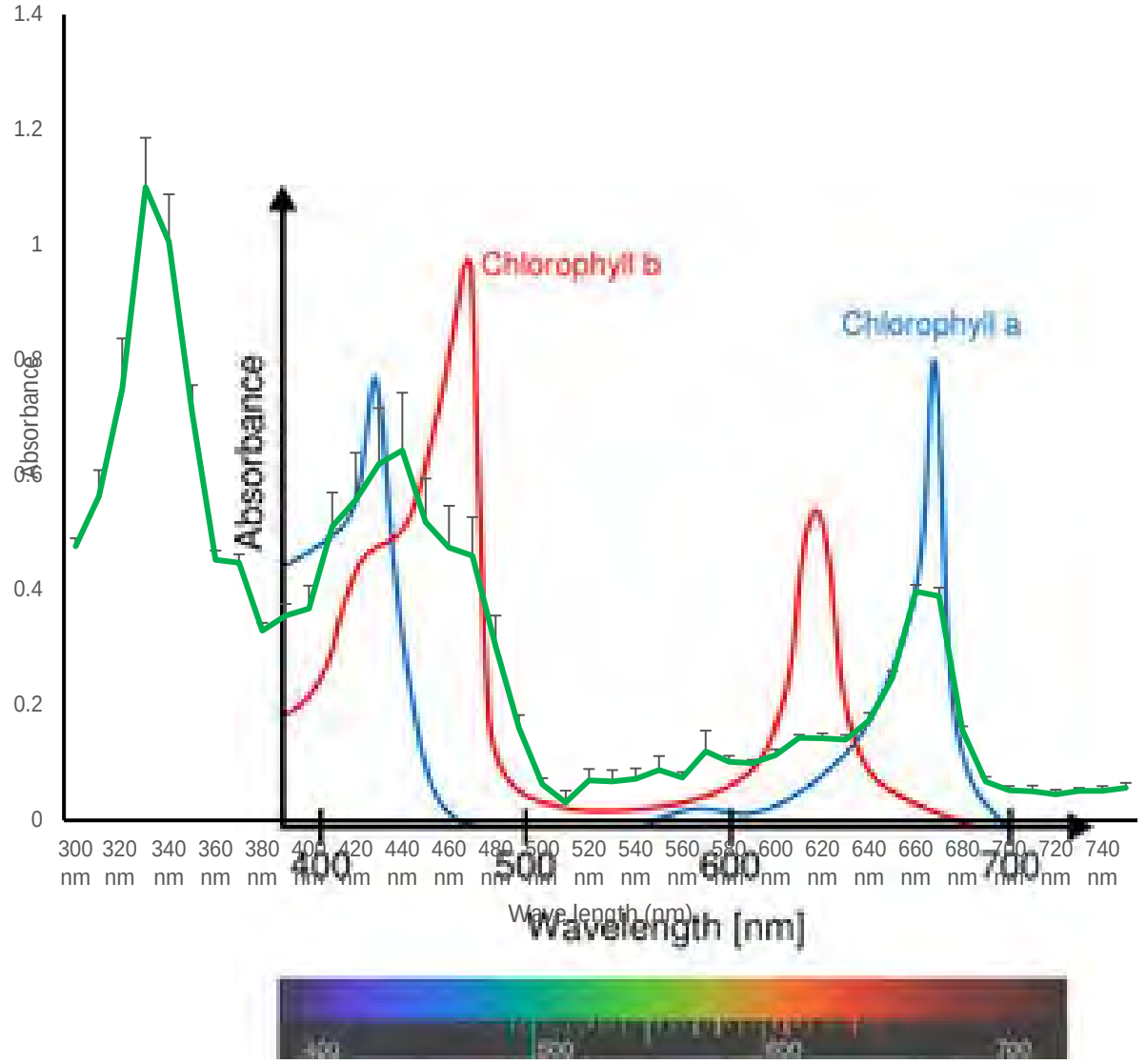
WHICH LED LIGHTS??



ABSORBANCE SPECTRUM OF BASIL

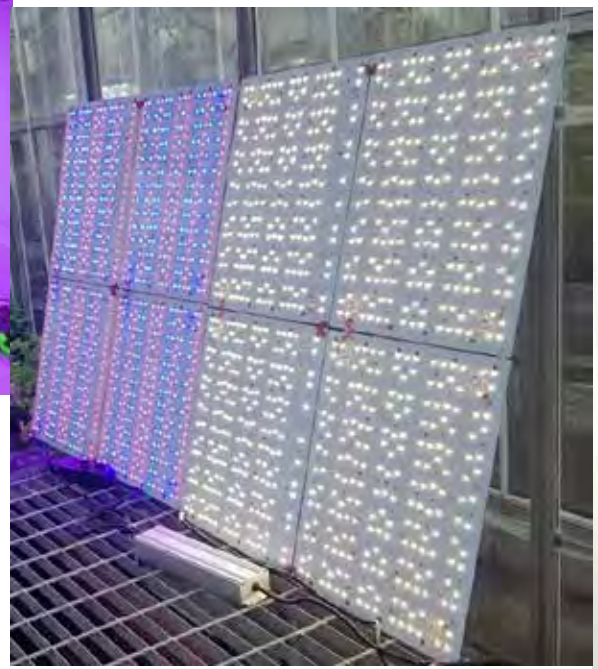


Basil


1.4
1.2
1
0.8
0.6
0.4
0.2
0
Absorbance
Chlorophyll b
Chlorophyll a
300 nm
320 nm
340 nm
360 nm
380 nm
400 nm
420 nm
440 nm
460 nm
480 nm
500 nm
520 nm
540 nm
560 nm
580 nm
600 nm
620 nm
640 nm
660 nm
680 nm
700 nm
720 nm
740 nm
400
500
600
700
Wavelength [nm]
Wave length (nm)

Designed and Fitted Custom controllable LED lighting fixtures

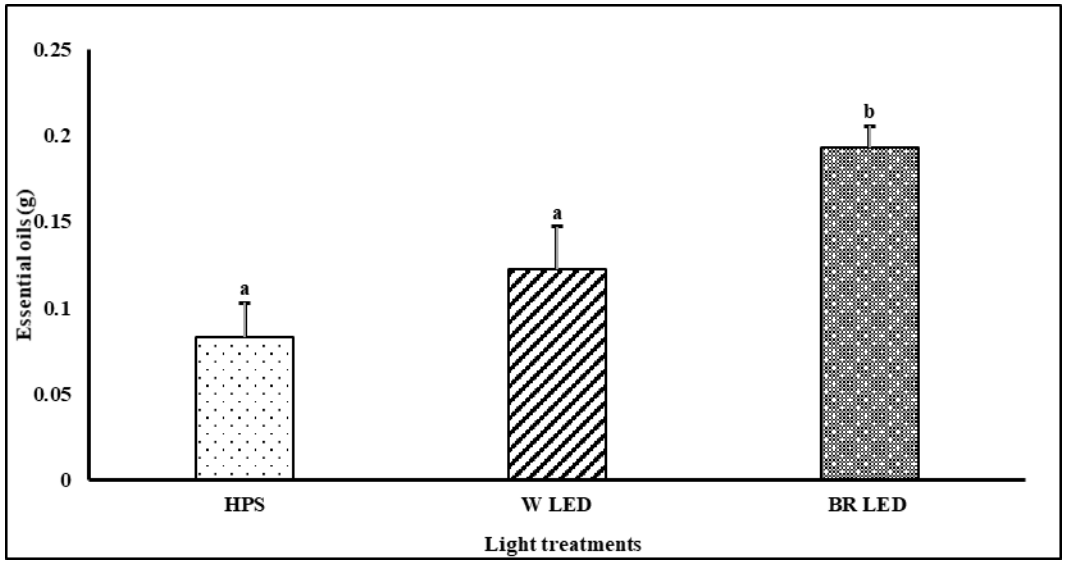
LED Bars

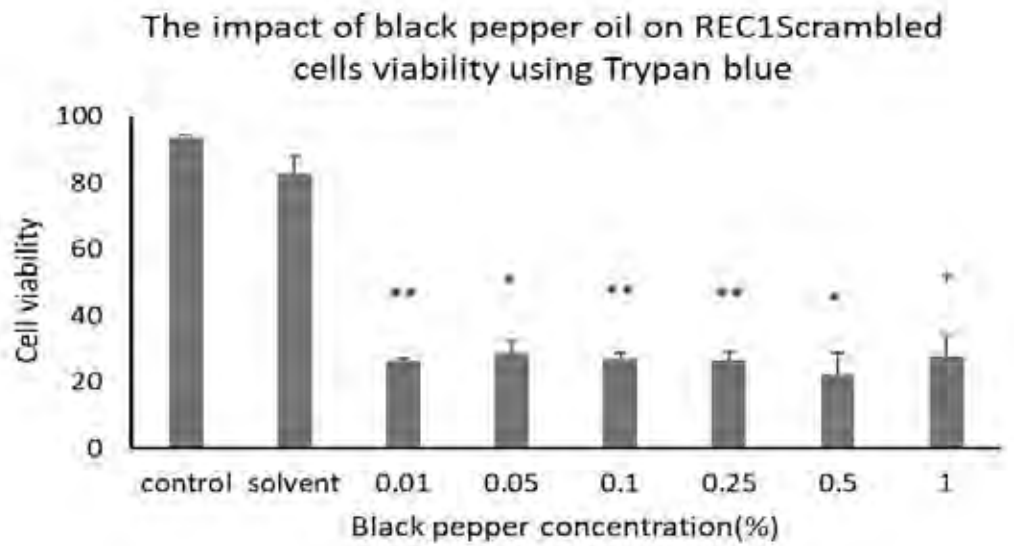


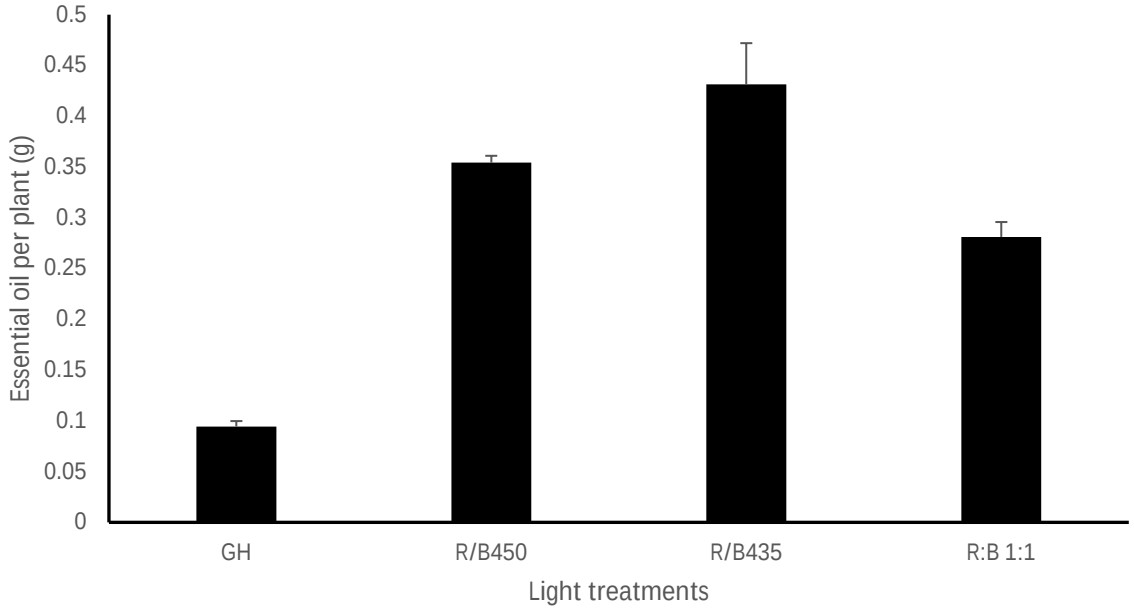
Replication

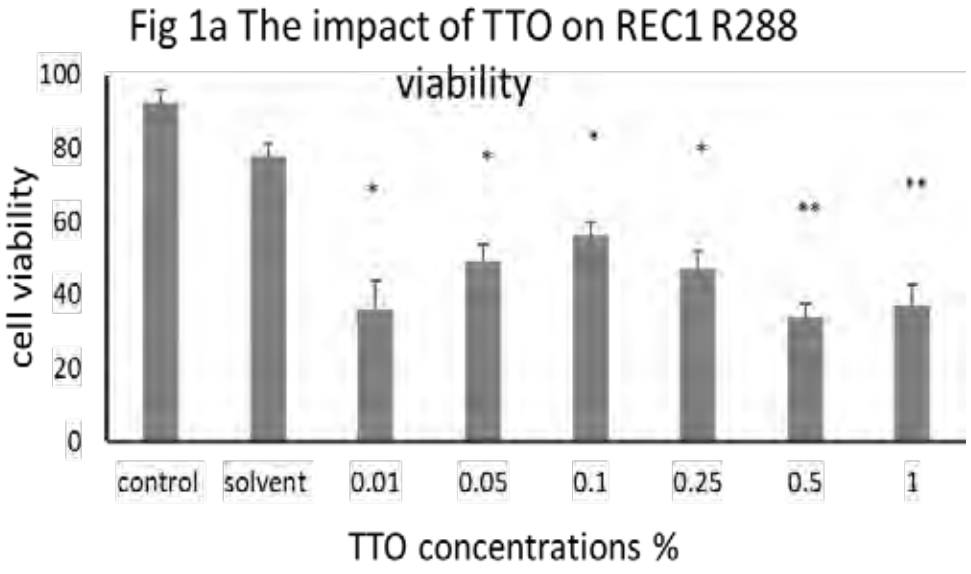
Control of:
LEDs wavelengths chosen
Ratio of LEDs to each other
Photoperiod
Dimming and Intensity

Some results from Plant Factory Plymouth

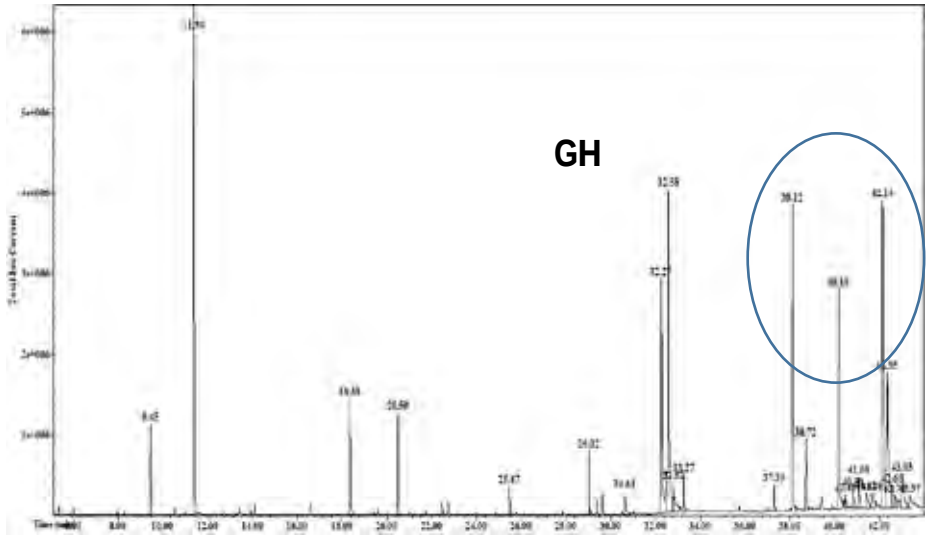


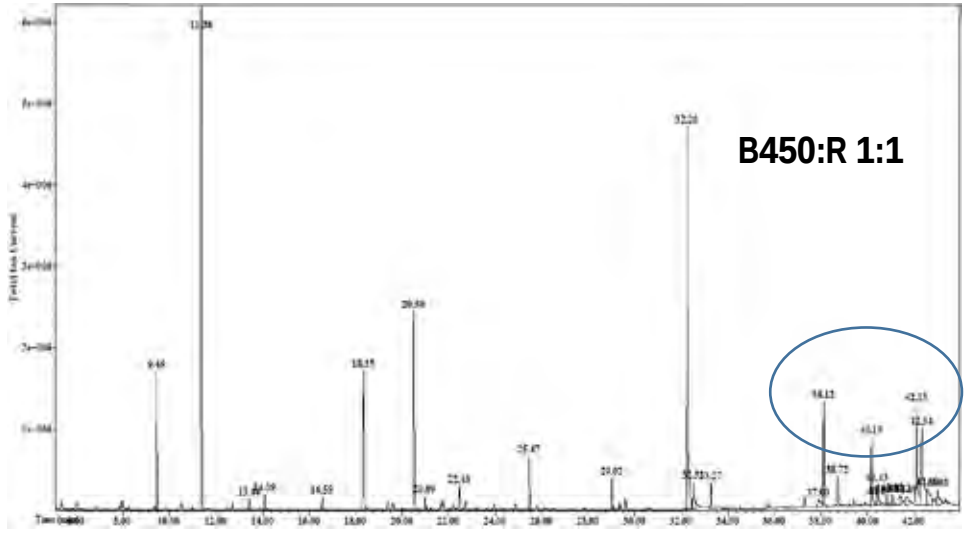


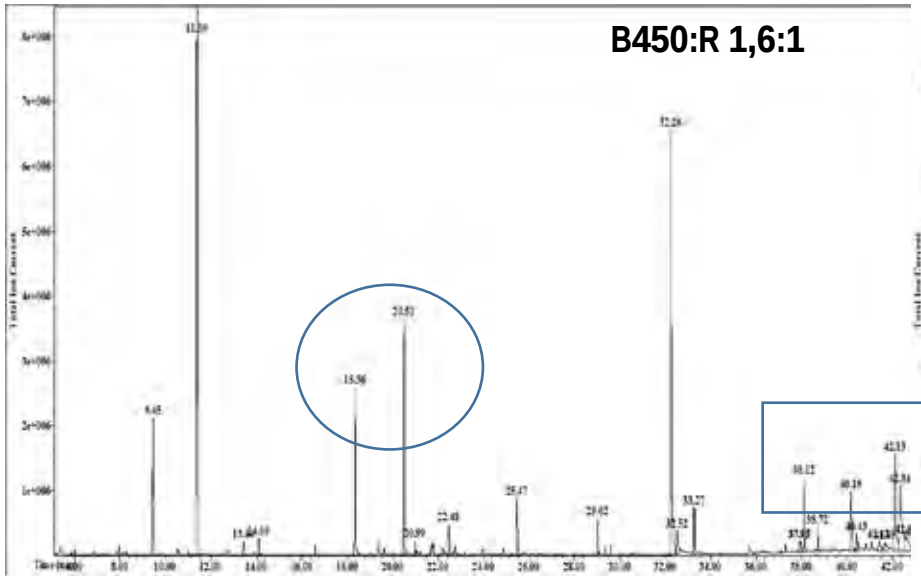


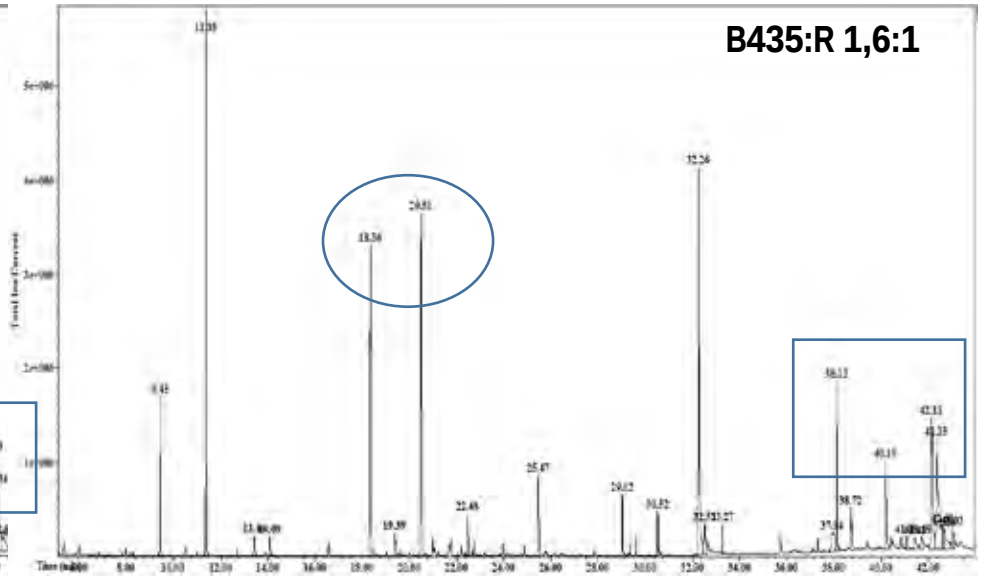


GC-MS ANALYSIS OF BASIL ESSENTIAL OIL









The Agri-Pharmacy

- Plant Factory growing ensures
  - Precision environmental control
    - Consistent product (crop) production with high yield
    - Maximised and consistent biochemical profile
    - Clean uncontaminated product
    - Photovoltaic power supply and recycled nutrients and water
    - Year round production opportunity independent of weather
    - Small to Medium-sized production capacity
    - High value crops
    - Maximum return on capital investment

Contact details

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- Yve Metcalfe-Tyrrell yve.metcalfe-tyrrell@plymouth.ac.uk

Supporting innovation.

Professor Mathew Upton. University of Plymouth
Jo Rufus, South West AgriTech
Robin Jackson, Future Farm, Duchy College
Simon Gregory, FoodWorks SW
Ross Brown, Sustainable Aquaculture Futures, University Exeter/Cefas

PROFESSOR MATHEW UPTON
Associate Head of School –
Biomedical Sciences

UNIVERSITY OF PLYMOUTH

Innovative approaches to address antimicrobial resistance: A one health perspective

Innovative approaches to address antimicrobial resistance
A one health perspective

University of Plymouth

Mat Upton

Professor of Medical Microbiology

Chief Scientific Officer - Amprologix
Director - Spectromics
Observer - WHO Technical Advisory Group on Vaccines for AMR

@mat_upton

One Health & AMR

Research letters

JAC

J Antimicrob Chemother 2020; **75**: 3411–3412
doi:10.1093/jac/dkaa338
Advance Access publication 12 August 2020

COVID-19, antibiotics and One Health: a UK environmental risk assessment

Sean D. W. Comber[1]*, Mathew Upton[2], Shaun Lewin[1], Neil Powell[3] and Thomas H. Hutchinson[1]

[1]School of Geography, Earth and Environmental Sciences, University of Plymouth, Drake Circus, Plymouth PL4 8AA, UK; [2]School of Biomedical Sciences, University of Plymouth, Drake Circus, Plymouth PL4 8AA, UK; [3]Pharmacy Department, Royal Cornwall Hospital Trust, Truro TR1 3LJ, UK

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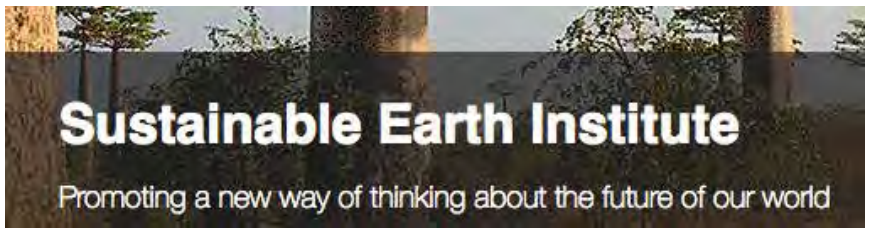
Sir,

There is growing interest in the role of secondary bacterial and fungal infections as a cause of increased morbidity and mortality in COVID-19 patients,[1] with reports of up to 95% of COVID-19 inpatients being prescribed antibiotics.[2] Concerns have been raised

Should the PEC of individual drugs exceed either the PNEC-MIC or PNEC-ENV, further investigations are required.

To examine the potential impact of antibiotic prescribing in COVID-19 patients in the UK, we have undertaken a risk assessment based on established principles.[3] Patient numbers were obtained for UK emergency hospitals set up temporarily around the country to receive COVID-19 patients, with one chosen for illustrative purposes, and details of WwTW capacity and river water dilution serving the emergency hospital and associated town were available from previous research.[4] Antibiotic excretion rates were obtained from the open literature. These data allowed estimation of antibiotic loads entering the WwTW, over and above the expected baseline (non-COVID-19) use for UK patients.[5] A freely available and validated wastewater process model (SimpleTreat 4.0) was used to predict removal rates, which allowed predictions of effluent concentrations for antibiotics of interest being discharged to surface waters. Based on known dilution estimates, a PEC:PNEC ratio was derived to provide a risk ratio.

We illustrate here data relevant to a single UK emergency hospital (Harrogate, with 500 beds; see Figure S1, available as Supplementary data at *JAC* Online) in different COVID-19 scenarios, providing environmental assessments relevant to designing optimal drug use and waste management systems in a One Health context. NICE COVID-19 guidance was followed, which suggests that the first-line antibiotic should be doxycycline, with



One Health AMR research

- Rapid genetic tools for microbial detection
  - Clinical & environmental diagnostics
  - Microbiome mapping – in health and disease
- Infection control in healthcare
- Microplastics as vectors for AMR
- Modelling AMR in the environment
- Discovery of new antibiotics in natural environments
- Vaccines for agriculture to reduce AMR

Dr Tina Joshi

Dr Phil Warburton

Dr Raul Bescos

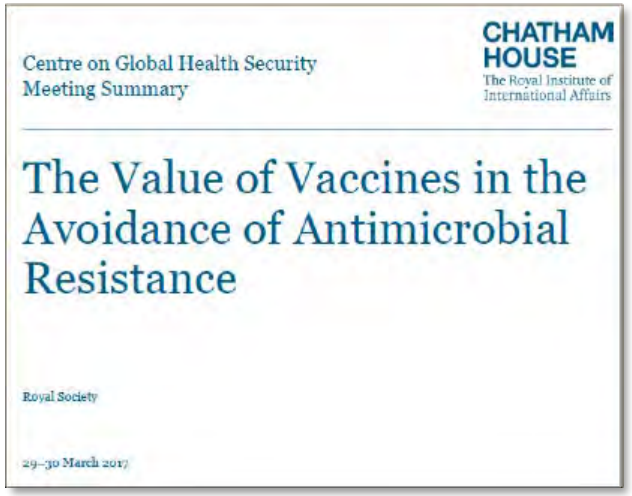
Plymouth Institute of Health and Care Research (PIHR)

From cutting-edge discovery research to translation into novel interventions and application within the community

Animal vaccination to reduce AMR

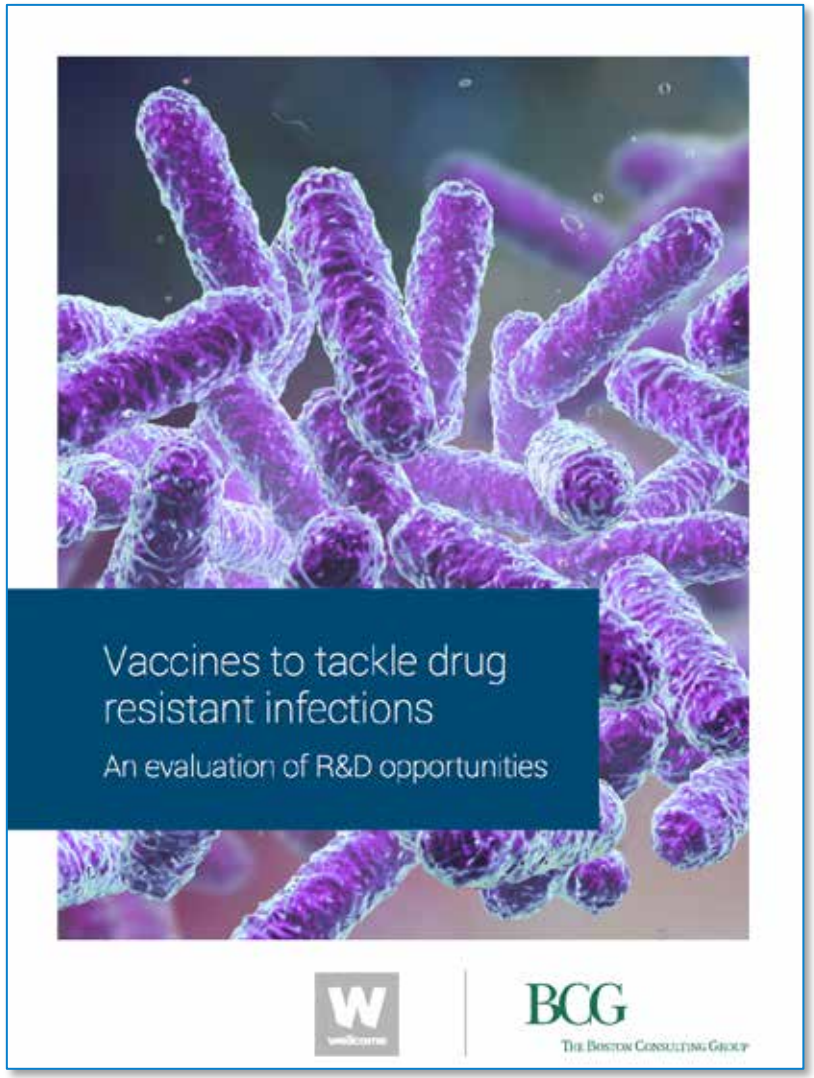
Vaccine Solutions for the 21st Century

Assoc. Prof. Michael Jarvis
University of Plymouth
The Vaccine Group



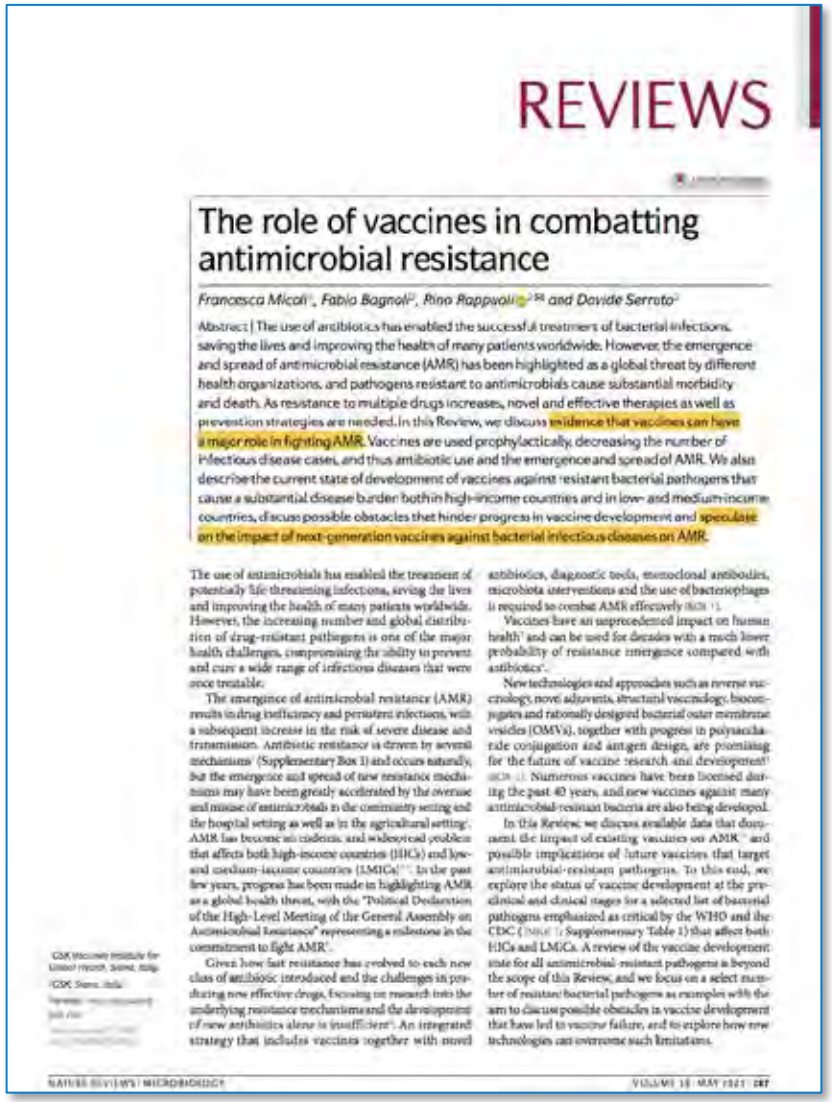
March 2017

"vaccine use and antibiotics in animals needs to be addressed"



Jan 2021

"Campylobacter transmission in LMICs needs investigation"



May 2021

"more studies are needed on vaccine use in food-producing animals"

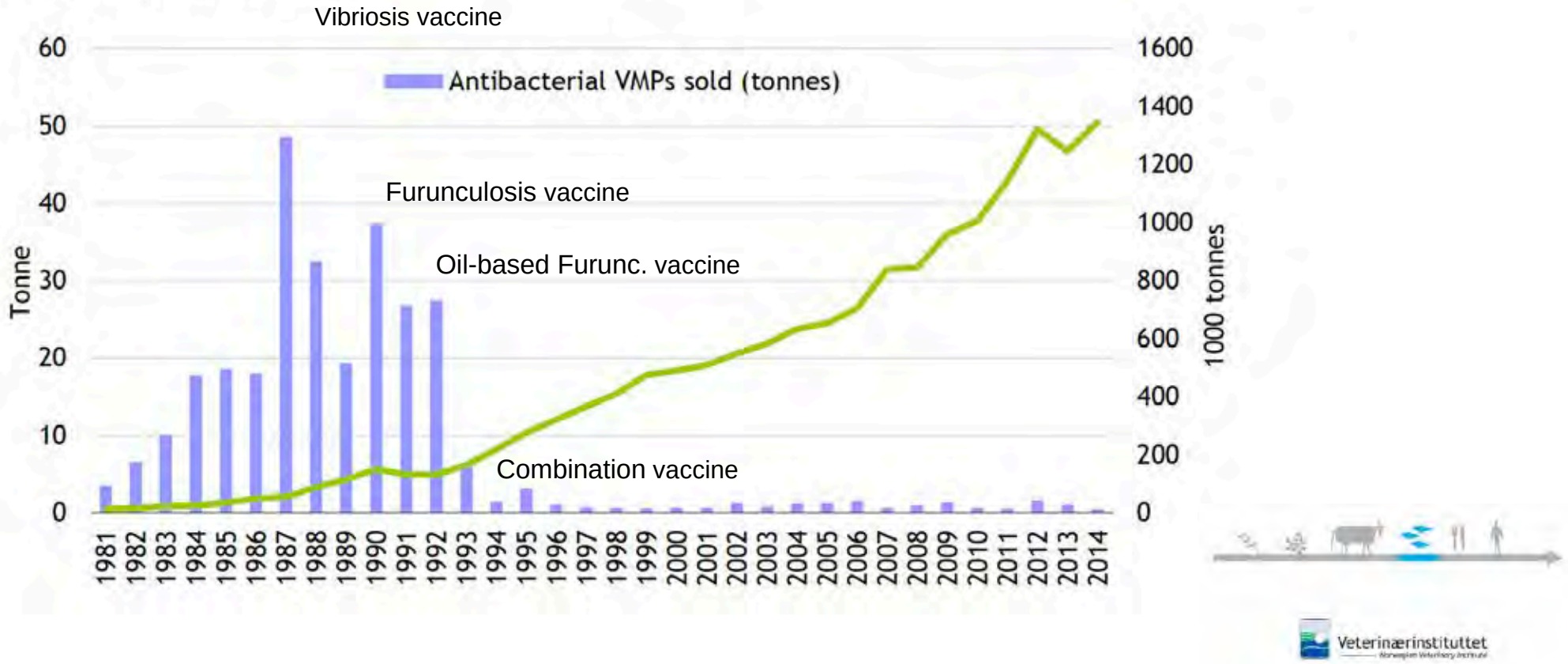
The Power of Vaccination

Norway has cut antibiotic use in salmon—one of the principal foods consumed in the country and a major export—to virtually zero. This has led to a flourishing industry and a reduction in the risk of antibiotic resistance in humans.

Norwegian Seafood Council/J. Wildhagen

Impact of Vaccination on Antibiotic Use

Figure 4. Total sales, in tonnes of active substance, of antimicrobial veterinary medicinal products (VMPs) for therapeutic use in farmed fish in Norway in the period 1981-2014 versus produced biomass (slaughtered) farmed fish.



Veterinærinstituttet

Current AMR Vaccine Projects

Porcine respiratory infection

- OIE and USDA target for vaccines
- Piglet loss & antibiotic use
- Zoonotic threat
- *Strep suis* serotype 2, 7, 9

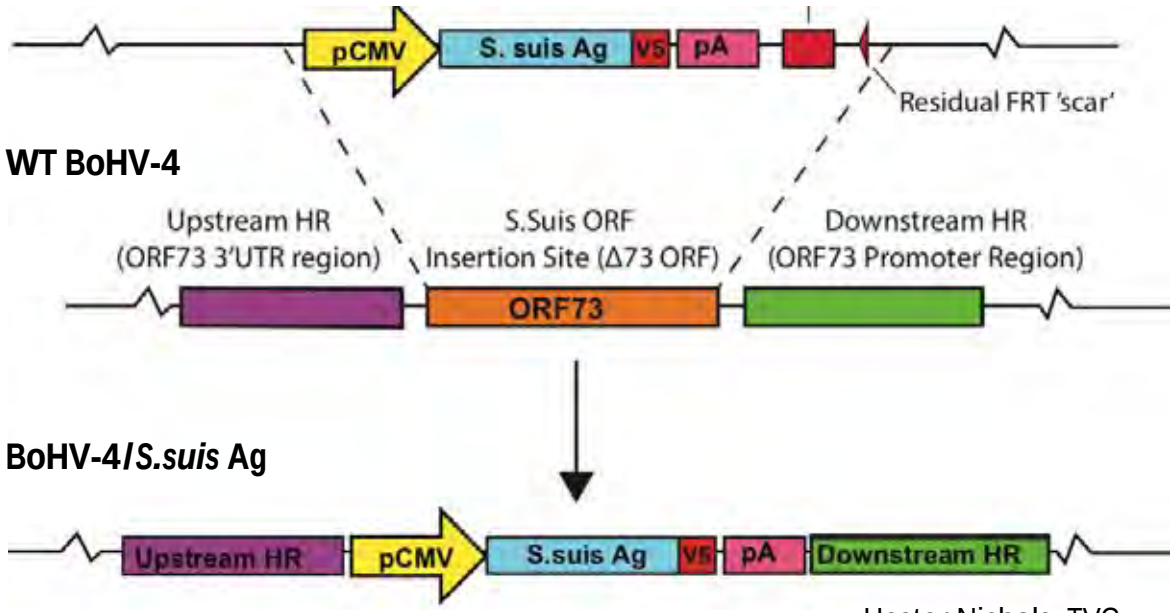
Bovine mastitis

- Milk losses & antibiotic use
- *Strep uberis, Staph aureus, E. coli*
- Current vaccines of limited success

Bovine Herpes Virus-4 (BoHV-4) as a vaccine vector

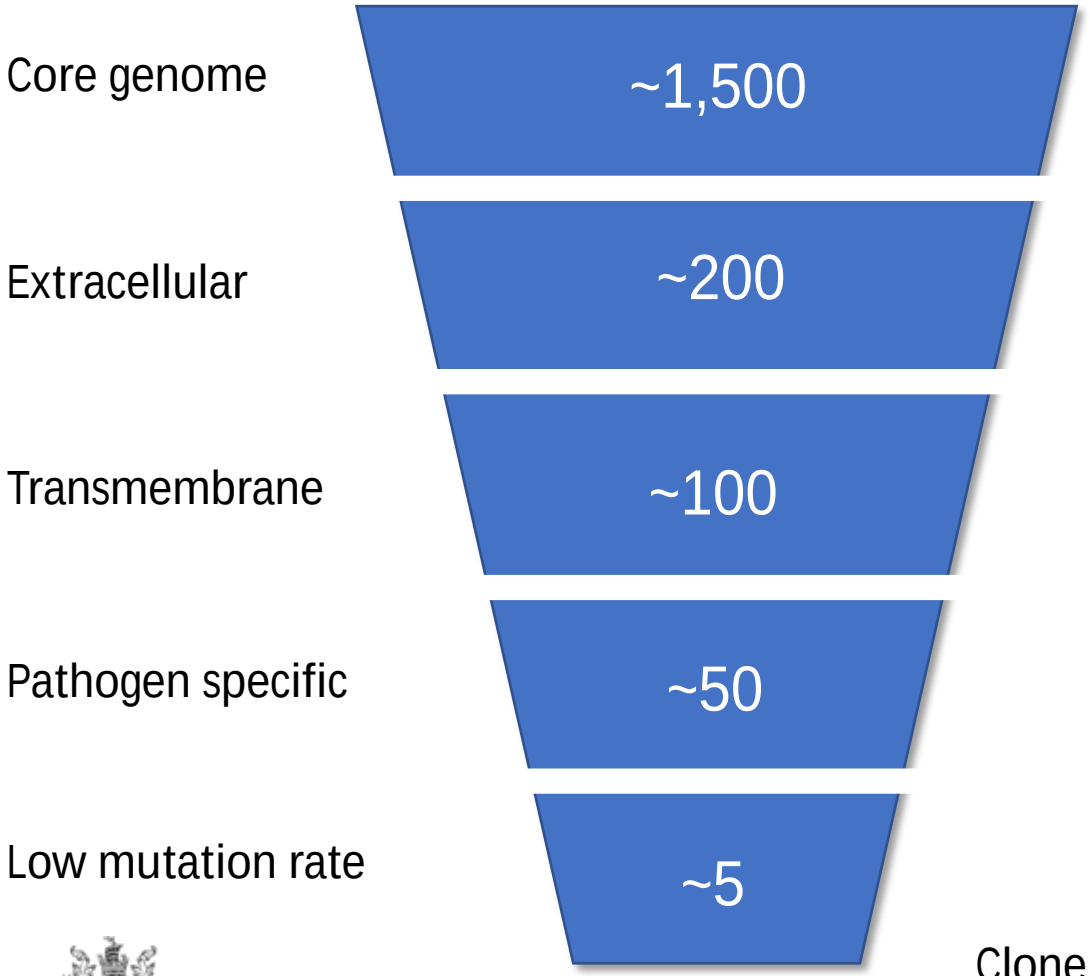
- BoHV-4 is immunogenic & can elicit serum-neutralizing antibodies against expressed proteins & T cell responses
- Little or no pathogenicity
- Virus persistence removed by ORF-73 deletion
- Able to re-infect seropositive host
- Inexpensive to produce

- Adaptable vaccine platform



Hester Nichols, TVG

Reverse vaccinology



Clone into BoHV-4

Measure impact on antibiotic use

Field challenge trial

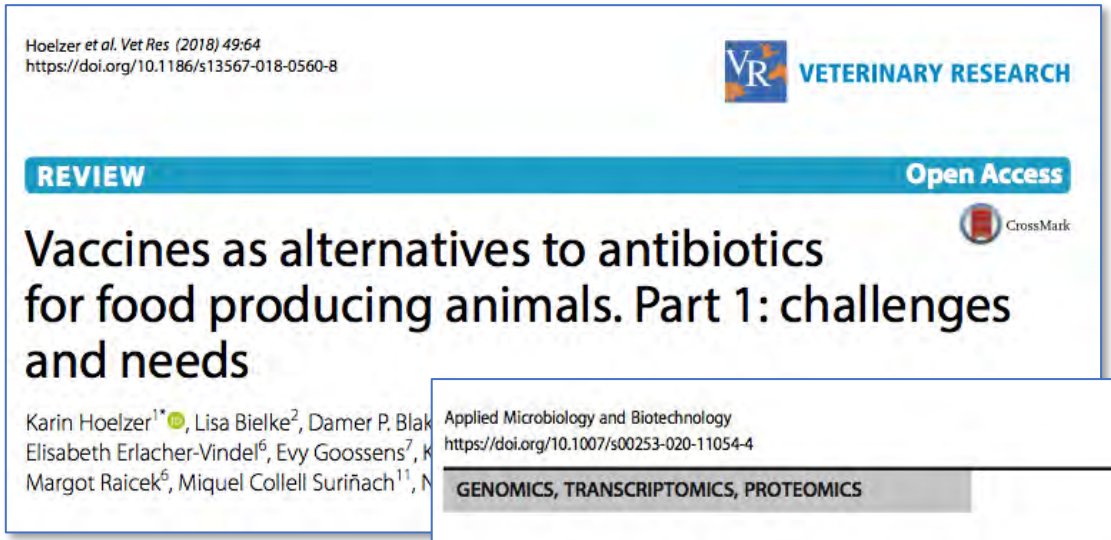
Scale up production

Challenge studies

Assess immunogenicity

University of Plymouth

Wider use of RV approaches



Hoelzer et al. Vet Res (2018) 49:64
https://doi.org/10.1186/s13567-018-0560-8

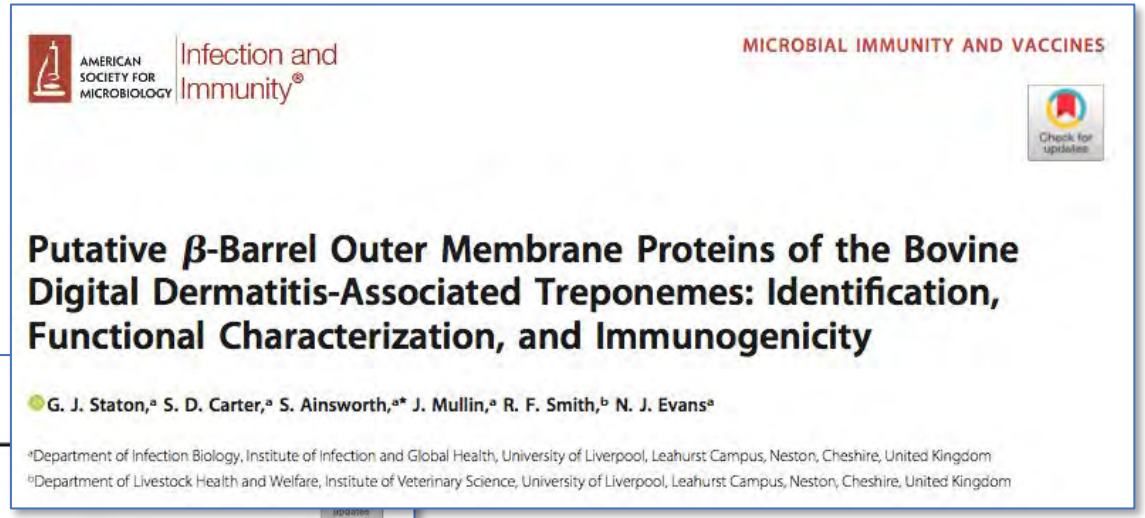
VETERINARY RESEARCH

REVIEW Open Access

CrossMark

Vaccines as alternatives to antibiotics for food producing animals. Part 1: challenges and needs

Karin Hoelzer[1*], Lisa Bielke[2], Damer P. Blak
Elisabeth Erlacher-Vindel[6], Evy Goossens[7], K
Margot Raicek[6], Miquel Collell Suriñach[11], N



AMERICAN SOCIETY FOR MICROBIOLOGY | Infection and Immunity®

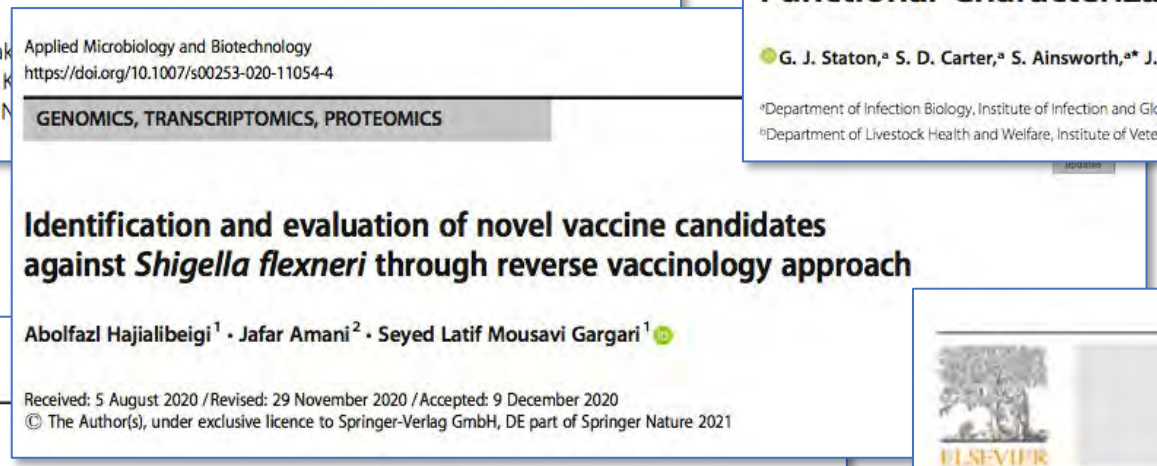
MICROBIAL IMMUNITY AND VACCINES

Check for updates

Putative β-Barrel Outer Membrane Proteins of the Bovine Digital Dermatitis-Associated Treponemes: Identification, Functional Characterization, and Immunogenicity

G. J. Staton,[a] S. D. Carter,[a] S. Ainsworth,[a]* J. Mullin,[a] R. F. Smith,[b] N. J. Evans[a]

[a]Department of Infection Biology, Institute of Infection and Global Health, University of Liverpool, Leahurst Campus, Neston, Cheshire, United Kingdom
[b]Department of Livestock Health and Welfare, Institute of Veterinary Science, University of Liverpool, Leahurst Campus, Neston, Cheshire, United Kingdom



Applied Microbiology and Biotechnology
https://doi.org/10.1007/s00253-020-11054-4

GENOMICS, TRANSCRIPTOMICS, PROTEOMICS

Identification and evaluation of novel vaccine candidates against *Shigella flexneri* through reverse vaccinology approach

Abolfazl Hajialibeigi[1] · Jafar Amani[2] · Seyed Latif Mousavi Gargari[1]

Received: 5 August 2020 / Revised: 29 November 2020 / Accepted: 9 December 2020
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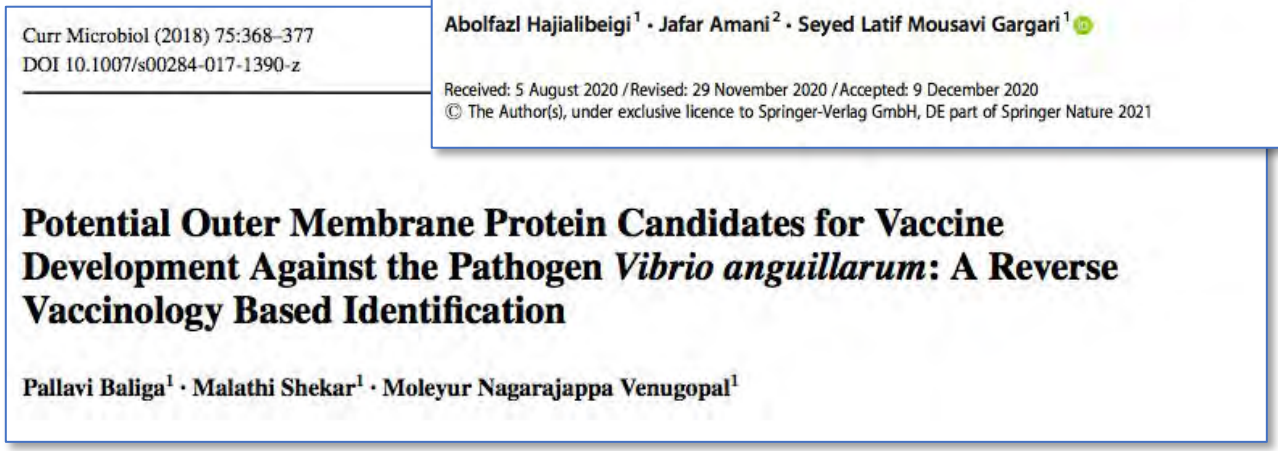
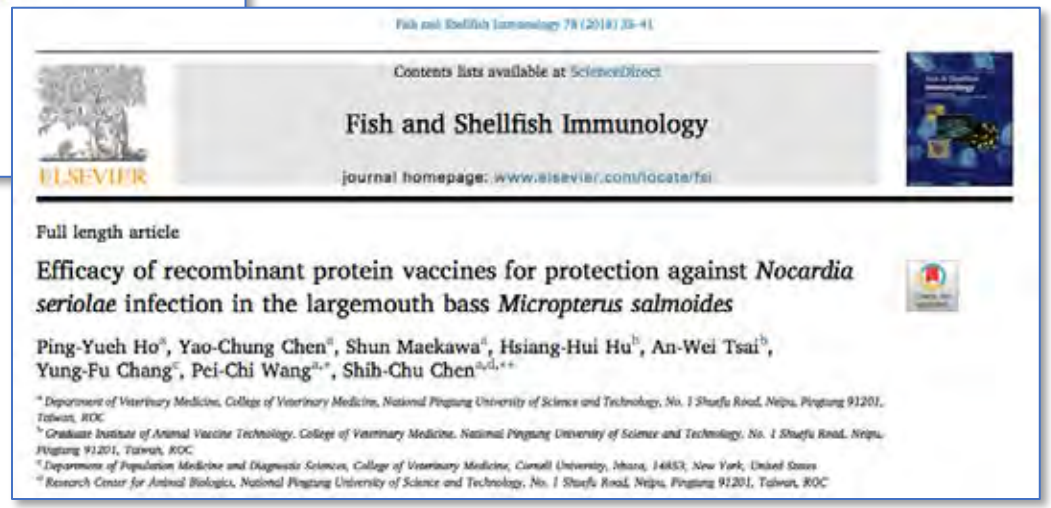


Curr Microbiol (2018) 75:368–377
DOI 10.1007/s00284-017-1390-z

Potential Outer Membrane Protein Candidates for Vaccine Development Against the Pathogen *Vibrio anguillarum*: A Reverse Vaccinology Based Identification

Pallavi Baliga[1] · Malathi Shekar[1] · Moleyur Nagarajappa Venugopal[1]



Fish and Shellfish Immunology 78 (2018) 33–41

Contents lists available at ScienceDirect

Fish and Shellfish Immunology

journal homepage: www.elsevier.com/locate/fsi

ELSEVIER

Full length article

Efficacy of recombinant protein vaccines for protection against *Nocardia seriolae* infection in the largemouth bass *Micropterus salmoides*

Ping-Yueh Ho[a], Yao-Chung Chen[a], Shun Maekawa[d], Hsiang-Hui Hu[b], An-Wei Tsai[b], Yung-Fu Chang[c], Pei-Chi Wang[a,*], Shih-Chu Chen[a,d,**]

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[b] Graduate Institute of Animal Vaccine Technology, College of Veterinary Medicine, National Pingtung University of Science and Technology, No. 1 Shuefu Road, Neipu, Pingtung 91201, Taiwan, ROC
[c] Department of Population Medicine and Diagnostic Sciences, College of Veterinary Medicine, Cornell University, Ithaca, 14853, New York, United States
[d] Research Center for Animal Biologics, National Pingtung University of Science and Technology, No. 1 Shuefu Road, Neipu, Pingtung 91201, Taiwan, ROC

Summary

- Vaccines are a powerful One Health tool for reducing AMR
- Wide access to genome sequence data makes sophisticated vaccine design feasible
- Novel vaccine vectors could improve effectiveness, with single dose potential
- Application of these approaches should be feasible in many species
- Vaccine use in agriculture could potentially improve sustainable production

Thank you

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Email - mathew.upton@plymouth.ac.uk
Twitter - mat_upton

University of Plymouth

Innovate UK

Medical Research Council

Department of Health & Social Care

Interreg France (Channel Manche) England

European Regional Development Fund

Plymouth Institute of Health and Care Research (PIHR)

From cutting-edge discovery research to translation into novel interventions and application within the community

JOANNE RUFUS
SOUTH WEST AGRITECH

Developing the region's AgriTech Powerhouse across the agricultural sector within the South West

South West AgriTech

Developing the region's AgriTech Powerhouse across the agricultural sector within the South West

www.southwestagritech.org.uk

10/03/2022

South West AgriTech

South West AgriTech

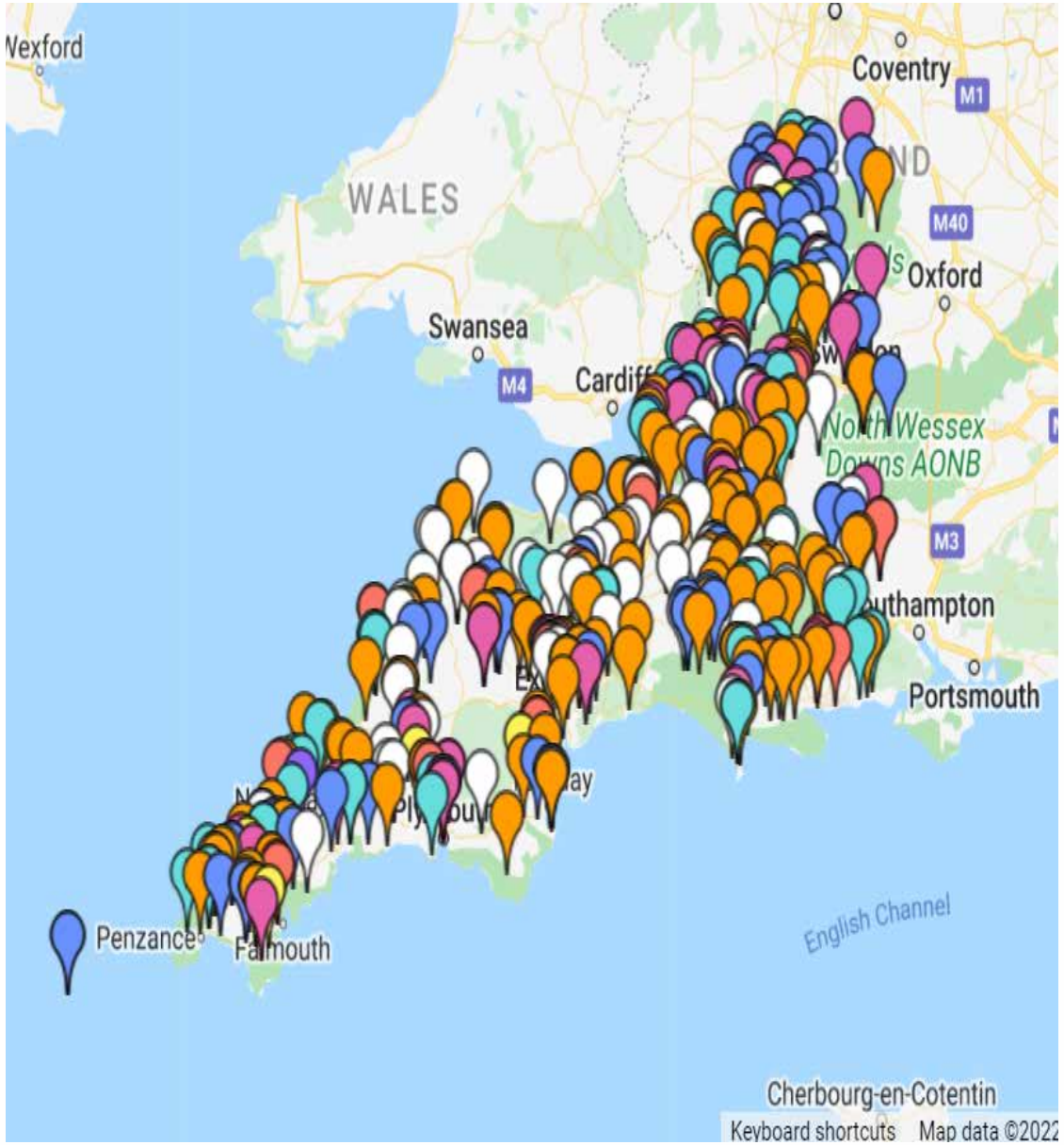
The local funding partners of South West AgriTech are:

- Cornwall and The Isles of Scilly LEP
- Dorset LEP
- West of England Combined Authority
- GFirst LEP
- Heart of the South West LEP
- Swindon & Wiltshire LEP

- Supported by Local Authority partners, NFU, academia and specialist organisations.

- Photos credit Small Robot Company and Synergy Farm Health

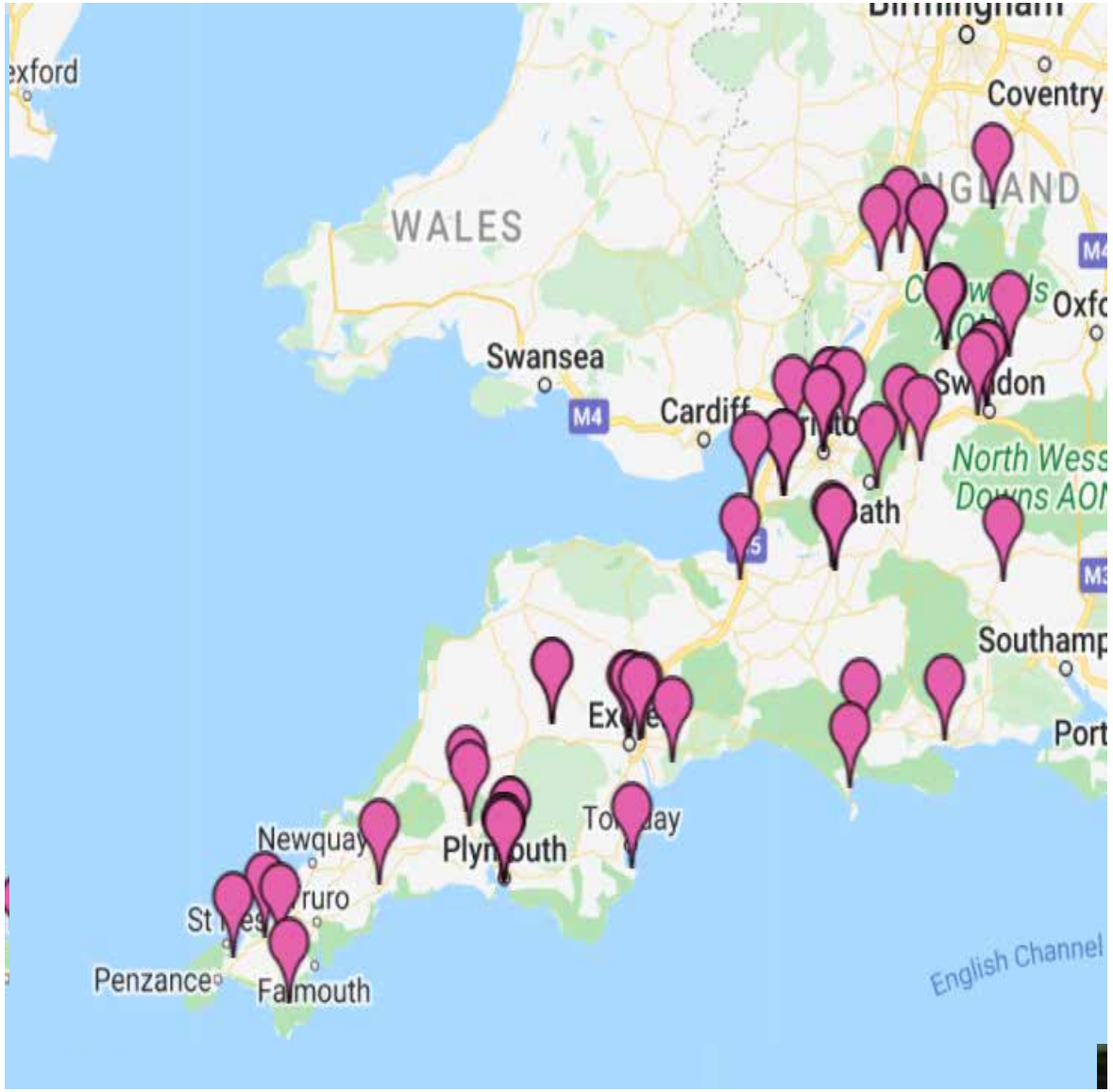
South West AgriTech



South West AgriTech

- South West
- Our climate
- Types of agriculture
- Mapping the strength of our cluster

South West AgriTech



South West AgriTech

- Strength of Academic/Research and Development
- 16 markers on Plymouth
- Derriford Research

South West AgriTech

South West AgriTech

The Positioning Paper

- Why did we write it?
- Results so far!

South West AgriTech

Farm491 at Royal Agricultural University

- Farm491 is a leading UK based innovation space focused on the future of farming and food systems.
- Farm491 supports AgriTech and agri-food entrepreneurs in converting their ideas or technologies into a viable and successful business

South West AgriTech

Production and Agricultural Intelligence Insights

Cropdesk Production is an innovative cloud-based software providing greater productivity and cost-effectiveness across the agricultural supply chain.

CROPDESK

- Cropdesk gives you the power to proactively track productivity by field, crop, farm, team and operation.
- A total productivity solution leading to greater efficiencies and cost-saving activities that will ultimately contribute to improving your bottom line.

South West AgriTech

South West AgriTech

- Our aims
- Our promotion of this emerging key sector
- Department for International Trade Game Changing Technologies for Agriculture 2022
- DIT UK AgriTech Portal https://www.agritech-uk.org/

South West AgriTech

South West
AgriTech

Future Farm

ROBIN JACKSON
RURAL BUSINESS SCHOOL

Future Farm

Robin Jackson: Director, Rural Business School

AGRITECH CORNWALL

DUCHY COLLEGE RURAL BUSINESS SCHOOL

European Union
European Regional Development Fund

Dairy Systems Research Platform

Future Farm provides a platform for research and knowledge transfer on a working farm

It has also been supported by the **Centre for Innovation Excellence in Livestock**, one of the UK's four national agri-tech innovation centres

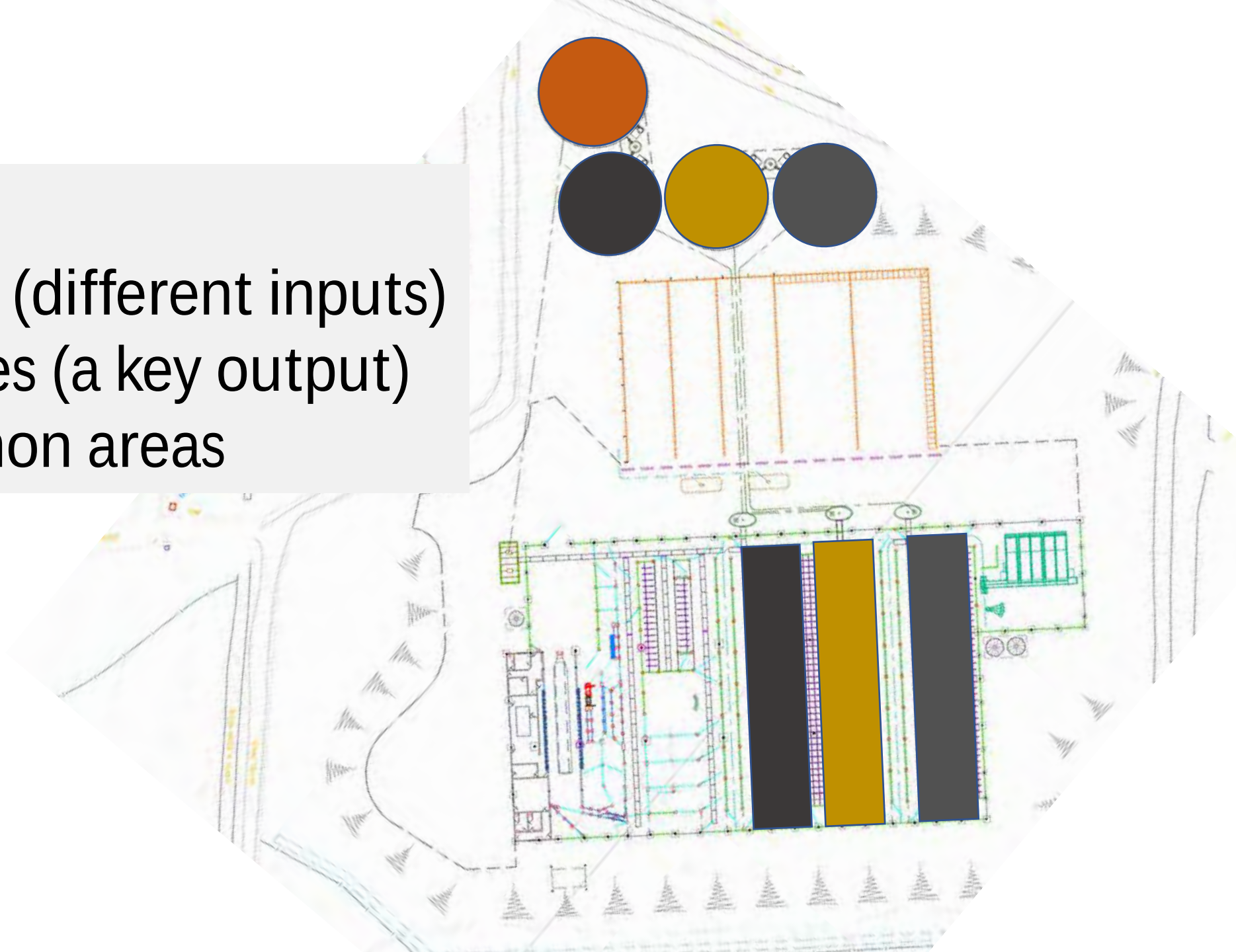
Precision Livestock: a Green Hoof-Print Dairy

From field to cow and back again: a platform to monitor different management regimes on groups of cows

- Health, welfare, breeding, lactation and digestion
- Inputs - automatic feeding
- Building and parlour sensors
- Outputs - milk and waste
- Nutrient management over seasons

Future Farm:

- 3 mini-herds (different inputs)
- 3 slurry stores (a key output)
- 4th for common areas



Automated Kitchen: precise formulation of feeds and supplements

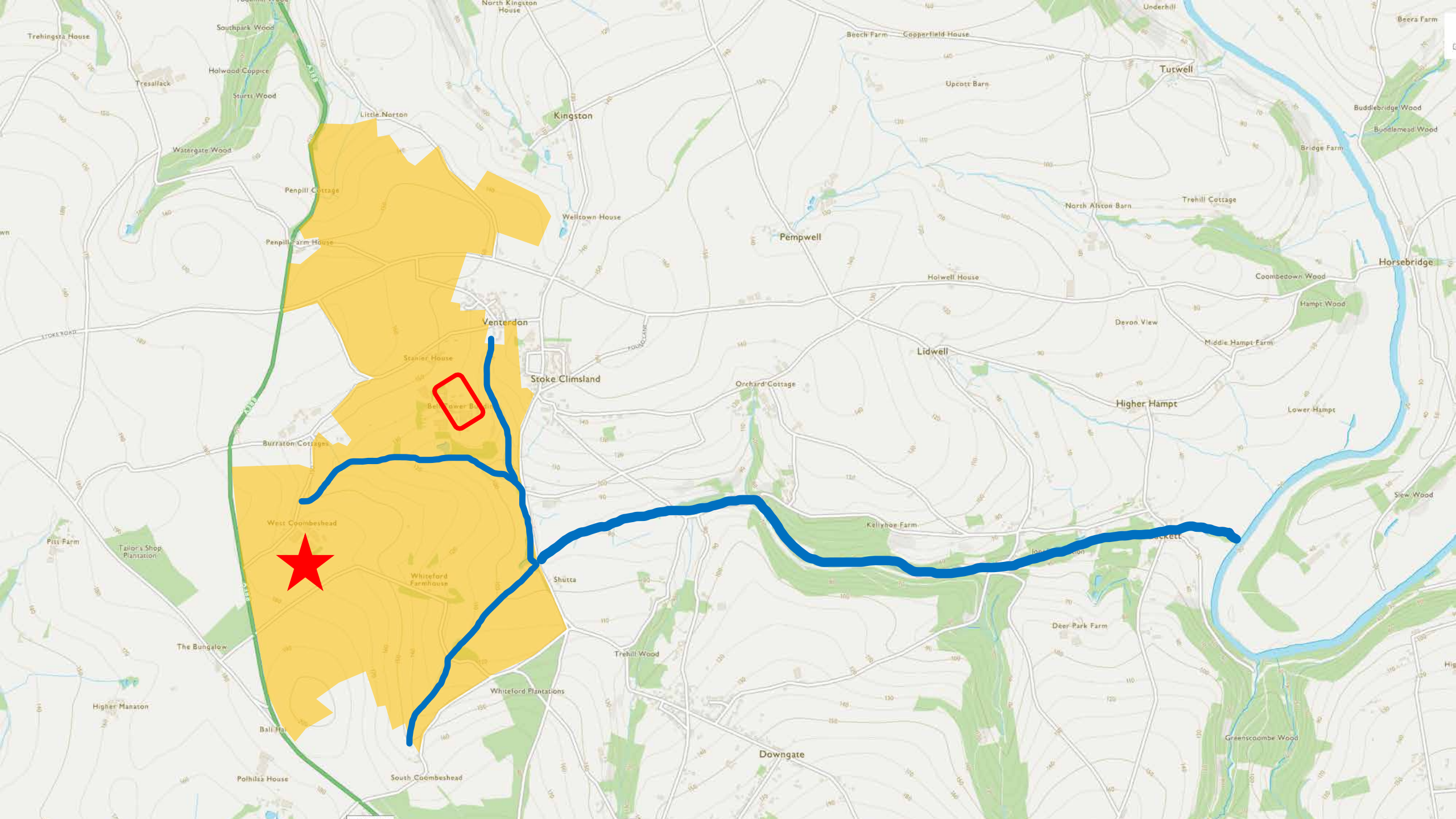
Feed Robot: precisely distributing feeds to different groups of cows

Milking Parlour: monitoring the quality and quantity of the milk produced

Slurry stores: separating the slurry from the different groups of cows

Circular approach: recycling the nutrients into crop production whilst minimising waste and pollution

Future Farm’s place in a productive landscape


Trehingsta House
Southpark Wood
Holwood Coppice
Tresalfack
Sturts Wood
Watergate Wood
Little Norton
Kingston
North Kingston House
Penpill Cottage
Penpill Farm House
Welltown House
Venterdon
Stanier House
Stoke Climsland
Burraton Cottage
West Coombeshead
Whiteford Farmhouse
Shutta
Trehill Wood
Whiteford Plantations
Downgate
South Coombeshead
Polhilsa House
The Bungalow
Higher Manaton
Pitt Farm
Tailor's Shop Plantation
Beech Farm
Copperfield House
Upcott Barn
Tuckwell
Underhill
Beera Farm
Buddlebridge Wood
Buddlemead Wood
Bridge Farm
Trehill Cottage
North Alston Barn
Pempwell
Holwell House
Horsebridge
Coombedown Wood
Hampt Wood
Devon View
Middle Hampt Farm
Lidwell
Orchard Cottage
Higher Hampt
Lower Hampt
Slew Wood
Kellyhoe Farm
Deer Park Farm
Greenscoombe Wood
A388
STOKE ROAD
POUNDLANE

Why use Future Farm and its landscape?

1. Test innovations (over 20 different new products being trialled) in particular:
    - Sensors, Treatments, Data & Analytics, Software, Crops and Feeds
    - ***Also*** the efficacy of regenerative and natural capital interventions
2. Demonstration and Knowledge Transfer
3. Teaching

SUSTAINABILITY

Food and Drink Innovation and Development

SIMON GREGORY
COMMERCIAL MANAGER SOUTH WEST

THE Food Works SW
plan | create | innovate

THE Food Works SW

plan | create | innovate

Food and Drink Innovation and Development

Simon Gregory

The Food and Drink Forum

FOOD & DRINK FORUM

North Somerset Council

WE ARE WEST OF ENGLAND LOCAL ENTERPRISE PARTNERSHIP

HM Government

Introduction

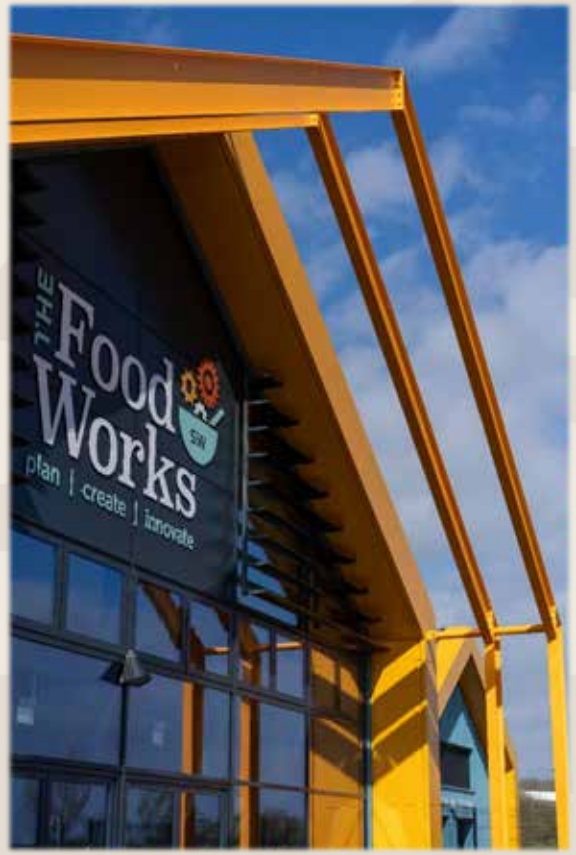
An innovation centre for supporting south west food and drink businesses with specialist equipment, facilities and technical support.

- Product Development Facilities
- Food-grade Business Units
- Business Hub

Located at J21 on the M5 at Weston-super-Mare.

Supporting producers

- Drive innovation, increased productivity, high value jobs, skills and training opportunities and knowledge transfer.
- Start ups to large companies food and drink technical advice and guidance and support.
- Safe production for consumption.
- Concept to launch - moving an idea through the stages to being a sellable product.
- Development, trial and scale up.
- Innovation through equipment, techniques, ingredients and processes.
- Networking.



Product Development

5 development kitchens.

- Trial kitchen.
- Bakery.
- Dairy/ Non Dairy.
- Soft drinks.
- Commercial.

Allow businesses of any size to

- Scale-up production.
- Introduce new lines.
- Produce short runs.
- Pilot product improvements.

Development & Innovation

- New to Market.
- Functional Ingredients.
- Shelf life.
- Sustainability.
- Local Supply Chains.
- Market trends and insights.
- Health impacts inc. HFSS, Nootropics, FODMAP diets.
- Allergen replacement.

Contact

The Food Works SW
8 Whirlwind Road
Weston-Super-Mare
BS24 8EF
enquires@foodworks-sw.co.uk
www.foodworks-sw.co.uk
01934 315381

Sustainable Aquaculture Futures

ROSS BROWN
Industrial Research Fellow




SUSTAINABLE AQUACULTURE FUTURES

Collaborative Centre

UNIVERSITY OF EXETER

Cefas

Dorset One Heath 2022

Ross Brown

https://www.exeter.ac.uk/research/saf/

@SAFexeter




SUSTAINABLE AQUACULTURE FUTURES

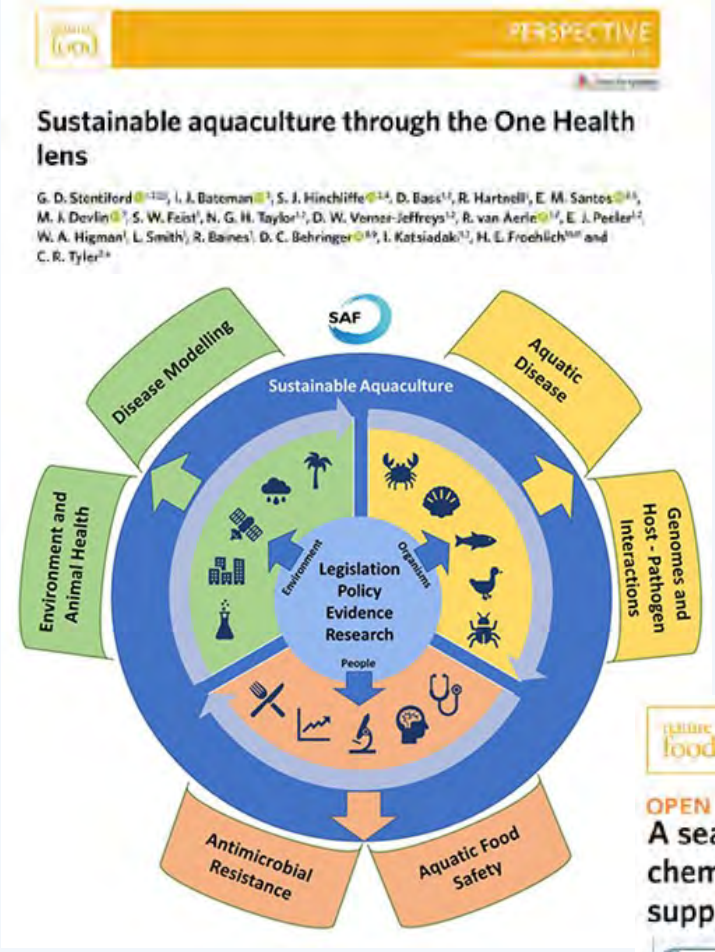
Launched Oct 2017

Some key aims :

1. Build academic and practical capabilities in the field of **aquatic health, disease control and aquaculture based food security and safety.**
2. Strengthen *regional, national and international* collaborations, responding to global challenges and emerging markets

https://www.exeter.ac.uk/research/saf/

@SAFexeter



Employing a **One Health approach**

- **Environment**
- **Organisms**
- **People**

in the development of **sustainable aquaculture**

Overarching topics

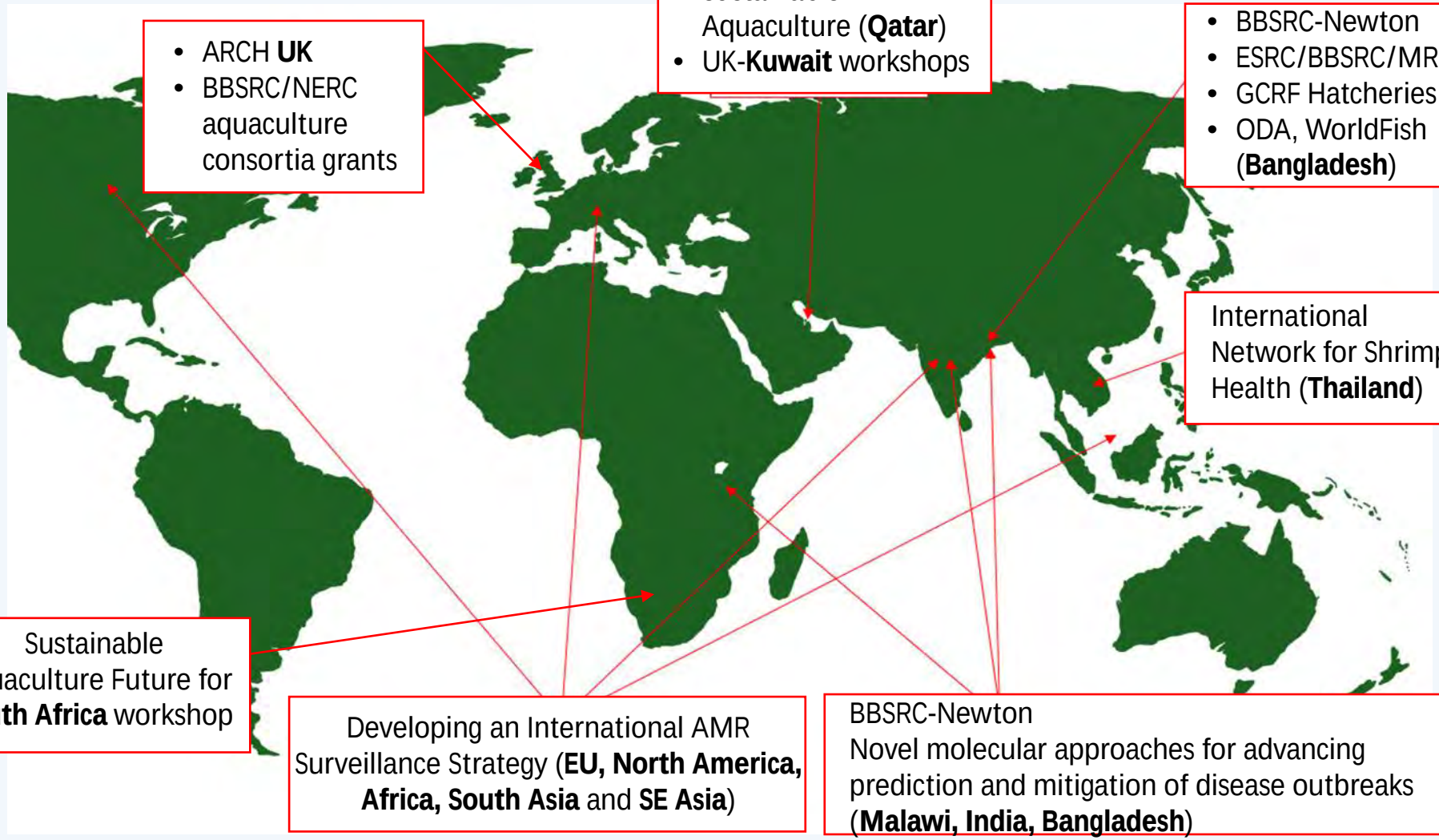
- *Aquatic Disease*
- *Genomes and Host – Pathogen Interactions*
- *Aquatic Disease Modelling and Epidemiology*
- *AMR*
- *Environment and Animal Health*
- *Aquatic Food Safety*

What we are delivering together

SUSTAINABLE AQUACULTURE FUTURES

1. Supporting sustainable aquaculture through national and international research, development and innovation (***over £6M in research income since 2015***)
2. Strengthening international academic collaborations ***enabling knowledge exchange and capacity building*** in developing and Low-Income Food Deficit Countries (LIFDCs) and emerging markets (WorldFish, FAO etc.)
3. Training next generation scientists for careers in aquatic food security and safety (***> 40 PhD studentships***)
4. Producing high quality research outputs with influence (***> 150 papers together since 2011***)

International Networks



- ARCH **UK**
- BBSRC/NERC aquaculture consortia grants

- Sustainable Aquaculture (**Qatar**)
- UK-**Kuwait** workshops

- BBSRC-Newton
- ESRC/BBSRC/MRC
- GCRF Hatcheries
- ODA, WorldFish (**Bangladesh**)

International Network for Shrimp Health (**Thailand**)

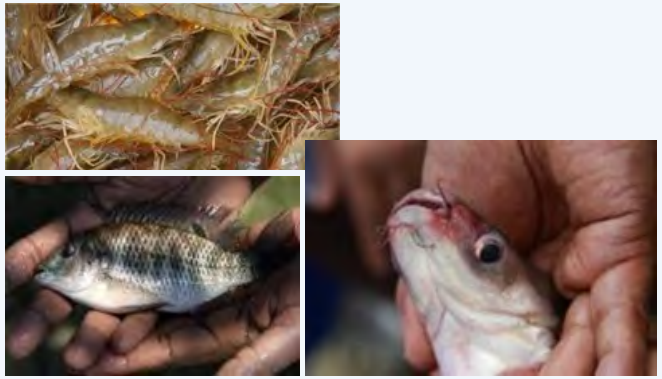
Sustainable Aquaculture Future for **South Africa** workshop

Developing an International AMR Surveillance Strategy (**EU, North America, Africa, South Asia** and **SE Asia**)

BBSRC-Newton
Novel molecular approaches for advancing prediction and mitigation of disease outbreaks (**Malawi, India, Bangladesh**)

Novel molecular biology techniques to reduce disease impacts

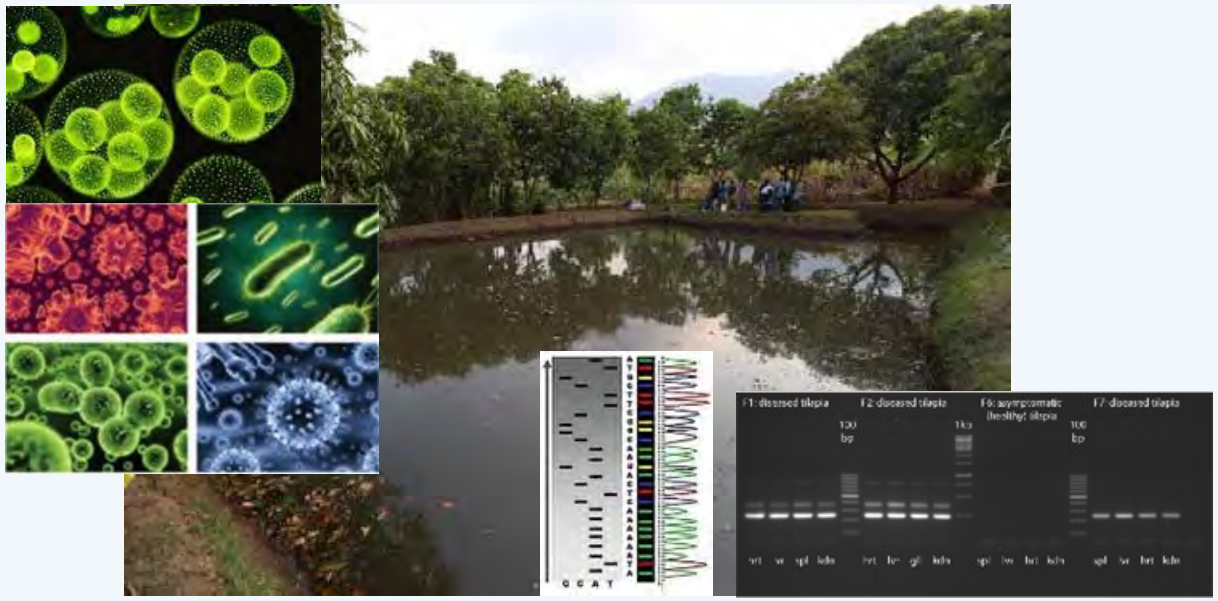
in aquaculture for the improvement of profitability of small-scale farmers in India

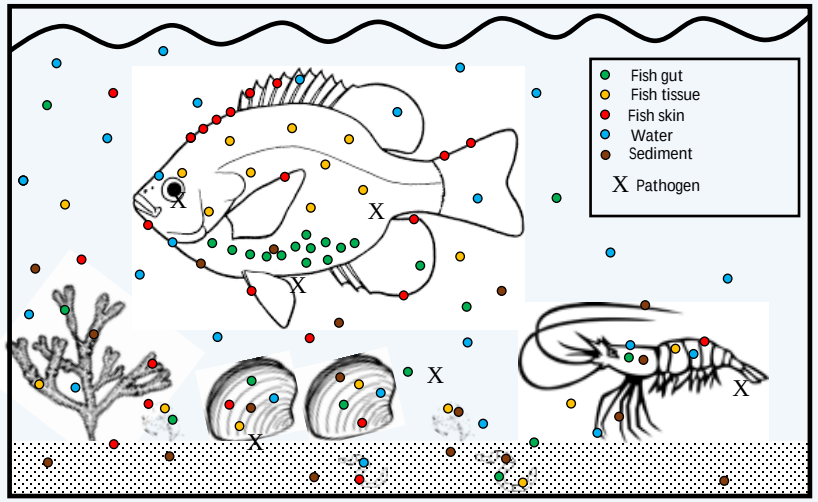


WorldFish

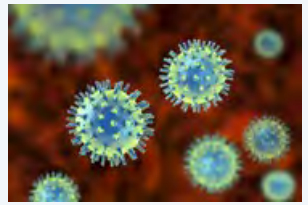
arban

Pond microbiomes and associated conditions that drive disease outbreaks in aquaculture…





TiLv



Bass, et al., (2019). TREE 34(11): doi: 10.1016/j.tree.2019.07.012
Chaput, et al., (2020). Viruses 12(3): doi: 10.3390/v12030258

BBSRC bioscience for the future

Newton-Bhabha Fund

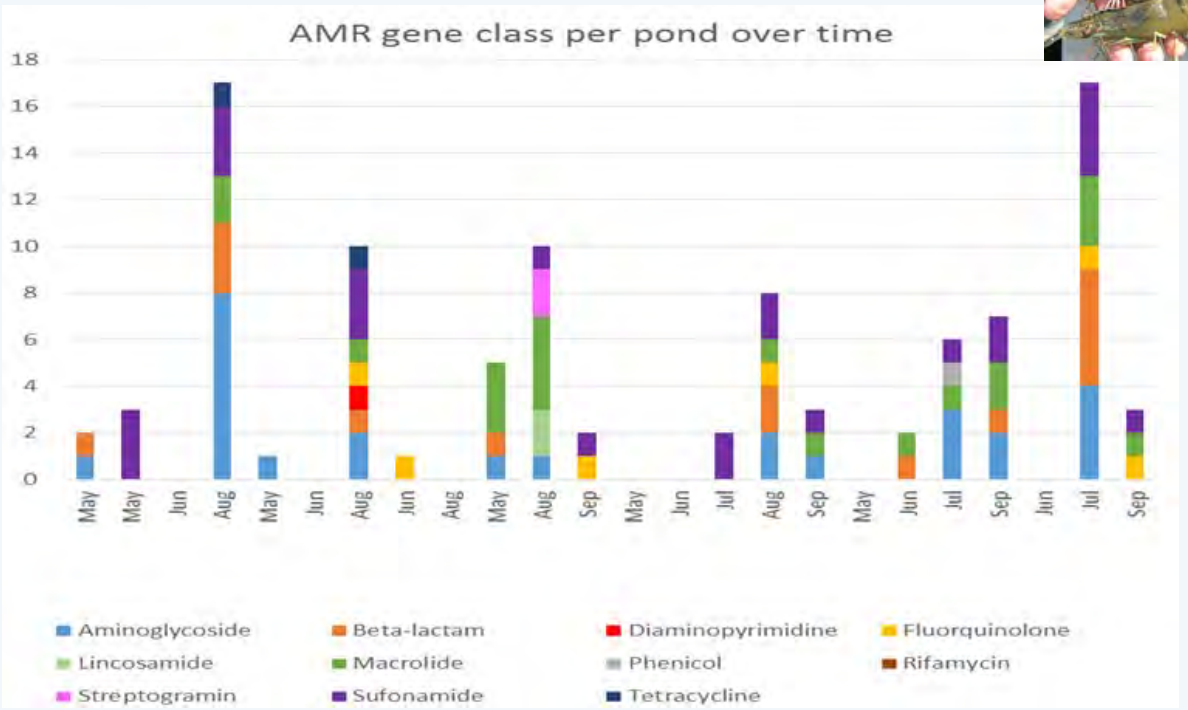
UKaid

E·S·R·C Economic & Social Research Council

Managing chemicals, antibiotics and AMR

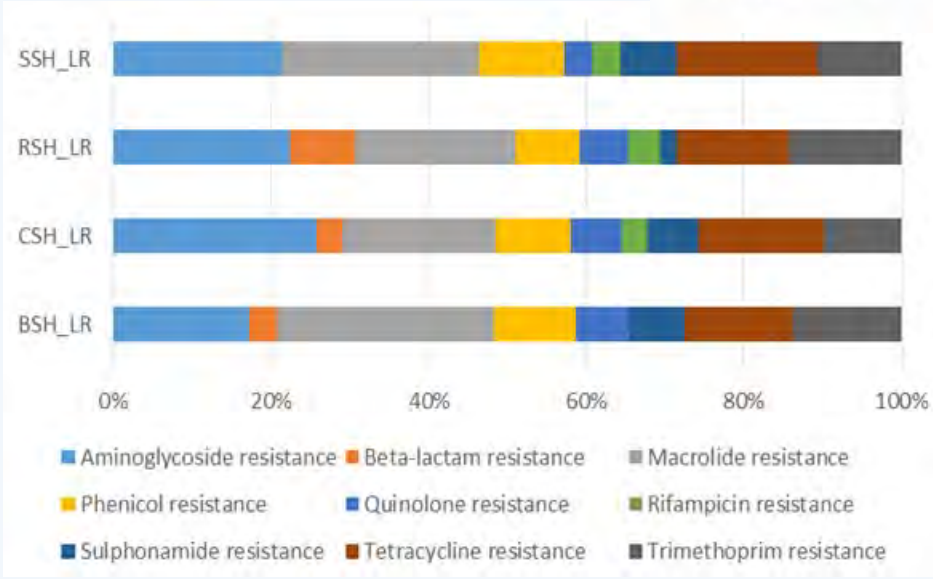
Estimated global use of antibiotics for selected finfish culture is 100 000s tonnes
Average amount of antibiotics used per year per shrimp hatchery: 108kg (20 hatcheries surveyed).
Antibiotic alternatives such as probiotics, prebiotics and synbiotics

AMR genes classes in shrimp ponds over time



Thornber, et al., (2020) Reviews in Aquaculture 1-21
doi: 10.1111/raq.12367

AMR in fish ponds



AMR genes found in tanks conferred resistance to critically important or highly important antimicrobials (WHO classification)

Thornber et al. (2020). Global Health Action *12*
doi: 10.1080/16549716.2020.1734735

National Aquaculture Projects: RCUK Aquaculture Funding Initiative

ROBUST-SMOLT

Impact of early life history in freshwater recirculation aquaculture systems on Atlantic salmon robustness & susceptibility to disease at sea

PROGRAMME
BBSRC/NERC
Joint Call in Aquaculture: Collaborative Research & Innovation

DURATION
36 months
Jan 2019 – Dec 2021

COORDINATOR / P.I.

Prof Herve Migaud
Institute of Aquaculture
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01786 467886

Co-P.I.s
Prof Charles Tyler (Exeter)
Prof Sam Martin (Aberdeen)
Prof Ross Houston (Edinburgh)

MORE INFO
Gateway to Research

MAIN FUNDERS
BBSRC and NERC

THE CHALLENGE

The rapid global expansion of the salmon industry has been made possible through the adoption of new farming technologies (including contained recirculation aquaculture systems-RAS) and husbandry regimes to manipulate the fish's physiology (time to seawater transfer and early maturation). These systems have clear advantages over land-based flow through and freshwater (FW) loch systems and salmon parr/smolts produced in RAS under manipulated regimes (constant high temperature and light) reach larger sizes and can be transferred to SW earlier than ever before. However, our knowledge of the impacts these new rearing systems have on salmon physiology is very limited. The impact of differing microbiota, water chemistry, altered photo-thermal regimes on fish disease resistance at sea, immune function and microbiome have not been characterised and these may explain sub-optimal performance of farmed stocks.

OBJECTIVES

To provide new knowledge and tools to monitor and enhance farming system efficiency and reliability, fish robustness and health, and sector productivity and sustainability.

1. To characterise and understand microbiome on mucosal surfaces and health interactions at early life stages, its impact upon lifelong immune competence and the impact of different production regimes.
2. To establish the interrelationships between FW chemistry (especially CO_2) in RAS and health ar
3. To establish t immune func
4. To establish t upon perform
5. To study gen environment
6. To facilitate a training and

PARTNER AND FUNDER LOGOS

University of Stirling · The University of Edinburgh · University of Aberdeen · University of Exeter · MOWI · Cooke Aquaculture Scotland · PHARMAQ · Biomar · Scottish Aquaculture Innovation Centre · Scottish Salmon · Cefas · BBSRC · NERC

AquaLeap: Innovation in Genetics and Breeding to Advance UK Aquaculture Production

PROGRAMME
BBSRC/NERC
Joint Call in Aquaculture: Collaborative Research & Innovation

DURATION
36 months
Jan 2019 – Dec 2021

COORDINATOR / P.I.

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Dr Eduarda Santos (Exeter)
Dr Andrew Davie (Stirling)
Dr Tim Bean (Cefas)

MORE INFO
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Gateway to Research

MAIN FUNDERS
BBSRC and NERC

THE CHALLENGE

Productive and sustainable UK aquaculture systems require a reliable supply of high quality stock. Well-managed programmes of domestication and selective breeding have huge potential for cumulative gains in production. However, the level of technology used for breeding and production is wide-ranging across aquatic species. Reliance on wild or near-wild stock creates vulnerability and limits profitability via impaired ability to improve stock performance and to combat emerging challenges. As such, a key research challenge for UK aquaculture is to enable selective breeding. Current barriers to this include knowledge gaps in the genetic basis of economically important traits, and a lack of molecular tools and quantitative genetics expertise.

OBJECTIVES

AquaLeap aims to improve genetics and breeding for four UK aquaculture sectors including a large, advanced industry (salmon), and smaller or emerging industries (lobster, flat oyster and lumpfish).

1. To develop and apply a range of novel genomic tools and resources to underpin domestication and genetic improvement for four species of commercial importance or potential in UK aquaculture.
2. To investigate the genetic and epigenetic basis of variation in key commercial production traits, with a focus on growth, robustness and disease resistance.
3. To improve gene editing techniques in aquaculture species, and use gene editing approaches to identify the causative factors underlying a major locus affecting disease resistance in salmon.
4. To address sk quantitative
5. To engage so of advanced

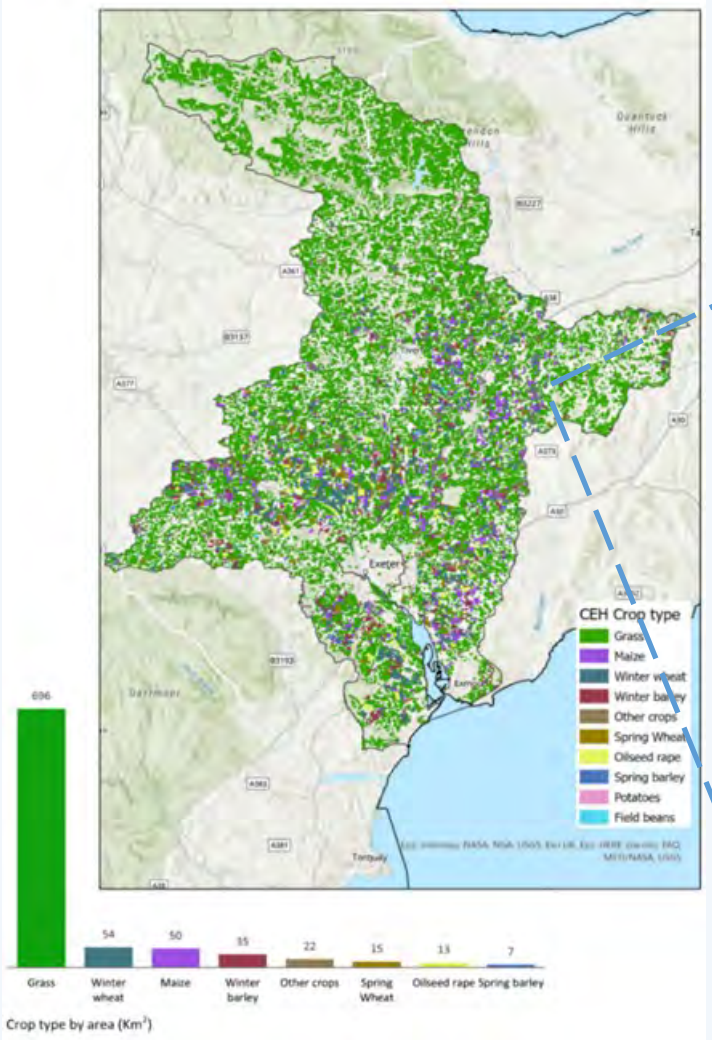
INDUSTRY

PARTNER AND FUNDER LOGOS

The University of Edinburgh · University of Stirling · University of Aberdeen · University of Exeter · Xelect · Hendrix Genetics

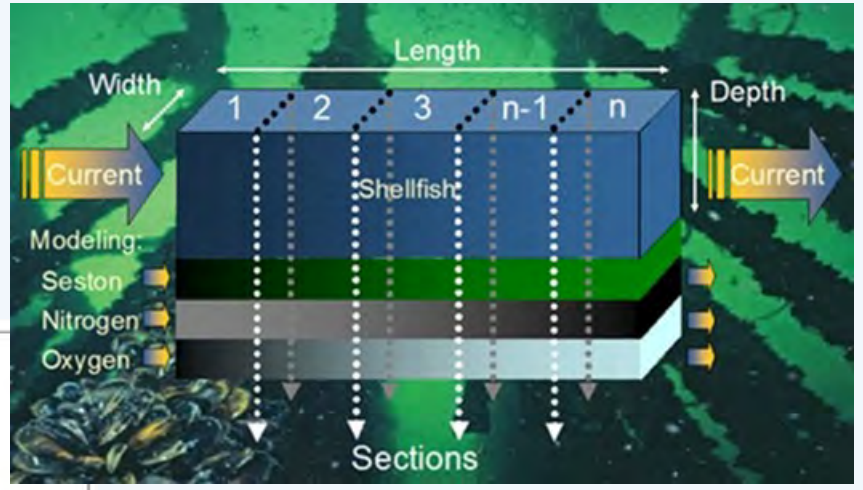
SW England - Linking land use - water quality - shellfish quality

UKCEH Land Cover® plus

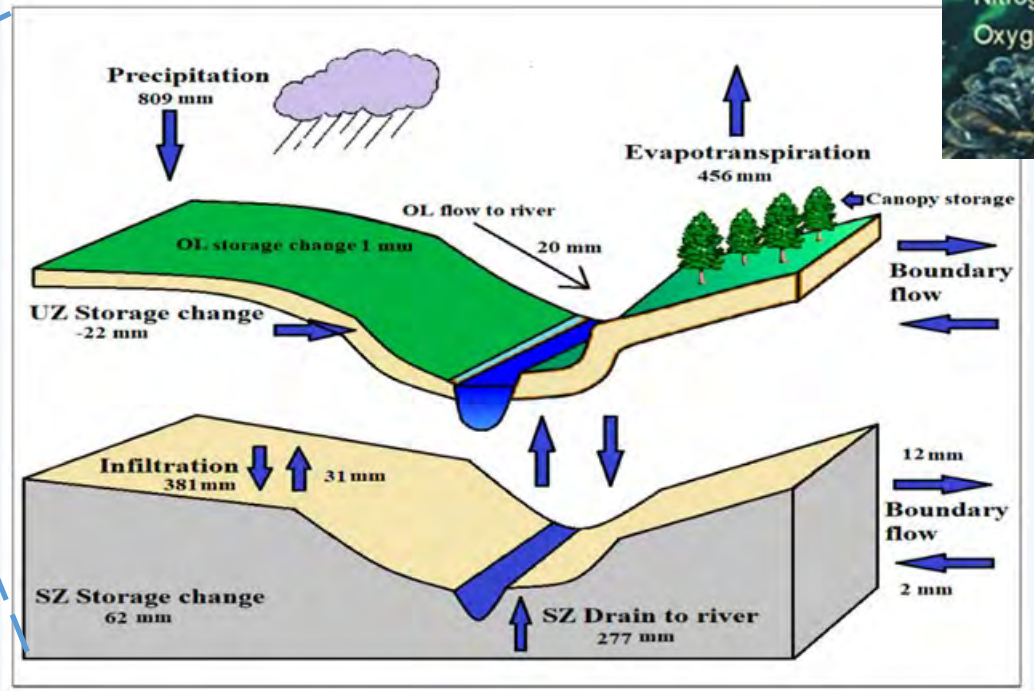


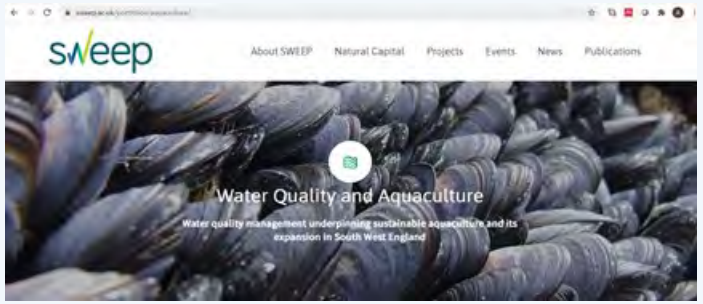
- **Nitrogen** – primary production
- **Copper** – inhibits shellfish growth
- **FIOs** – affect shellfish quality/hygiene

ShellSIM



INCA





https://sweep.ac.uk/portfolios/aquaculture/

sweep

University of Exeter

Cefas

Westcountry Rivers Trust

Devon Wildlife Trust

Plymouth Marine Laboratory

NERC Science of the Environment

AI image analysis - Quantifying biofouling on farmed seaweed in Portland Port

Image capture

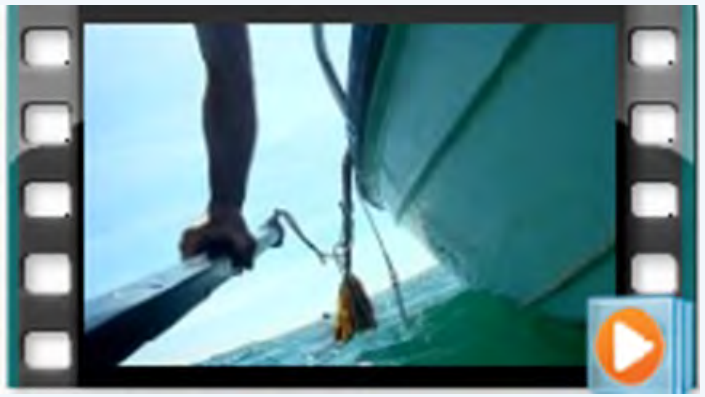
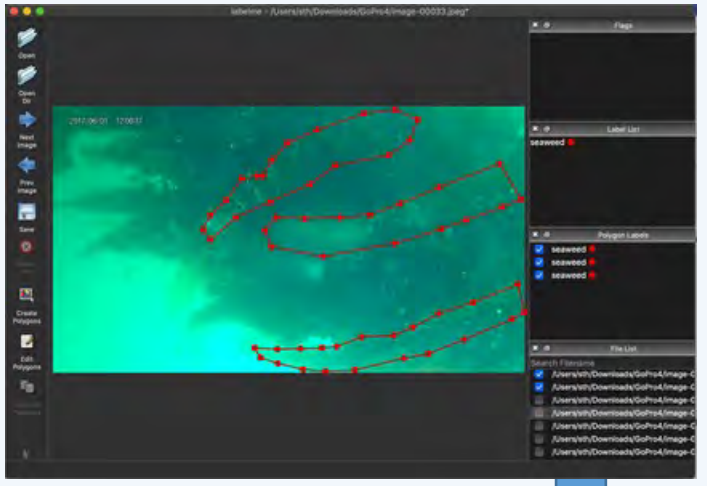
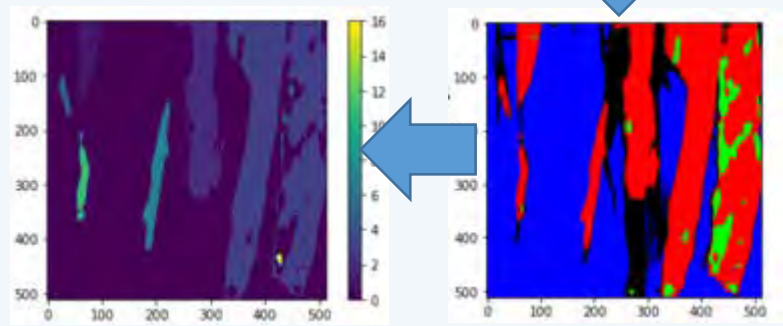
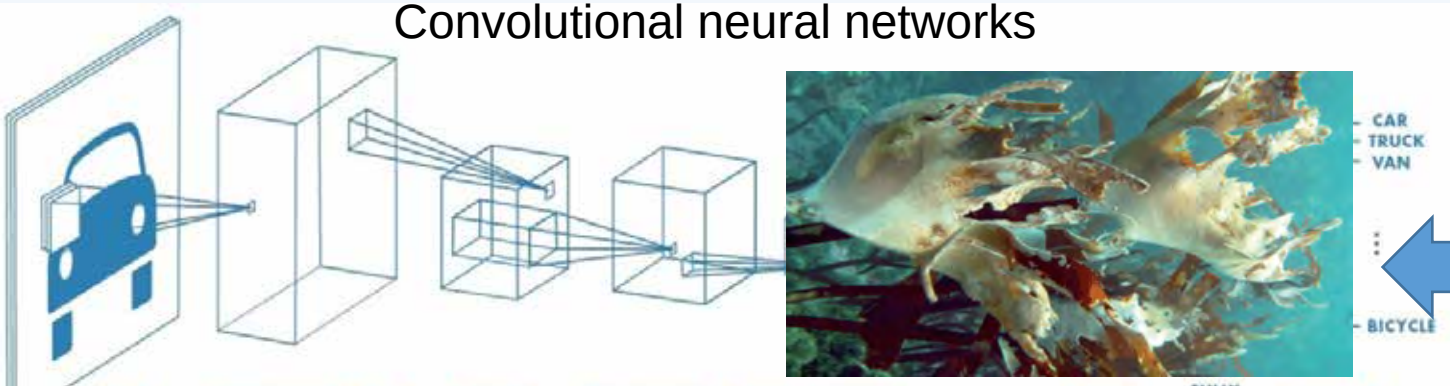


Image extraction and labelling





Convolutional neural networks



Feature learning

Classification

UNIVERSITY OF EXETER

SAF

Wessex Internet

JURASSIC SEA FARMS

5G RuralDorset

Thanks

SUSTAINABLE AQUACULTURE FUTURES

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Grant Stentiford

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Afsoon Sadeghi Azadi

Industrial Research Fellow

Lisa Bickley

Business Development Manager

Wendy Higman

Business Development Associate

Louise Smith

https://www.exeter.ac.uk/research/saf/

- Bass D et al. (2019). The Pathobiome in Animals and Plant Diseases. **Trends in Ecology and Evolution** 30(11): 996-1008 https://doi.org/10.1016/j.tree.2019.07.012
- Thornber K et al. (2019). Evaluating antimicrobial resistance in the global shrimp industry. **Reviews in Aquaculture** 1-21 https://doi.org/10.1111/raq.12367
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- Brown AR et al. (2020). Assessing risks and mitigating impacts of harmful algal blooms on mariculture and marine fisheries **Reviews in Aquaculture** 12, 1663–1688. https://doi.org/10.1111/raq.12403
- Chaput DL et al. (2020). The Segment Matters: Probable Reassortment of Tilapia Lake Virus (TiLV) Complicates Phylogenetic Analysis and Inference of Geographical Origin of New Isolate from Bangladesh. **Viruses**12. https://doi.org/10.3390/v12030258
- Hinchliffe S et al. (2020). Production without medicalisation – socio-economic drivers of disease and antimicrobial uses in aquaculture. **Geographical Journal** https://doi.org/10.1111/geoj.12371
- Stentiford GD et al. (2020). Sustainable aquaculture through the One Health lens. **Nature Food** 1: 468 - 474. https://doi.org/10.1038/s43016-020-0127-5
- Webber JL et al. (2021). Impacts of land use on water quality and the viability of bivalve mariculture in the UK: A case study for SW England. **Environmental Science and Policy** 126:122–131 https://doi.org/10.1016/j.envsci.2021.09.027
- Stentiford GD et al. (2022). A seafood risk tool for assessing and mitigating chemical and pathogen hazards in the aquaculture supply chain. **Nature Food** *3: 169–178* https://doi.org/10.1038/s43016-022-00465-3
- Corrigan et al. (2022). Approaches to quantifying habitat provision for evaluating the ecological and economic value of macroalgal cultivation **Reviews in Aquaculture** A*ccepted*

Agri-EPI Centre
Supporting Agri-Tech Innovation

LISA WILLIAMS
DIRECTOR OF BUSINESS DEVELOPMENT

DORSET Local Enterprise Partnership

AGRIEPICENTRE Engineering • Precision • Innovation

Agri-EPI Centre
Supporting Agri-Tech Innovation

Presented by:

Lisa Williams
Director of Business Development

Empowering world leading precision agricultural technology

Part of the family of Centres

Agri-EPI Centre is one of UK's four Centres of **Agricultural Innovation**. Supported by Department for Business, Energy and Industrial Strategy and Innovate UK, the four Agri-Tech Centres are delivering benefits to UK farming.

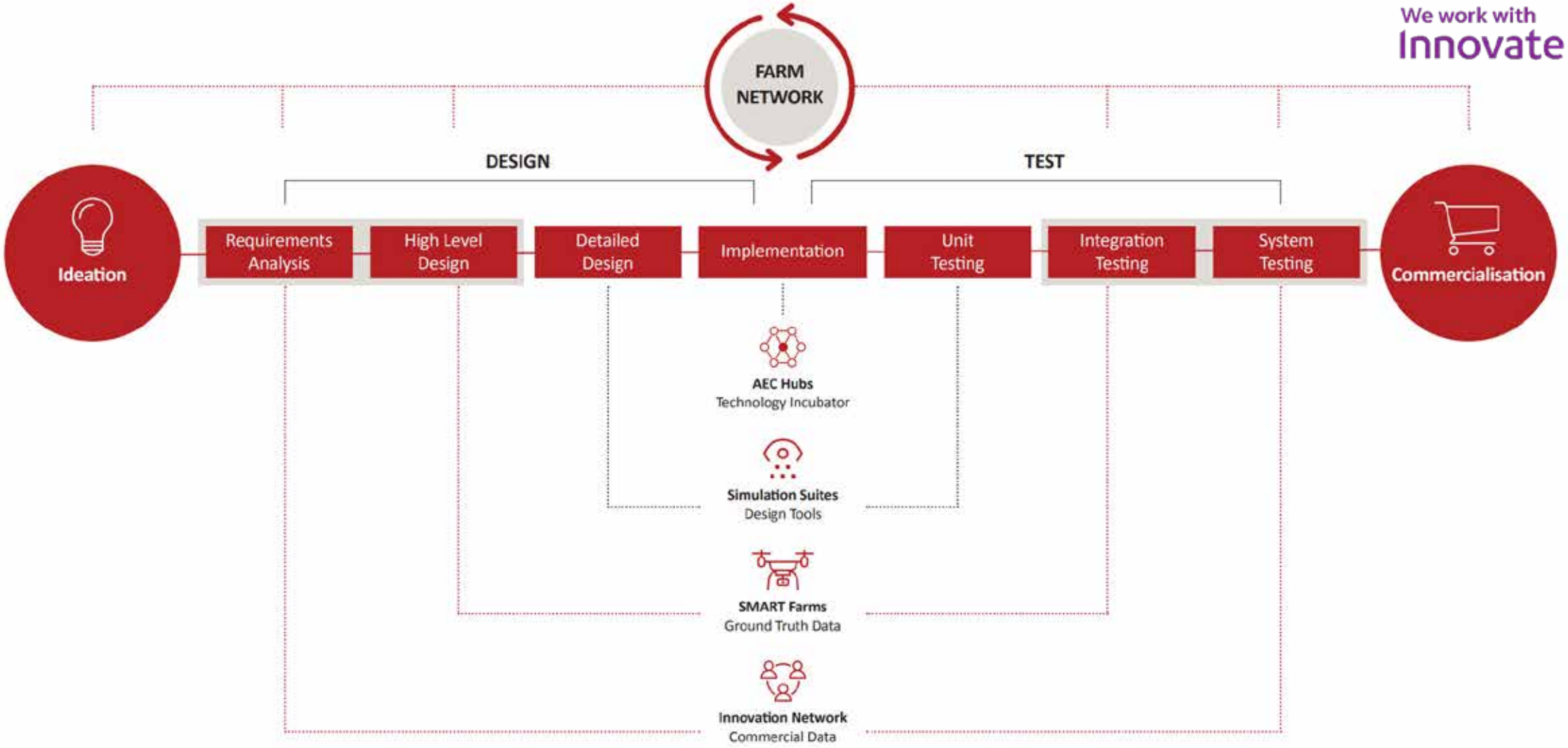
- Agricultural Engineering Precision Innovation Centre (Agri-EPI Centre)
- Big Data Centre of Excellence (Agrimetrics)
- Crop Health and Protection (CHaP)
- Centre for Innovation and Excellence in Livestock (CIEL)

www.agritechcentres.com

Agri-EPI Centre Knowledge Exchange Network

AGRIEPICENTRE
Engineering • Precision • Innovation

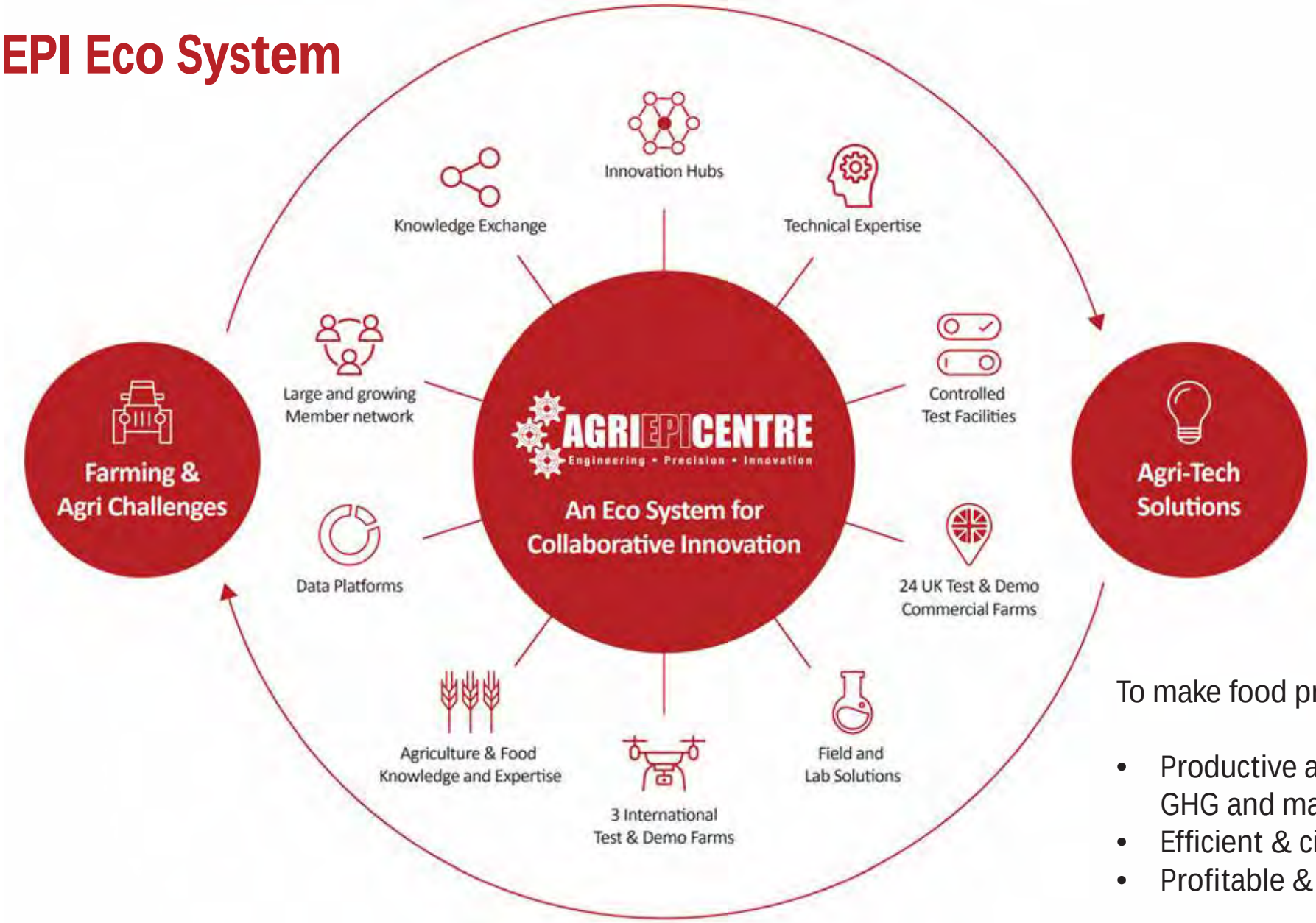
We work with Innovate UK



Agri-EPI Eco System

AGRIEPICENTRE
Engineering • Precision • Innovation

We work with Innovate UK



To make food production systems:

- Productive and carbon neutral (minimize GHG and maximise C sequestration)
- Efficient & circular
- Profitable & resilient

Go-to enabler

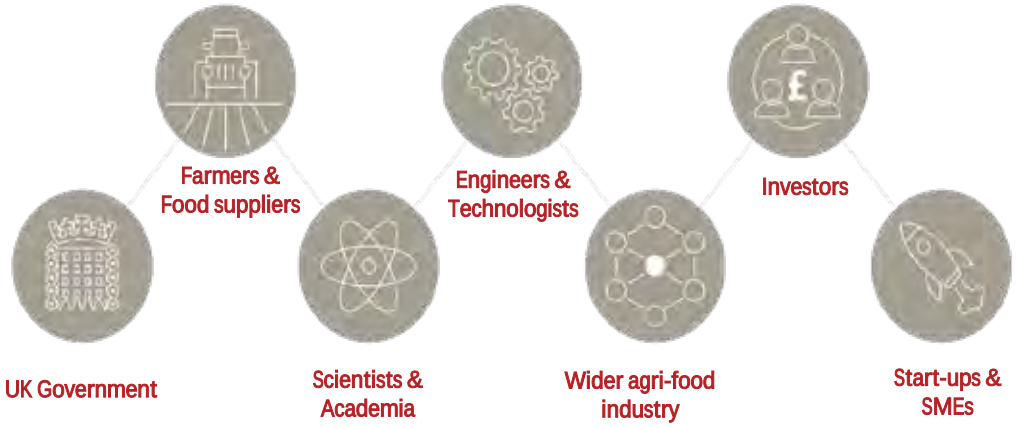
of innovation in precision agriculture

Our services and support

R&D funding
Project management
International links
Technical expertise
Farm environment testing
Technology business incubation
R&D capabilities
KE and dissemination
UK policy engagement
Broker Engagement

AGRIEPICENTRE
Engineering • Precision • Innovation

Key collaborators



Our partner network

200 members with a combined turnover of **> £560B**

Our Agri-EPI Network

>200 member organisations

Combined TO > £560B

Project Example - Salad Automation

Partners: Grimme, UWE, IDS, HAU, G's Fresh, PDM

Challenge: To replace seasonal labour, which is increasingly difficult to source, from the front of the harvesting progress with automation.

Work packages:

- Mechanically lifting lettuce from the soil,
- De-leafing the outer wrapper leaves,
- Machine Vision and AI to identify precise cut-point on stem
- Trigger signal from camera to adjust knife to precise cut-point of lettuce on moving belt
- Combine all the above into a working prototype

Impact: Successfully achieving the above and combining into a multi-row harvest head could save approximately 8 labour units from the harvesting process representing a significant cost saving

Project: CROVER

Grain-swimming robot offers help for alleviating global food waste

Challenge: When grains such as wheat and barley are stored in sheds and silos for long periods of time they are at risk of spoilage from infestation by insects and moulds.

Crover aids in avoiding disruption and interruption in grain monitoring activities, thanks to the remote automation capability of the robotic device. The ability to remotely operate the Crover and let it reach every corner of bulk also keeps workers safe.

Solution: The Crover robot has been designed for grain storage operators – it 'swims' through bulk grain stores to map the condition of the grain and identify suboptimal storage conditions, as well as mixing the grain in-situ, which helps maintain its quality.

It is being trialled in partnership with **Agri-EPI Centre's Satellite Farm - Upper Nisbet, located in the Scottish Borders**.

Watch the video case study

Contact Details

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Director of Business Development

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Email: lisa.williams@agri-epicentre.com

SUSTAINABILITY

DORSET Local Enterprise Partnership

BUSINESS SHOWCASE

efeca

breedr.co

Pollenize

wessexinternet

5G RuralDorset

INTREPID MINDS
THE ART OF THE POSSIBLE

ROYAL ACADEMY OF ENGINEERING | LEADERS IN INNOVATION FELLOWSHIPS

SUSTAINABILITY

DORSET Local Enterprise Partnership

BUSINESS SHOWCASE

PAUL DRAPER
FOUNDER DIRECTOR

draperGROUP- Poultry Innovation - 2022

draperGROUP
home of innovation

One Health 2022

Established in 1995 - Agritech and renewable energy focussed

24 full time employees - Current group annual turnover £10m

Headquarters in Dorset Innovation Park - Chapman Site

New warehouse part funded by a loan from Dorset LEP Growing Places Fund

Renewable energy & heating helped by Low Carbon Dorset

An important point in history

In 2008 draperGROUP designed and installed the very first UK hot water heating system using a hybrid biomass and LPG boiler system

Today

Over 500 UK poultry houses have been installed with draperGROUP renewable heating systems and equipment, with 150,000 kW of biomass boilers using all renewable fuel types, saving over 300,000,000 kW/h of fossil fuel usage every year or 65,000 T of Carbon.

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home of innovation

draperVENT
climate control systems

draperHEAT
hot water engineering

draperGROUP
home of innovation

draperGROUP
home of innovation

draperTECH
engineering excellence

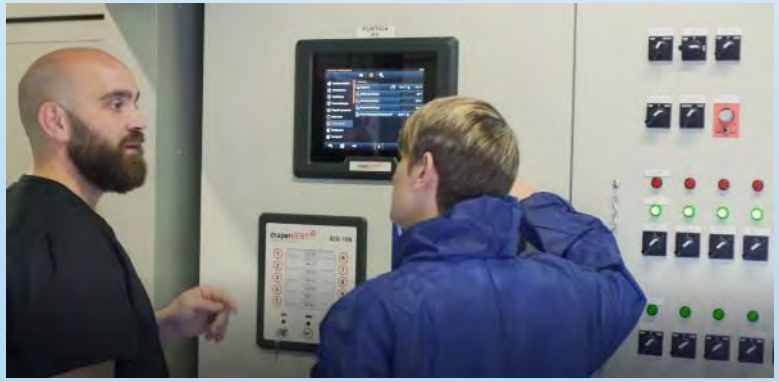
Project Management

Mechanical & Electrical Installation

Commissioning & Testing

Maintenance & Service

draperCARE
poultry expertise and mentoring



Project Handover

Training

Mentoring

Consultancy

A snapshot of renewable energy projects completed over the last decade

draperGROUP
home of innovation

2012















2017

A snapshot of renewable energy projects completed over the last decade

draperGROUP
home of innovation

2017





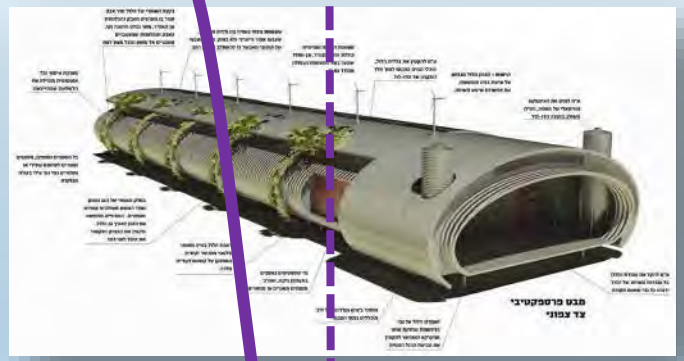







2021

We must innovate to improve the sustainability of food production



Poor house and controls

2.0Kg @ 45 D
2.0 FCR
1990

Better environment and breeding

2.0Kg @ 30 D
1.4 FCR
2022

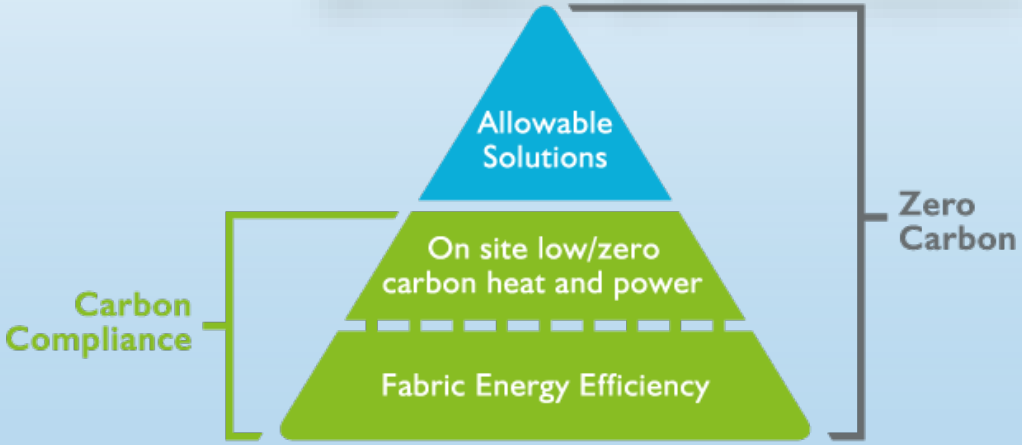
Best Technology

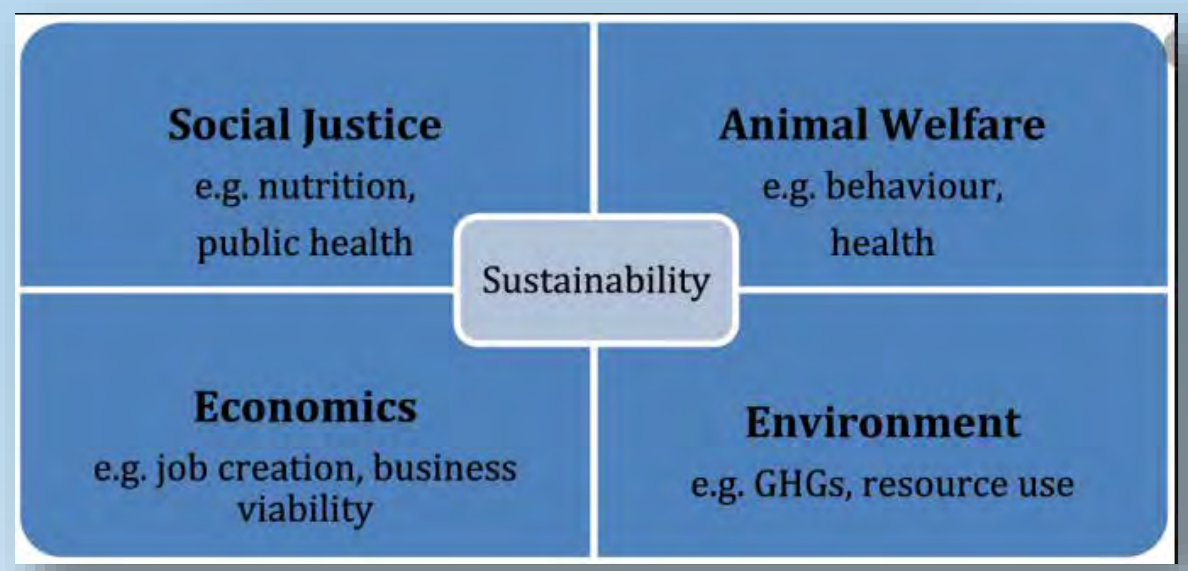
Genetic potential ..then

Now

Future...?

The Journey for Zero Carbon – Zero Emission Poultry Production still has a very long way to go





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ofgem

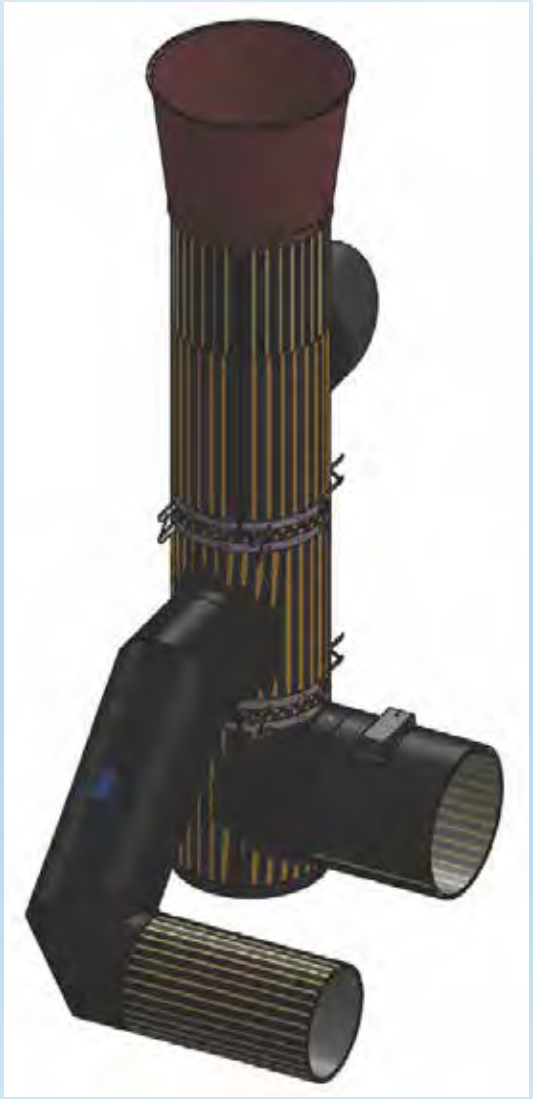
Non-Domestic Renewable Heat Incentive (RHI)

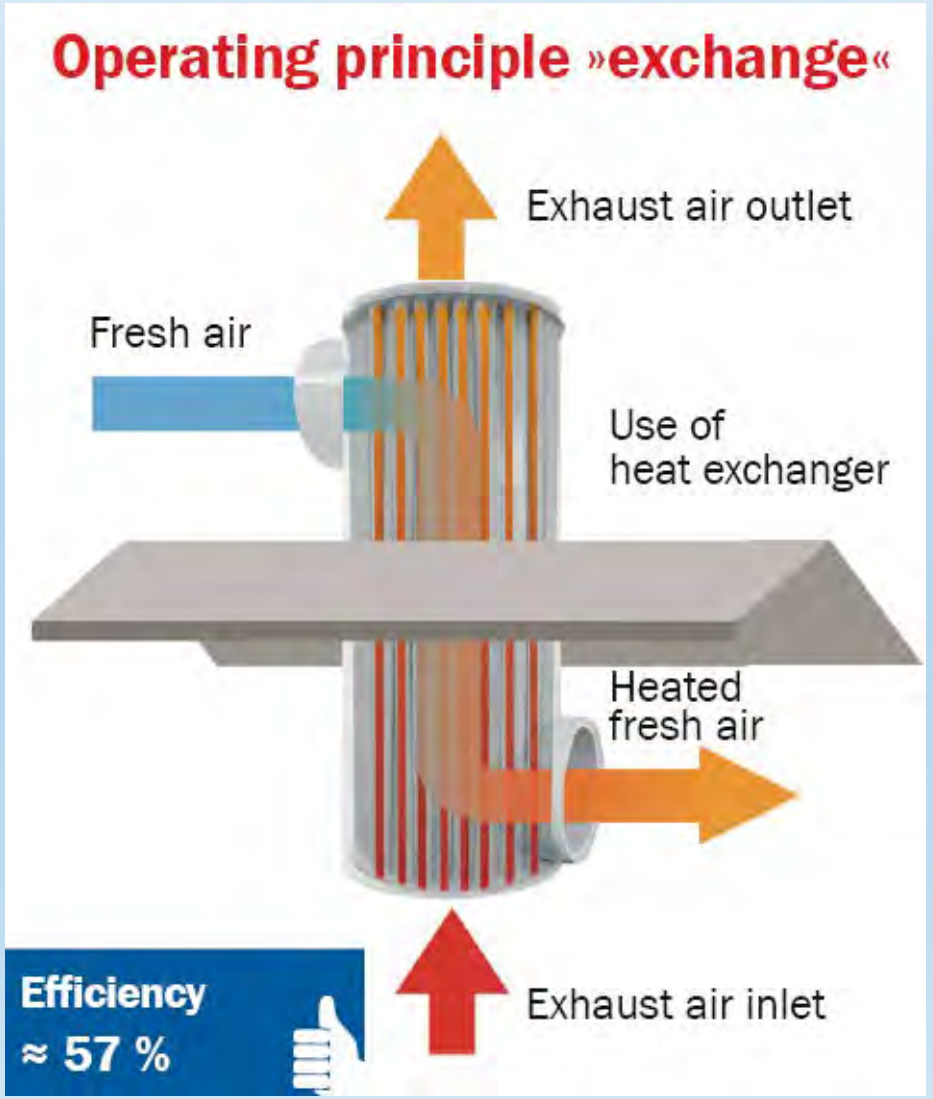
2011-2021

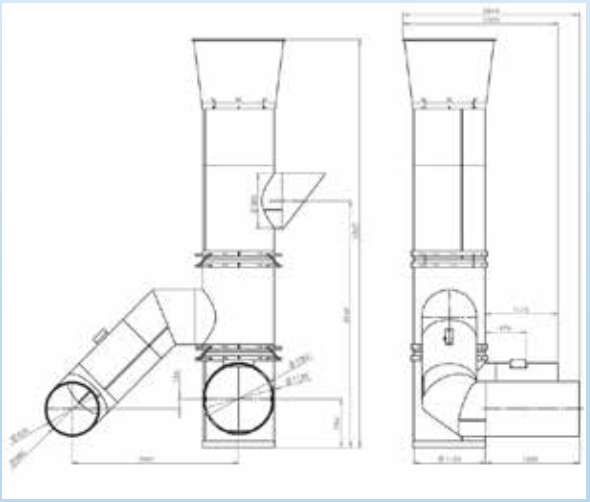
A decade of diversion from energy efficiency!?

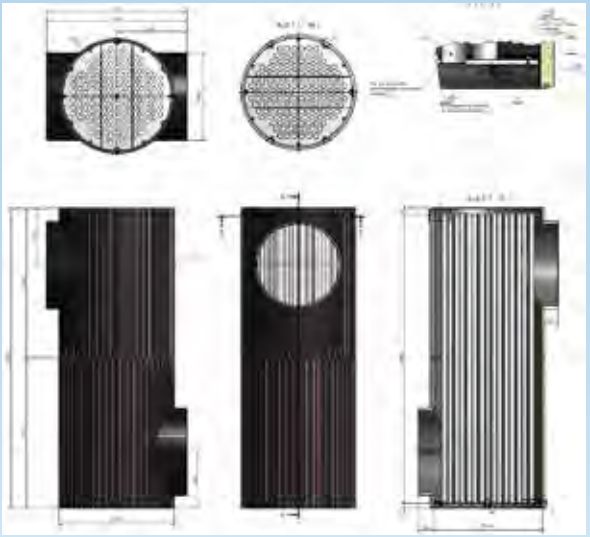
2022 – Innovation Projects

Integration of Air-to-Air Heat Recovery Systems



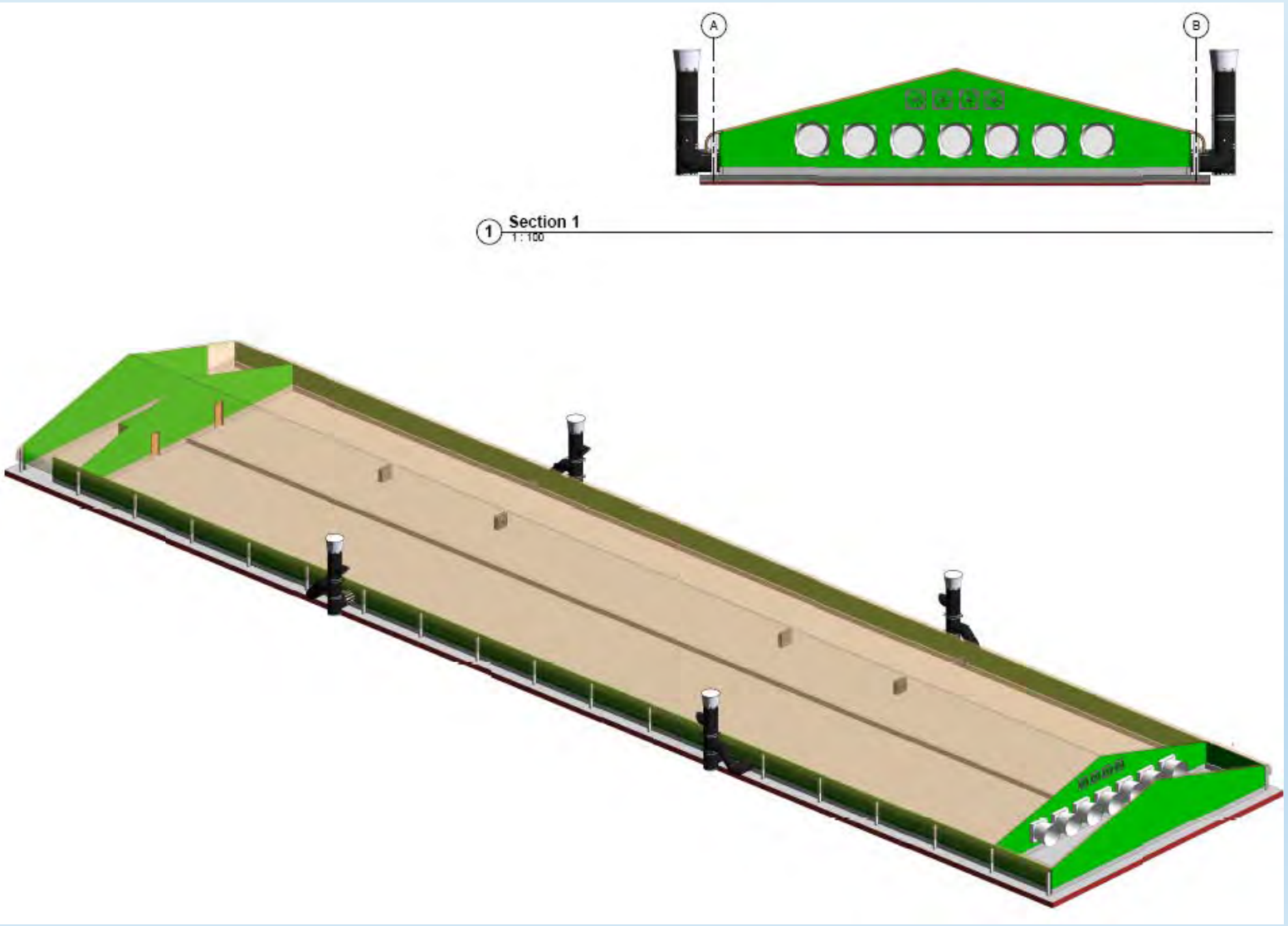






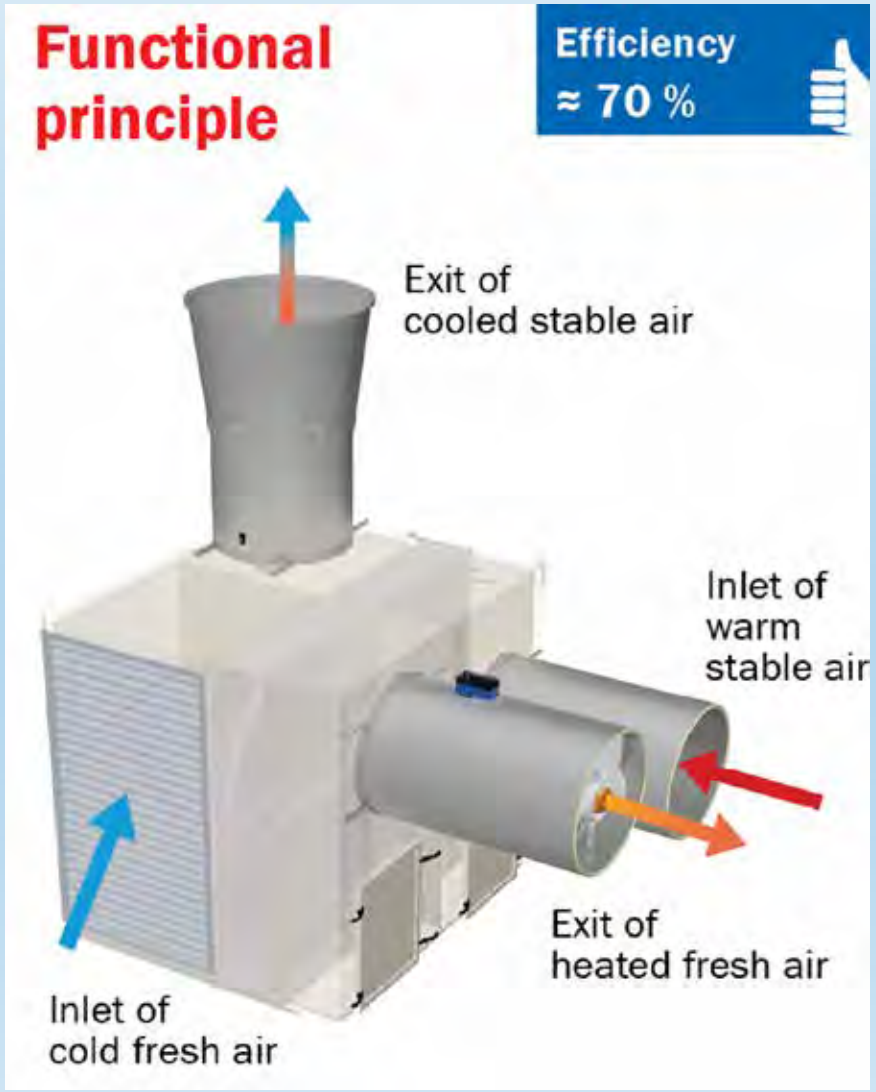
2022 – Innovation Projects

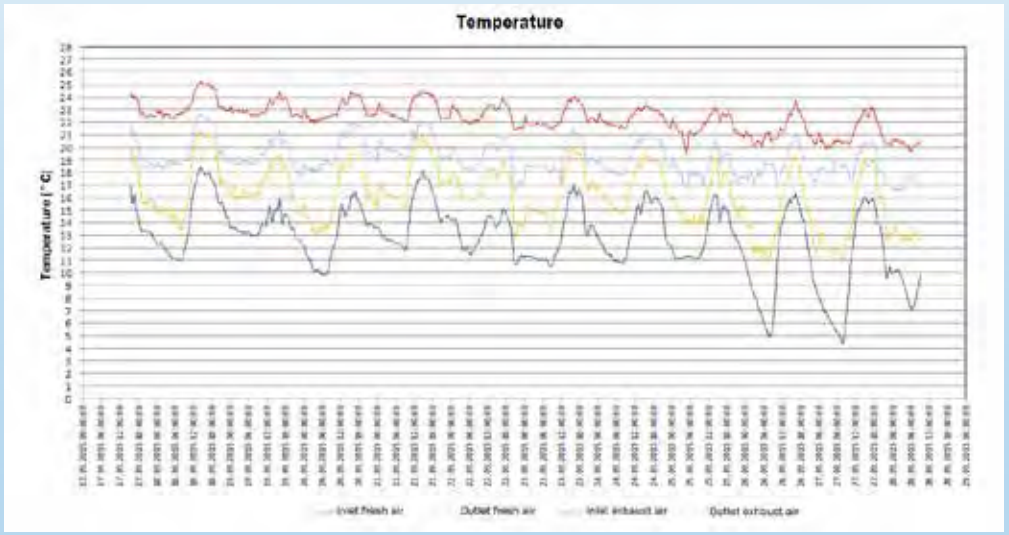
Integration of Air-to-Air Heat Recovery Systems

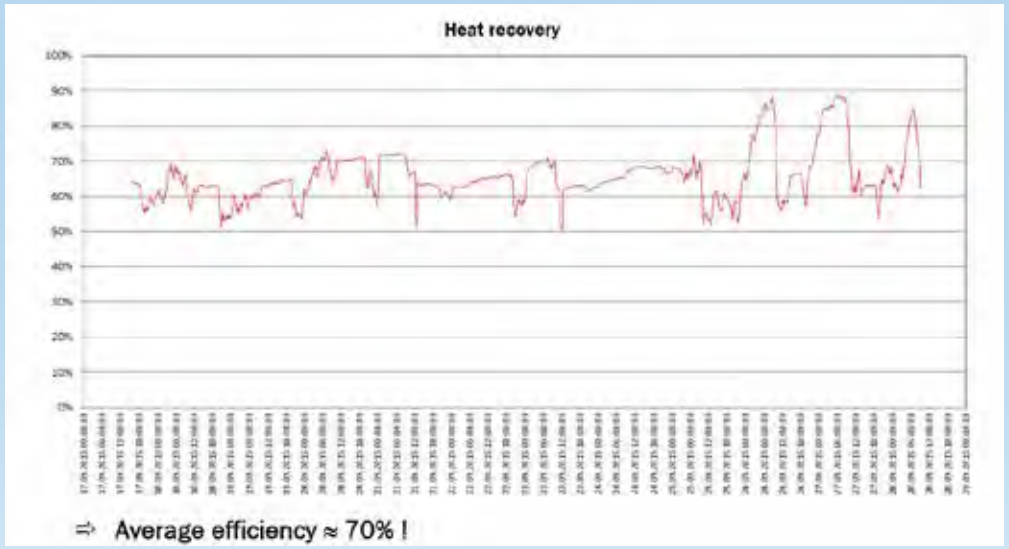


2021 – Future Innovation Projects

Integration of Energy Wheel Heat Recovery Systems

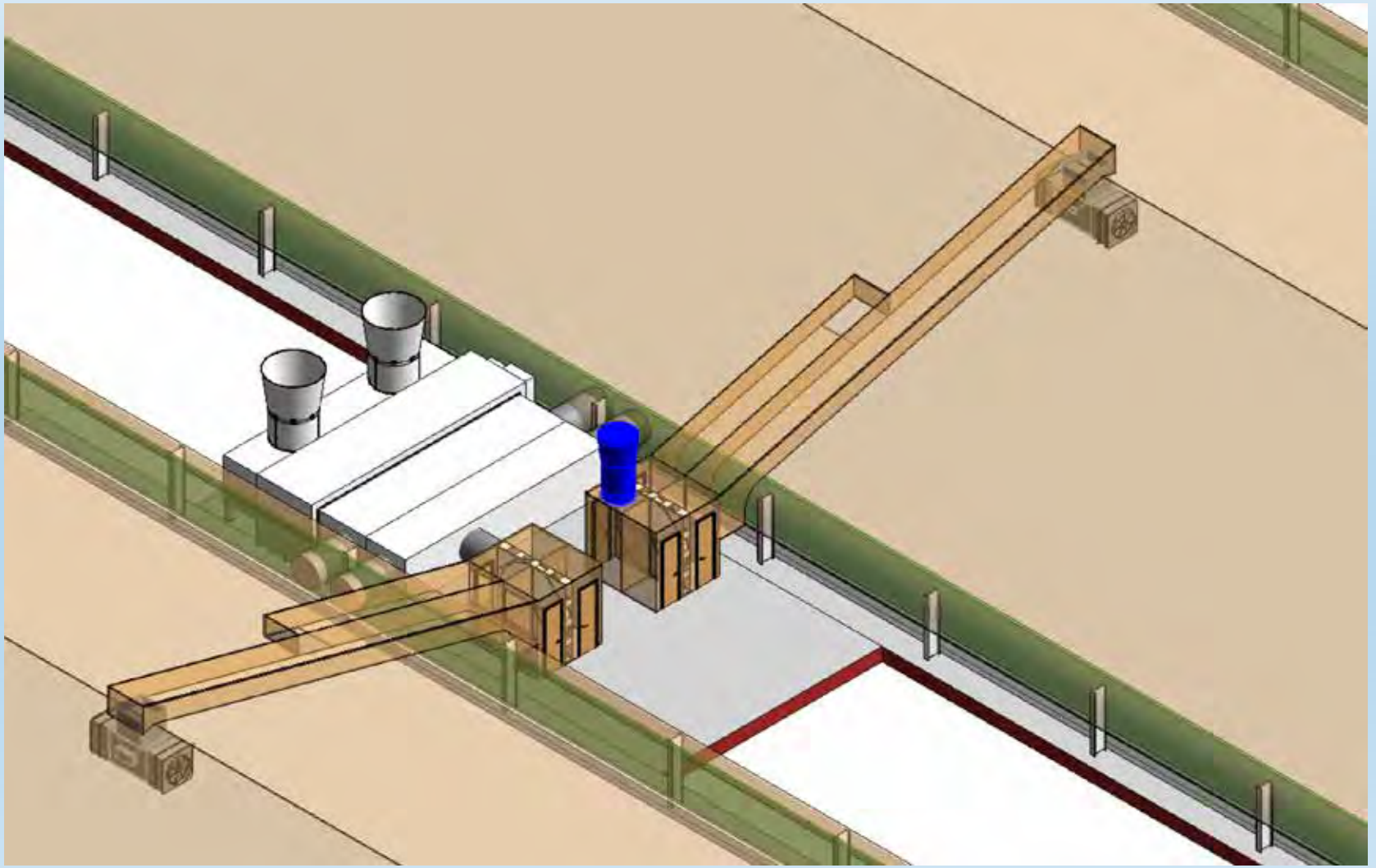






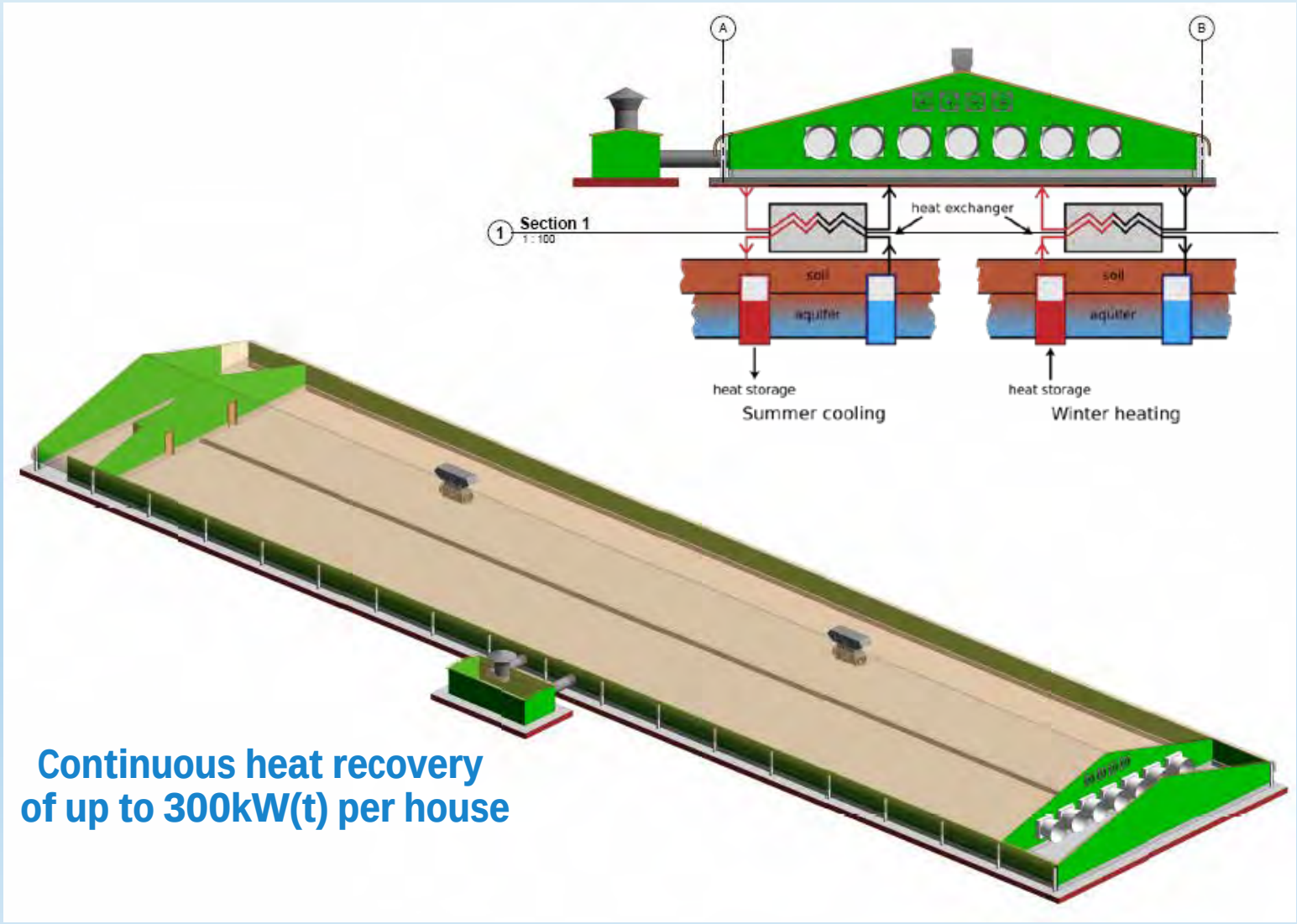
2021 – Future Innovation Projects

Integration of Energy Wheel Heat Recovery Systems



2021 – Future Innovation Projects

Integration of GSHP Heat Recovery Systems

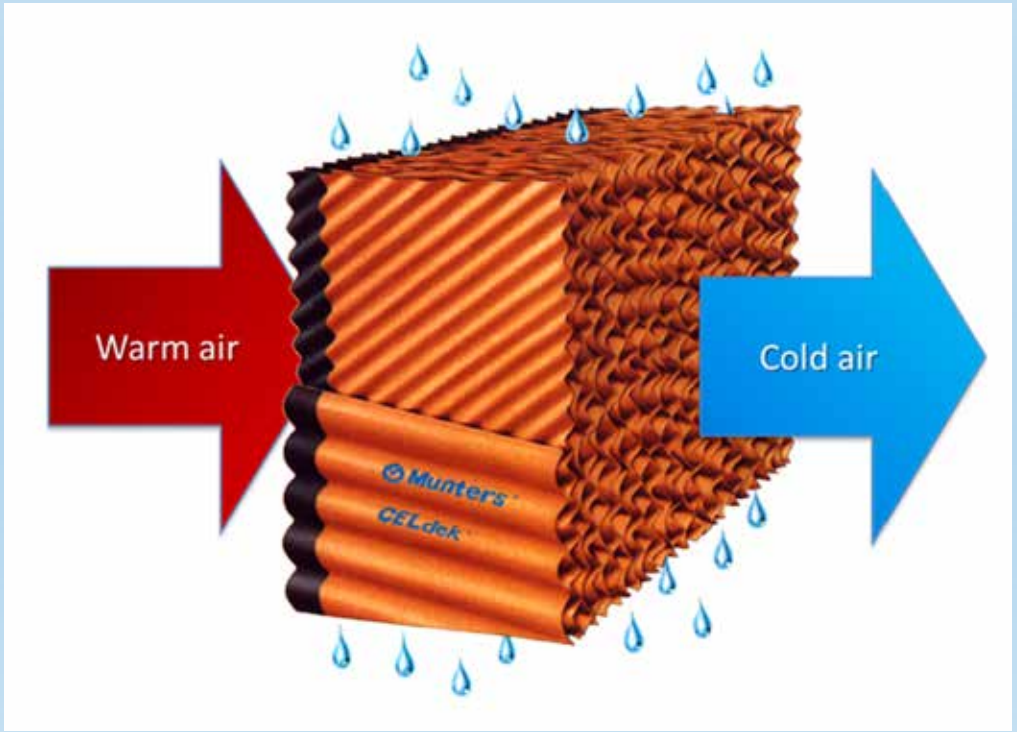


Continuous heat recovery of up to 300kW(t) per house

2021/2 – Future Innovation Projects

Direct Evaporative Cooling

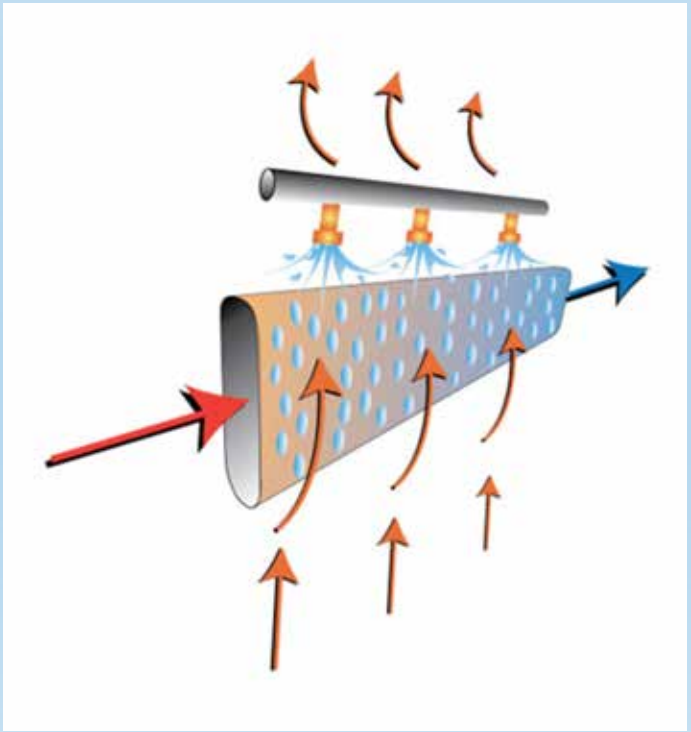
Fresh air drawn through water soaked medium (or via high pressure misting)



Increase in RH

Indirect Evaporative Cooling

Fresh air cooled through air-to-air plate heat exchanger with water cooling the extract air



No increase in RH

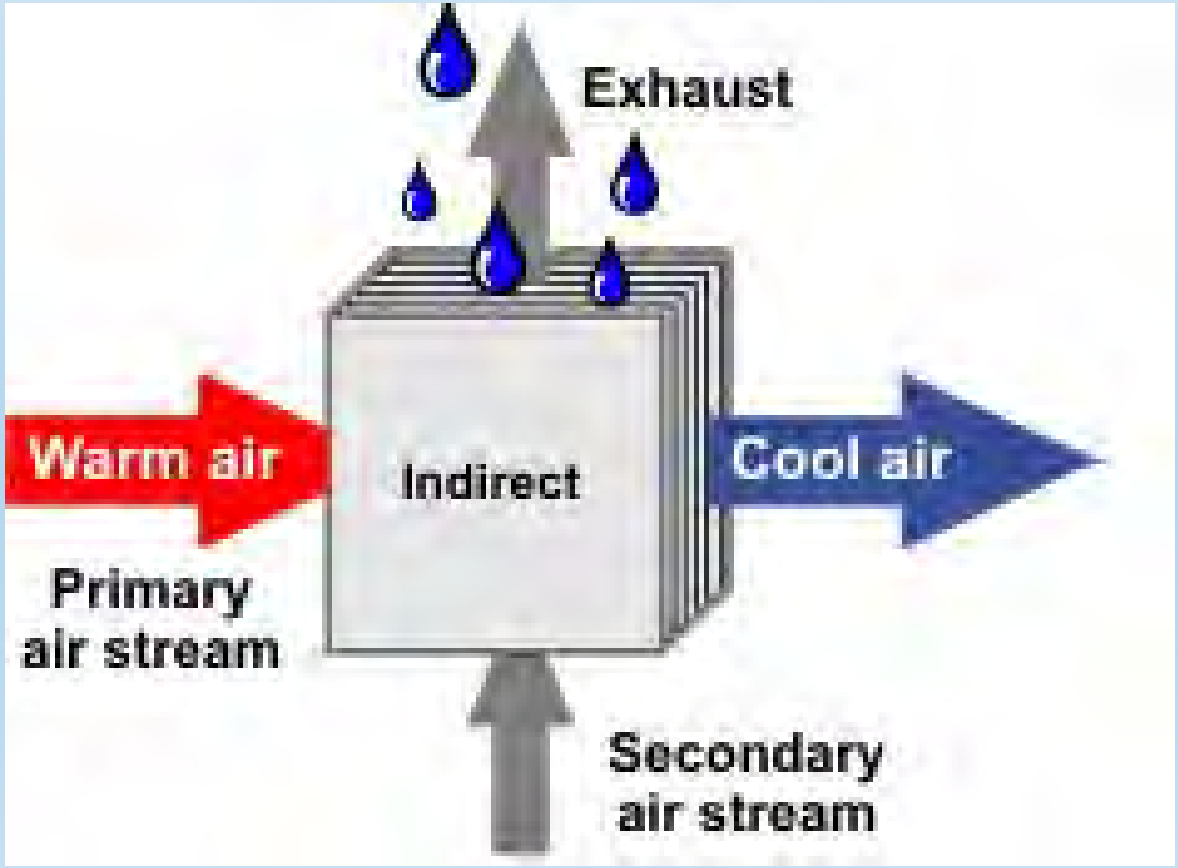
2021/2 – Future Innovation Projects

Heat Recovery Systems / Indirect Evaporative Cooling

Indirect evaporative cooling is extremely energy efficient, negating the need for compressors in the cooling cycle.

Energy savings in the region of 80-90% can be achieved compared to conventional cooling methods.

Lots of water is required for the process though.



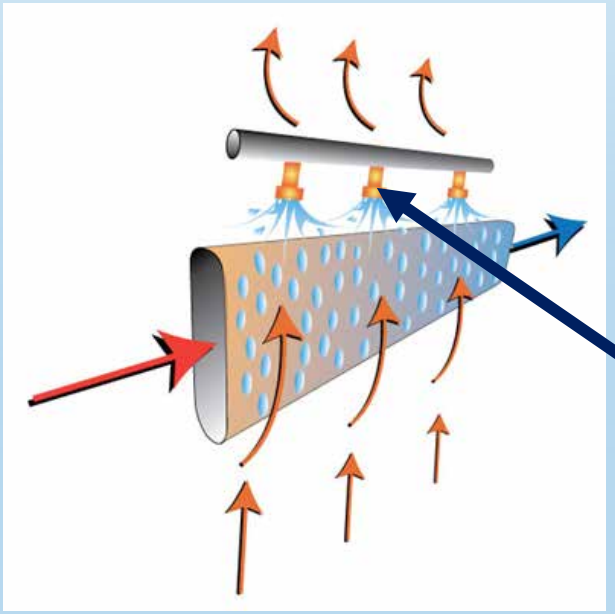
Heat Recovery Systems / Indirect Evaporative Cooling

Concept layout for harvesting water from outside air

Hot Outside Air

35°C – 60% RH

23 ml of water per m^3



Warm Shed Air

25°C – 50% RH

12 ml of water per m^3

Supercool Air

Cooled Air

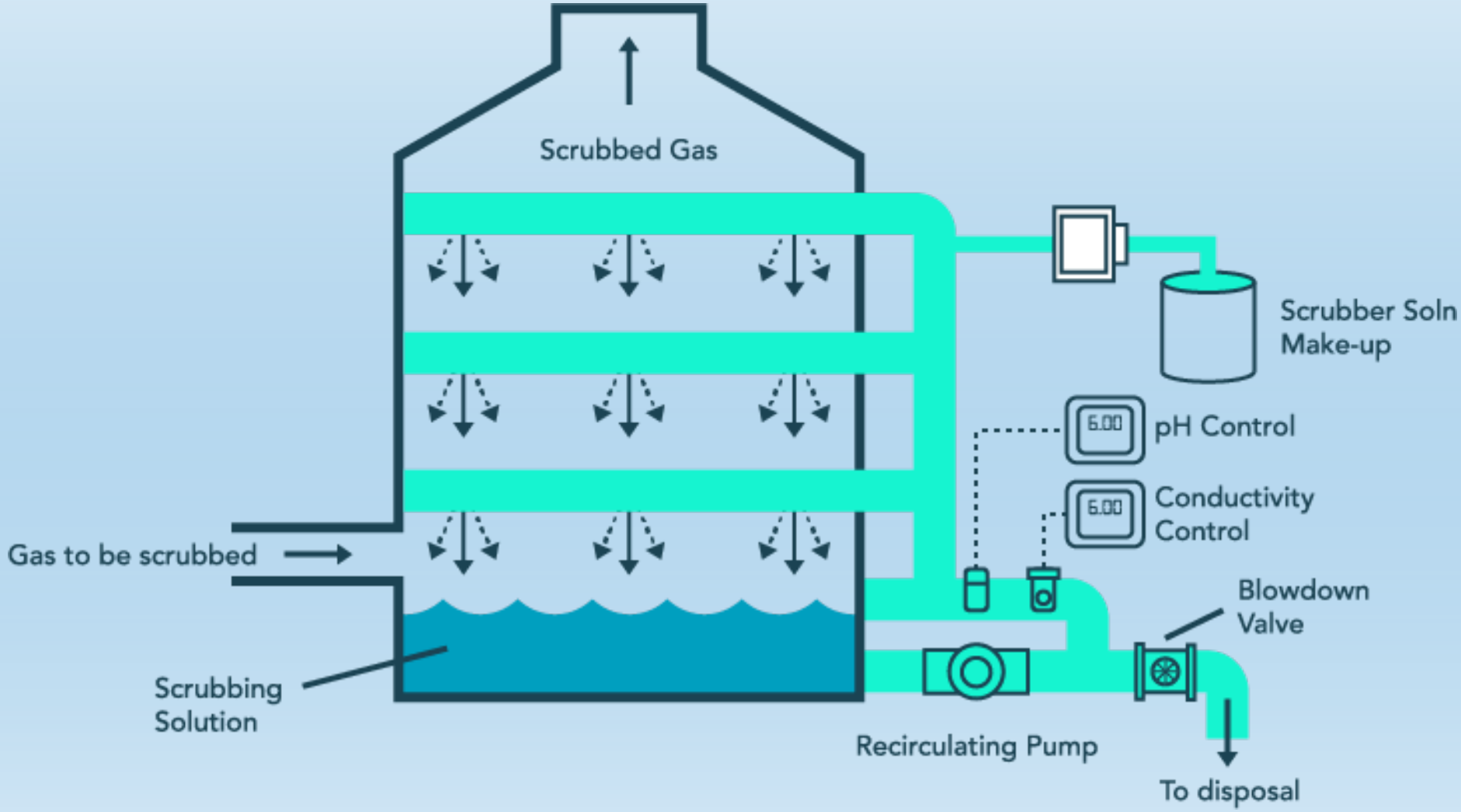
15°C – 100% RH

11 ml of water per m^3

Removal of 12ml water per m^3
Therefore 150,000 m^3/h
= 43,200 L of free water per day

2021 – Projects

Reducing ammonia outputs via wet scrubbers and sulphuric acid



2021 – Projects

Low energy air scrubber system – unique drum washer

2021 – Projects

Air Scrubbing Systems using chemical air scrubbers

2022 – Innovation Projects

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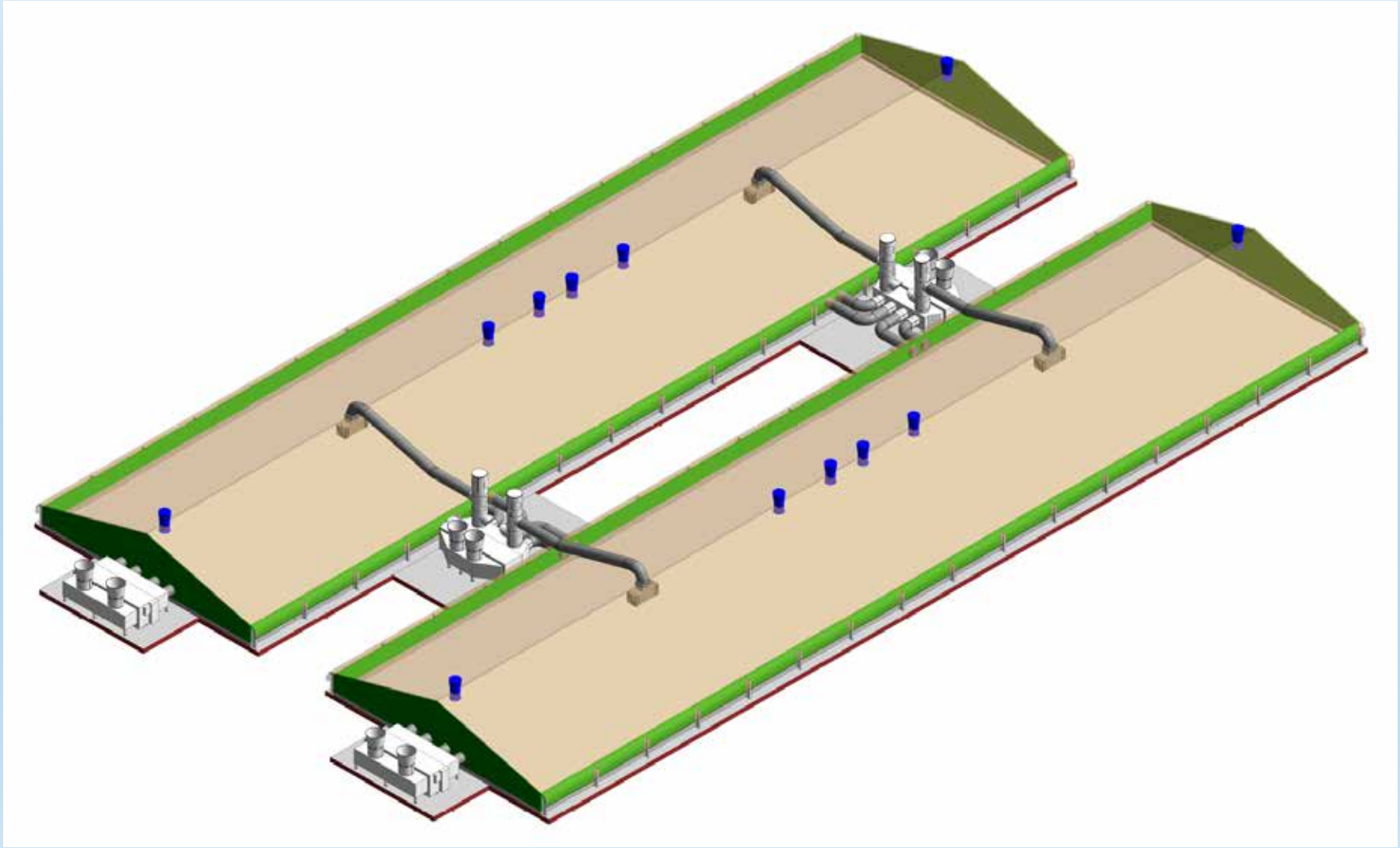
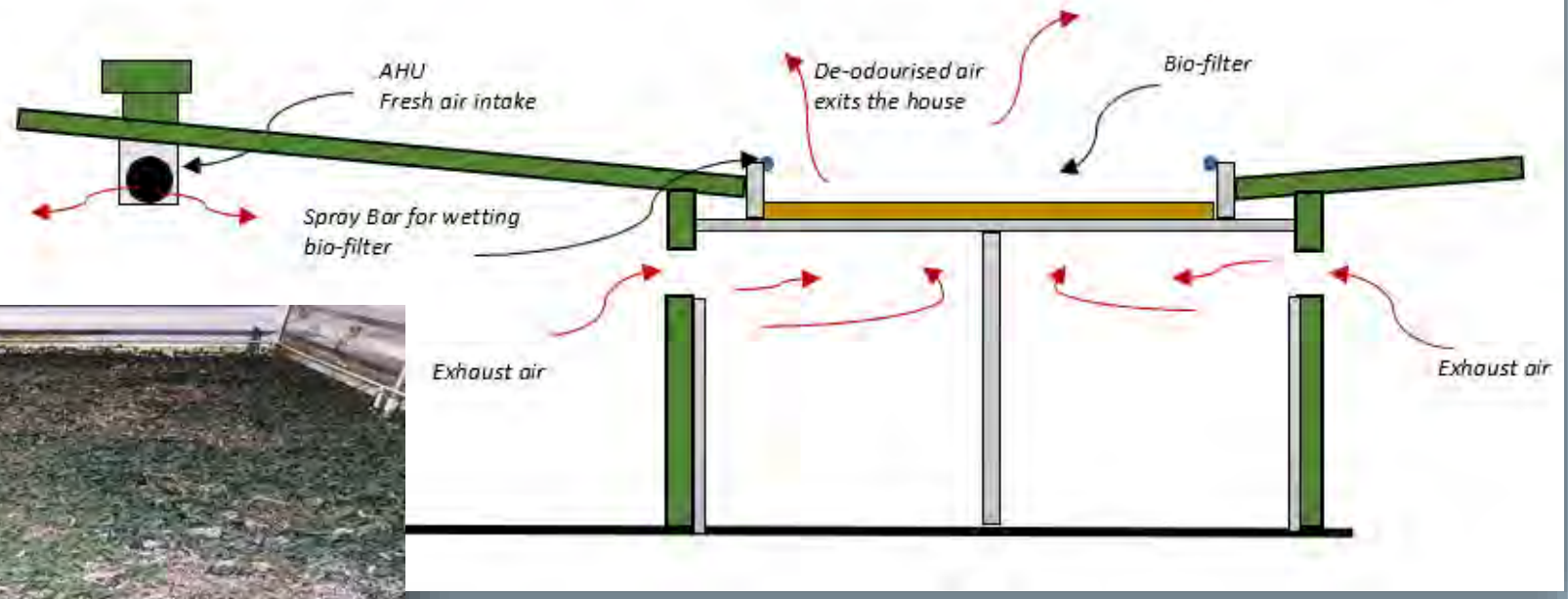
Integration of Heat Recovery Systems & Air Scrubbing Systems



2021 – Current Innovation Projects

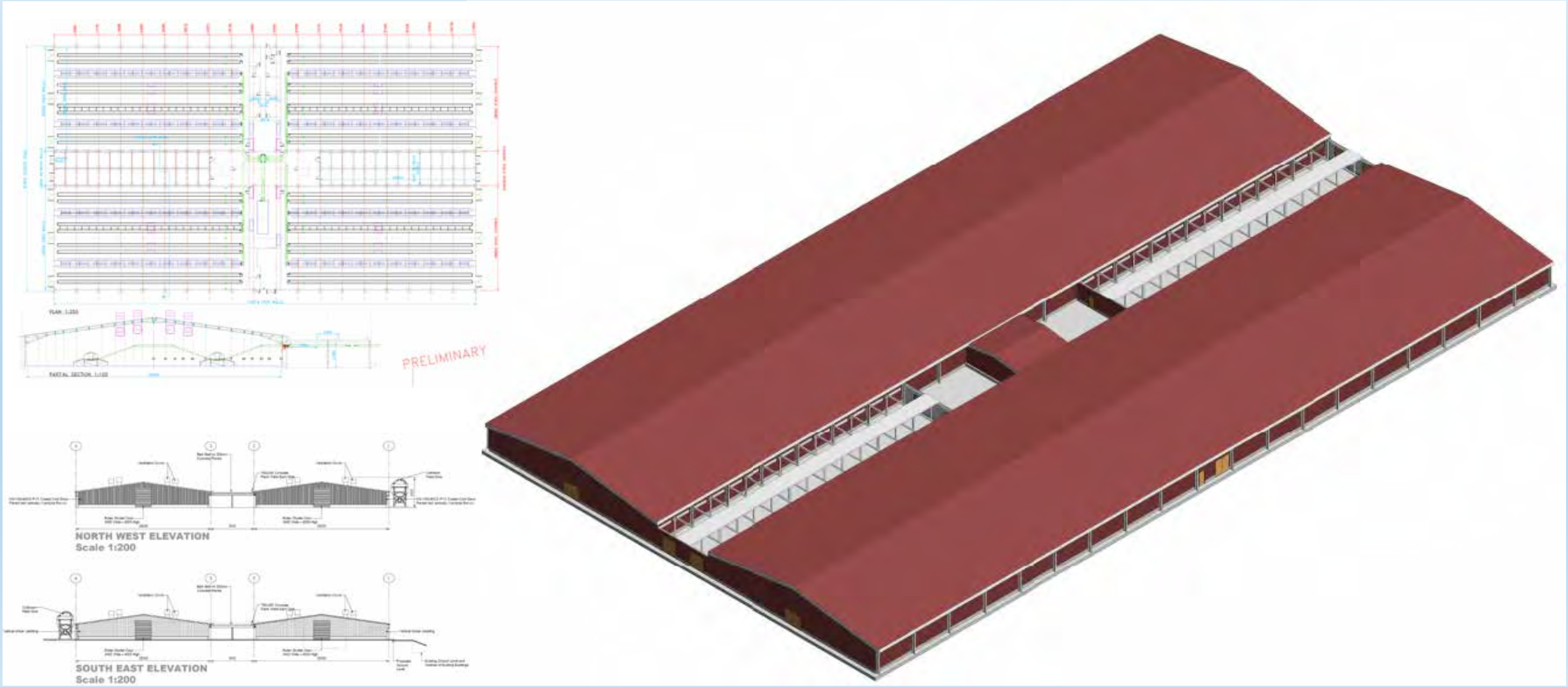
Exhaust Air Bio-Filter System

(Diagram 2: This diagram shows an air handling units and the route taken by exhaust air to the biofilter that is located between two houses.)



2021 – Current Innovation Projects

Exhaust Air Bio-Filter System



2022 – Current Innovation Projects

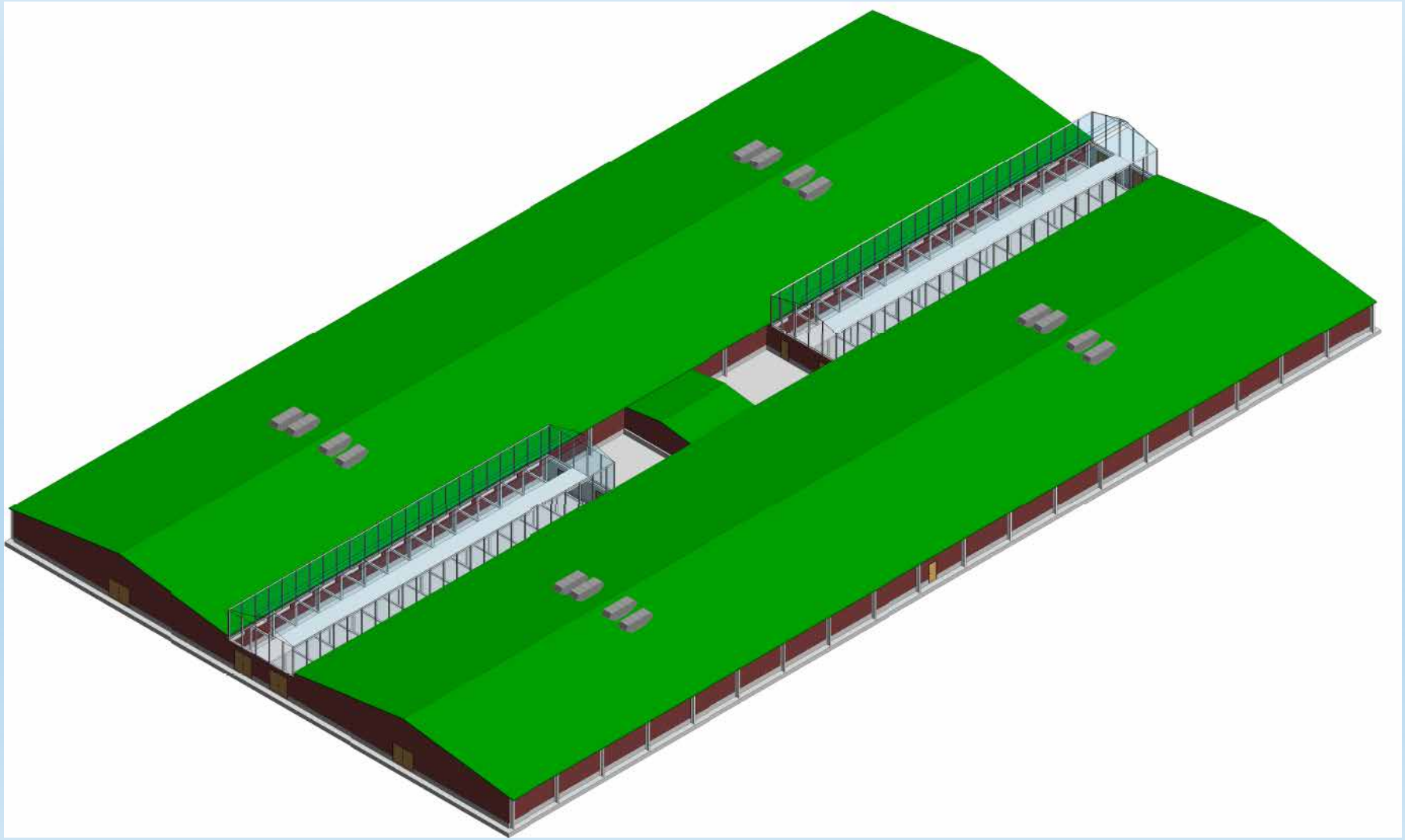
Exhaust Air Bio-Filter System

2022 – Current Innovation Projects

Exhaust Air Bio-Filter System

2022 – Current Innovation Projects

Poultry and plants together?!



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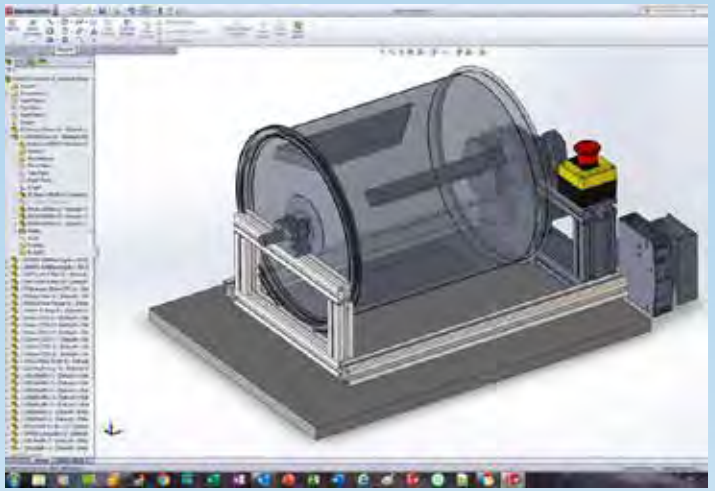
2022 – Ongoing Innovation

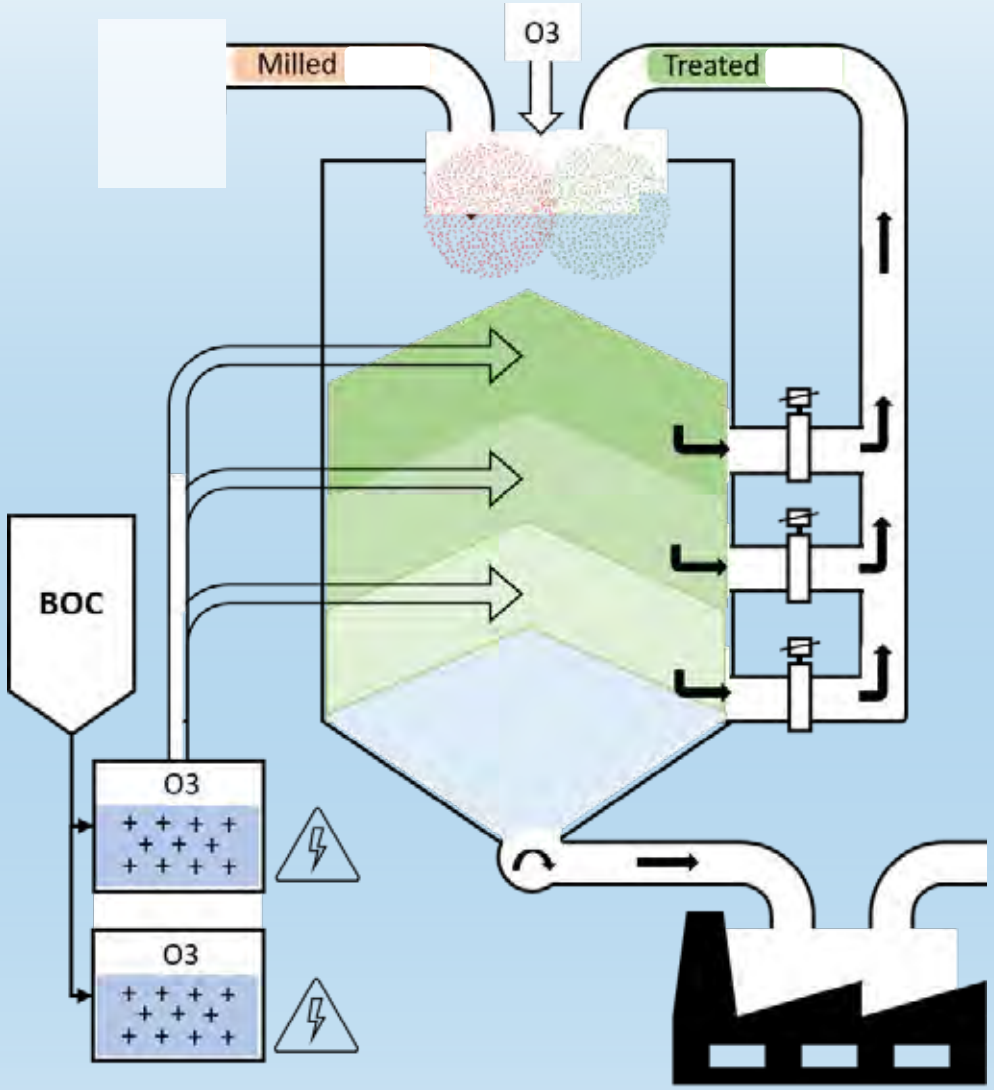
OZONE treatment of feed at feed mills

‘AiRedox #1’
Agricultural Study

Applications of Reactive Oxygen in the Control & Prevention of Fungal Colonisation of Feed Grain from Harvest (*Aspergillus*, *Fusarium*, *Ergot & Penicillium*), along with elimination of Salmonella.



Science challenging engineering



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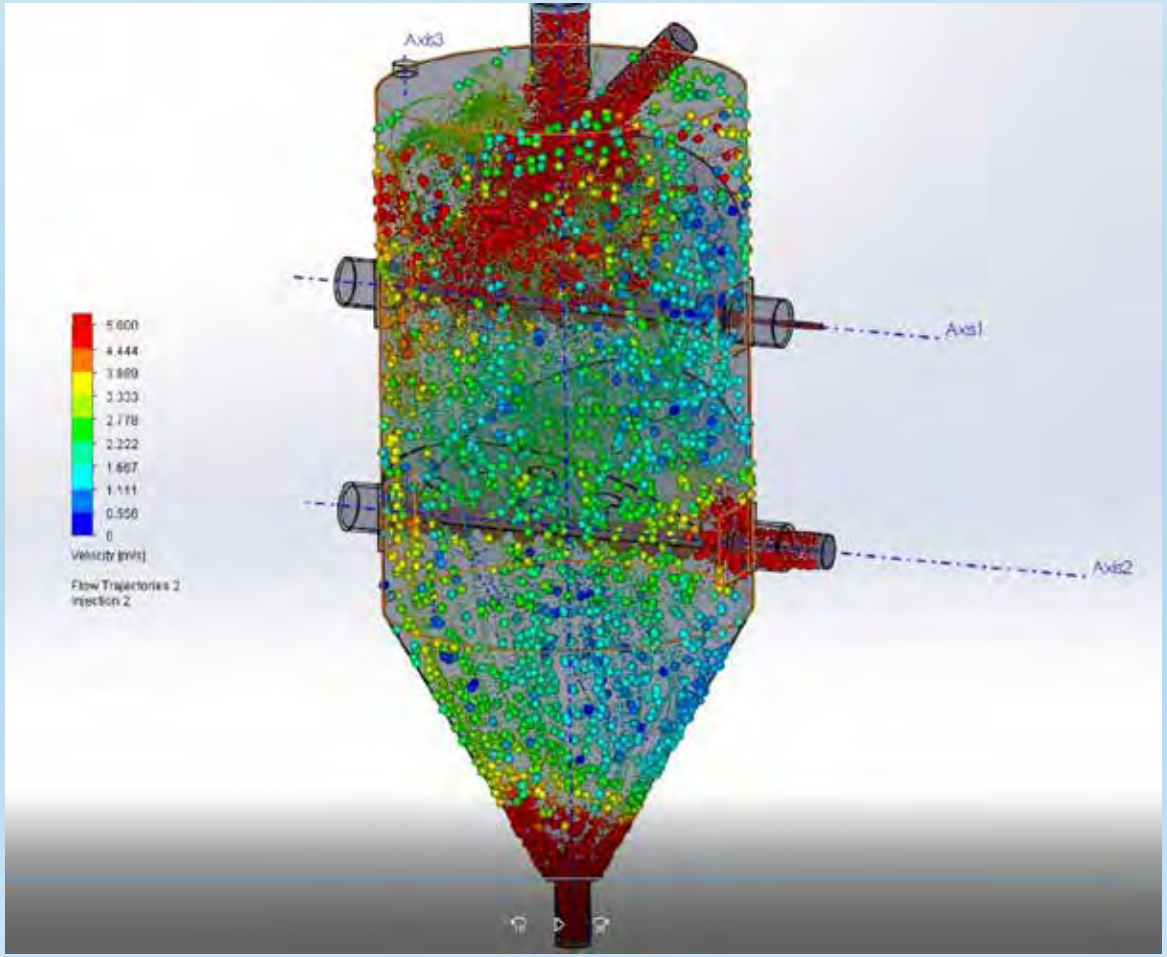
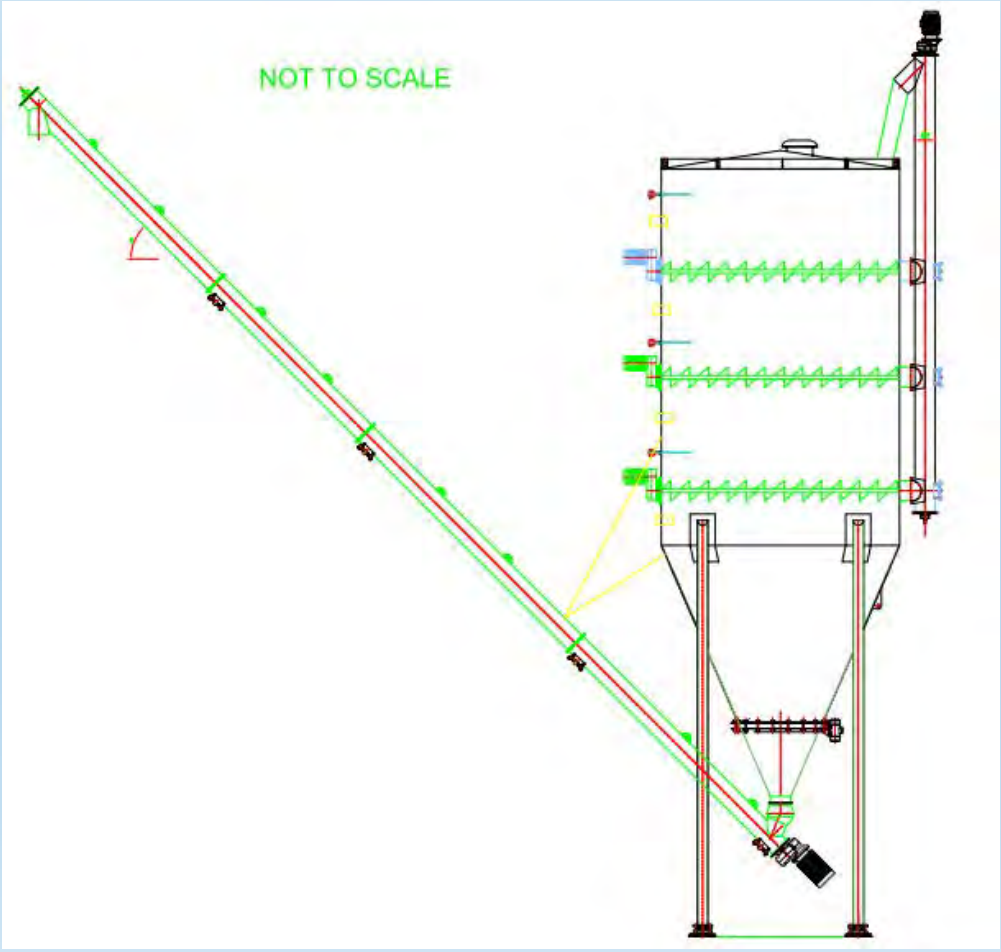
Modelling



Early Designs



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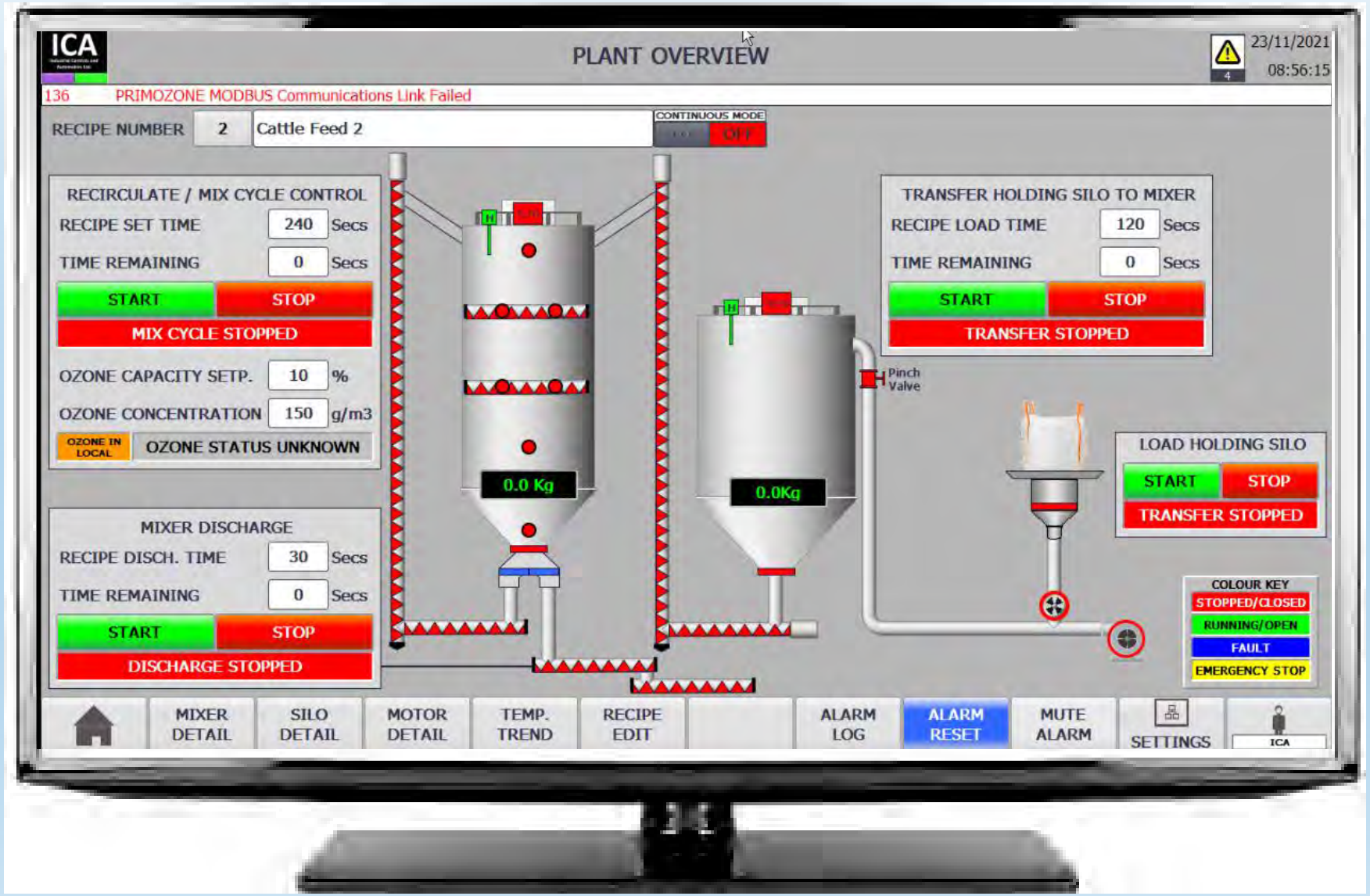
ICA
PLANT OVERVIEW
23/11/2021
08:56:15
136 PRIMOZONE MODBUS Communications Link Failed
RECIPE NUMBER 2 Cattle Feed 2
CONTINUOUS MODE OFF
RECIRCULATE / MIX CYCLE CONTROL
RECIPE SET TIME 240 Secs
TIME REMAINING 0 Secs
START STOP
MIX CYCLE STOPPED
OZONE CAPACITY SETP. 10 %
OZONE CONCENTRATION 150 g/m3
OZONE IN LOCAL
OZONE STATUS UNKNOWN
MIXER DISCHARGE
RECIPE DISCH. TIME 30 Secs
TIME REMAINING 0 Secs
START STOP
DISCHARGE STOPPED
0.0 Kg
0.0Kg
TRANSFER HOLDING SILO TO MIXER
RECIPE LOAD TIME 120 Secs
TIME REMAINING 0 Secs
START STOP
TRANSFER STOPPED
Pinch Valve
LOAD HOLDING SILO
START STOP
TRANSFER STOPPED
COLOUR KEY
STOPPED/CLOSED
RUNNING/OPEN
FAULT
EMERGENCY STOP
MIXER DETAIL
SILO DETAIL
MOTOR DETAIL
TEMP. TREND
RECIPE EDIT
ALARM LOG
ALARM RESET
MUTE ALARM
SETTINGS
ICA

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Registered in England. Company Number 06758105
Registered Office: 4 King Square, Bridgwater, Somerset TA6 3YF

SUSTAINABILITY

BUSINESS SHOWCASE

LUCY CULLINANE
OPERATIONS DIRECTOR

efeca

Global to local taking action to change consumer behaviour - the case of palm oil

efeca economics climate environment

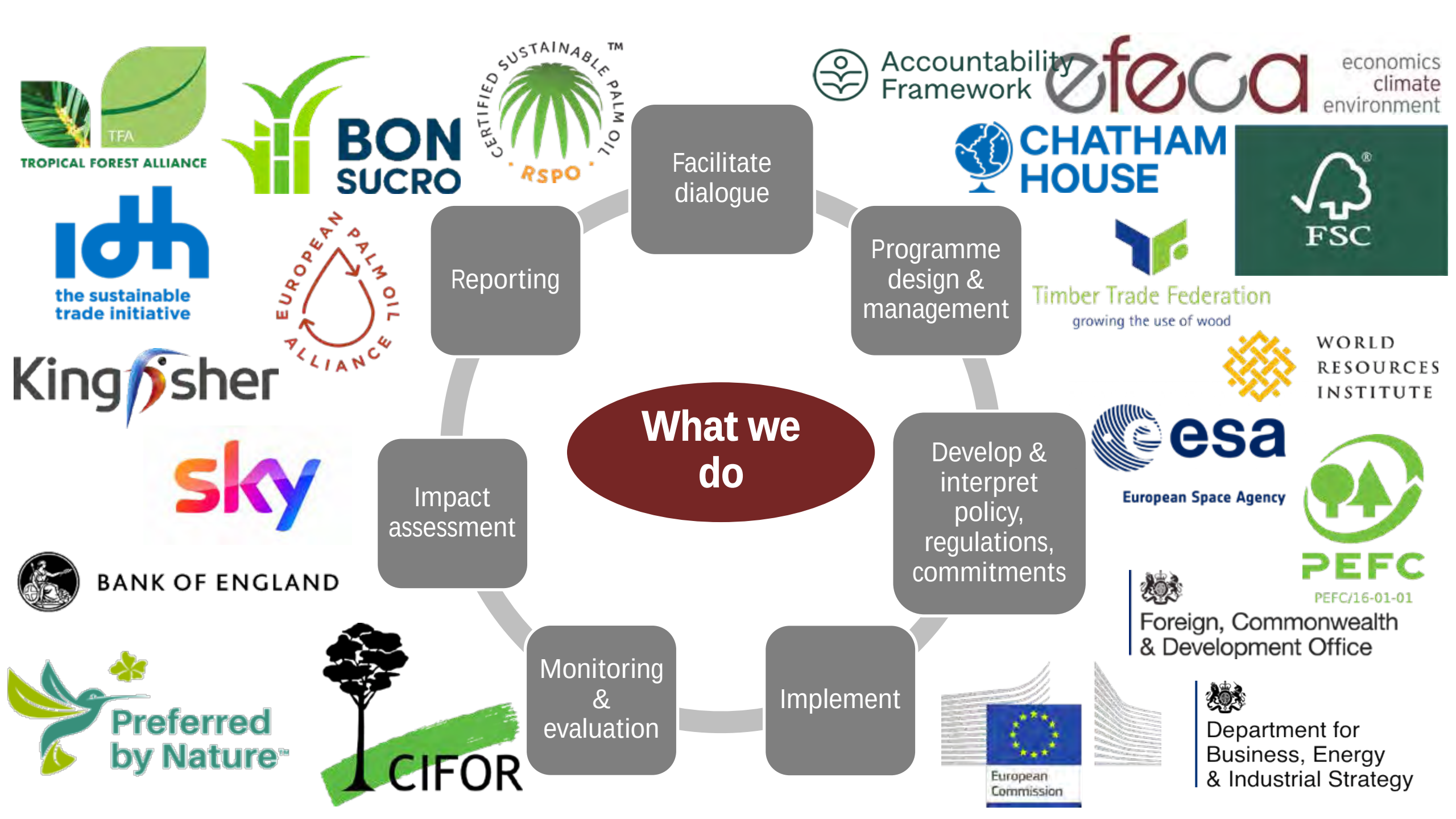
Global to local taking action to change consumer behaviour - the case of palm oil

10 March 2022

Lucy Cullinane, Operations Director
Efeca – www.efeca.com

Efeca – who are we?

- Natural resource sustainability company providing expert advice and support on sustainable sourcing to NGOs, companies and government
- Aim: Mitigation of deforestation / illegal logging in producer countries
- Aim: Increase deforestation free and sustainable supply chains
- Bournemouth and Dorchester


What we do
Facilitate dialogue
Programme design & management
Develop & interpret policy, regulations, commitments
Implement
Monitoring & evaluation
Impact assessment
Reporting
TFA
TROPICAL FOREST ALLIANCE
BON SUCRO
CERTIFIED SUSTAINABLE PALM OIL
RSPO
Accountability Framework
efeca
economics climate environment
CHATHAM HOUSE
FSC
idh
the sustainable trade initiative
EUROPEAN PALM OIL ALLIANCE
Timber Trade Federation
growing the use of wood
Kingfisher
WORLD RESOURCES INSTITUTE
sky
esa
European Space Agency
PEFC
PEFC/16-01-01
BANK OF ENGLAND
Foreign, Commonwealth & Development Office
Preferred by Nature
CIFOR
European Commission
Department for Business, Energy & Industrial Strategy

UK Sustainable Palm Oil Initiative

- Established in 2012, funded by UK Government
- Industry-led Roundtable
  - Members: UK-wide industry participation (over 60 companies/associations) with civil society partners
  - Major trade associations (food and non-food), refiners, manufacturers, contract caterers, retailers
- Post-2020 our focus is broader – driving a positive global impact

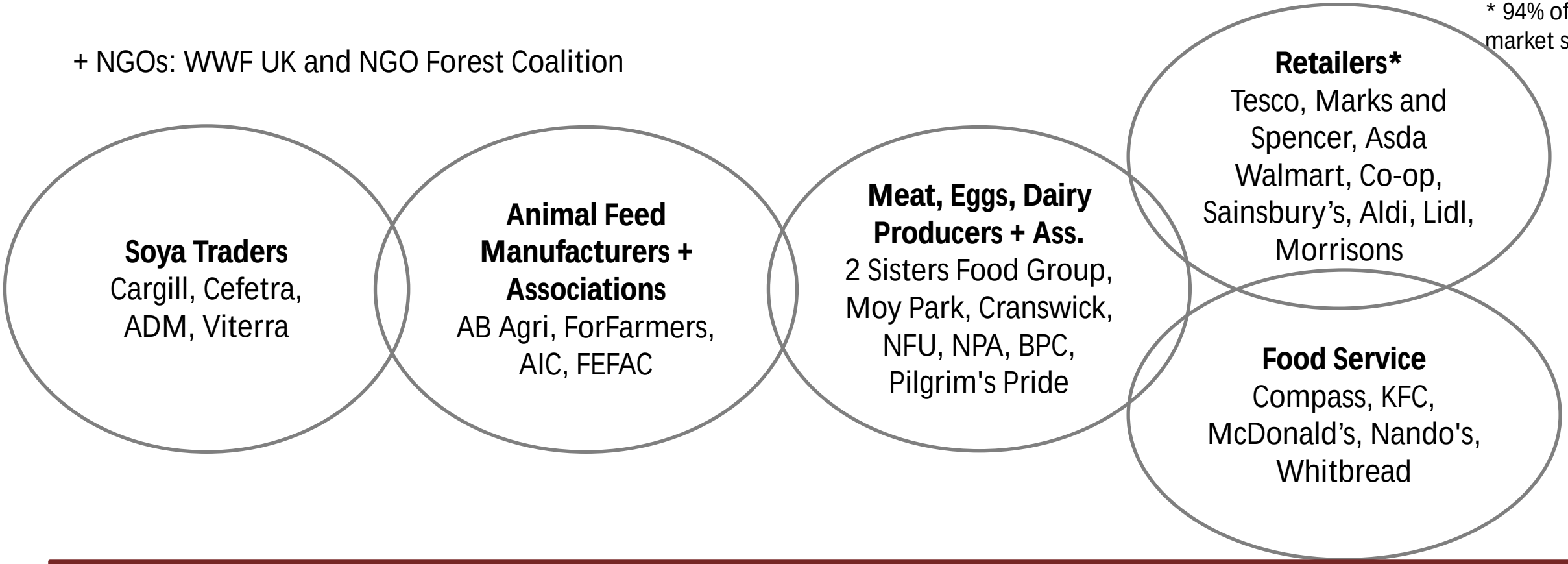
Ø Post-2020 goal: sustainable and resilient supplies of palm oil to the UK

UK Sustainable Soya Initiative

efeca economics climate environment

+ NGOs: WWF UK and NGO Forest Coalition

* 94% of retail market share



WHOLE OF THE UK SOYA SUPPLY CHAIN

and supporting partners: AFI, certification bodies, civil society, Government, soy initiatives in producer countries, etc.

UK Soy Manifesto – Secretariat

A collective industry commitment to ensure all physical shipments of soy to the UK are **deforestation and conversion** free fully implemented immediately where possible and **no later than 2025.**

Working together to develop joined up, pragmatic implementation plans, building on and accelerating progress that has already made.

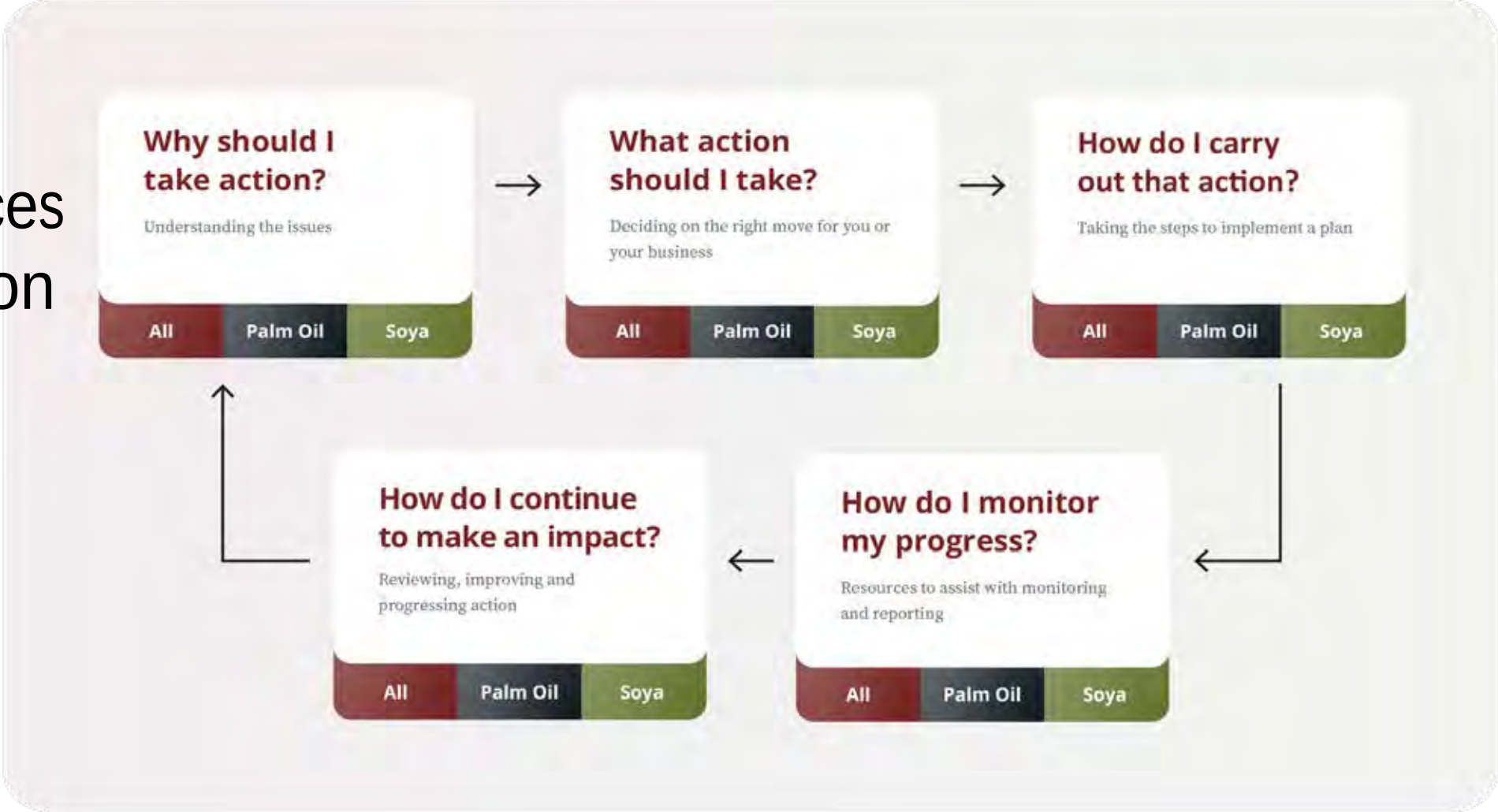
Acting at scale to support a broader mass market transition within global soy supply chains by aligning with the French Soy Manifesto and other European national sustainable soy initiatives.

Align monitoring and reporting to support **greater transparency** and **compliance** with future due diligence legislation.

Signatories represent nearly 2 million tonnes of soy purchases each year and nearly 60% of all UK soy bought every year

Efeca Sustainable Commodities Resource Hub

- Provides tools, info and resources to support on the sustainable sourcing journey



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Dorset Sustainable Palm Oil Community – let's make Dorset the world's first sustainable palm oil county

CHESTER ZOO

SUSTAINABLE PALM OIL COMMUNITY

Steps to joining up as a Champion

1. Sign the Organisation Pledge
2. Check your products for the use of palm oil – supplier questionnaire
3. Make one change
4. Tell us what change you have made
5. Publish your position statement on SPO on your website, or put it on social media = CHAMPION
6. Switch all your products so you only use 100% SPO

Our Champions – pledge to only use 100% SPO

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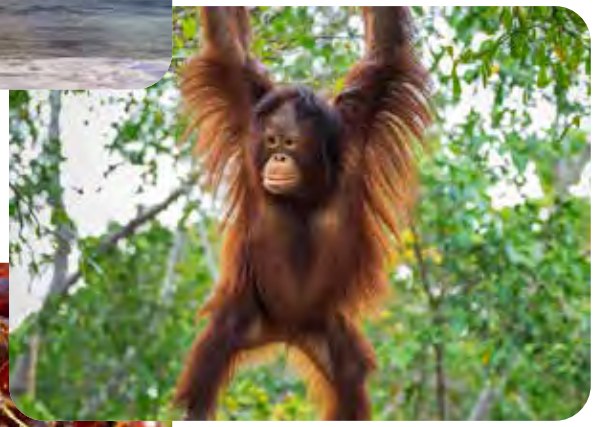
Ambassadors – support and promote

Getting involved

- Need more champions and ambassadors
- Monthly newsletter – join our mailing list
- 15th March – join our webinar on sustainable palm oil and its importance in the fight against climate change



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Thank you

lucy.cullinane@efeca.com
www.efeca.com

BUSINESS SHOWCASE

IAN WHEAL
FOUNDER & CEO

breedr.co

Future of low carbon beef

Breedr

Future of low carbon beef

A practical guide to improving animal productivity, profitability and sustainability

March 2022

Industry is changing *now*

Traceability now **must have** for brands

Technology **adoption accelerating**

Farm **productivity critical state** as subsidies removed

NetZero targets set for 2030 in key markets

Livestock has to be part of the solution

Improving Soil Organic Matter

Cool the atmosphere with same output

Nutrient Source for Consumers

+

Improved Returns for Farmers

The Sustainable Livestock Supply Chains

FARMERS AT THE HEART

Performance | Marketing | Cashflow

Our data is proving environmental impact

Breedr

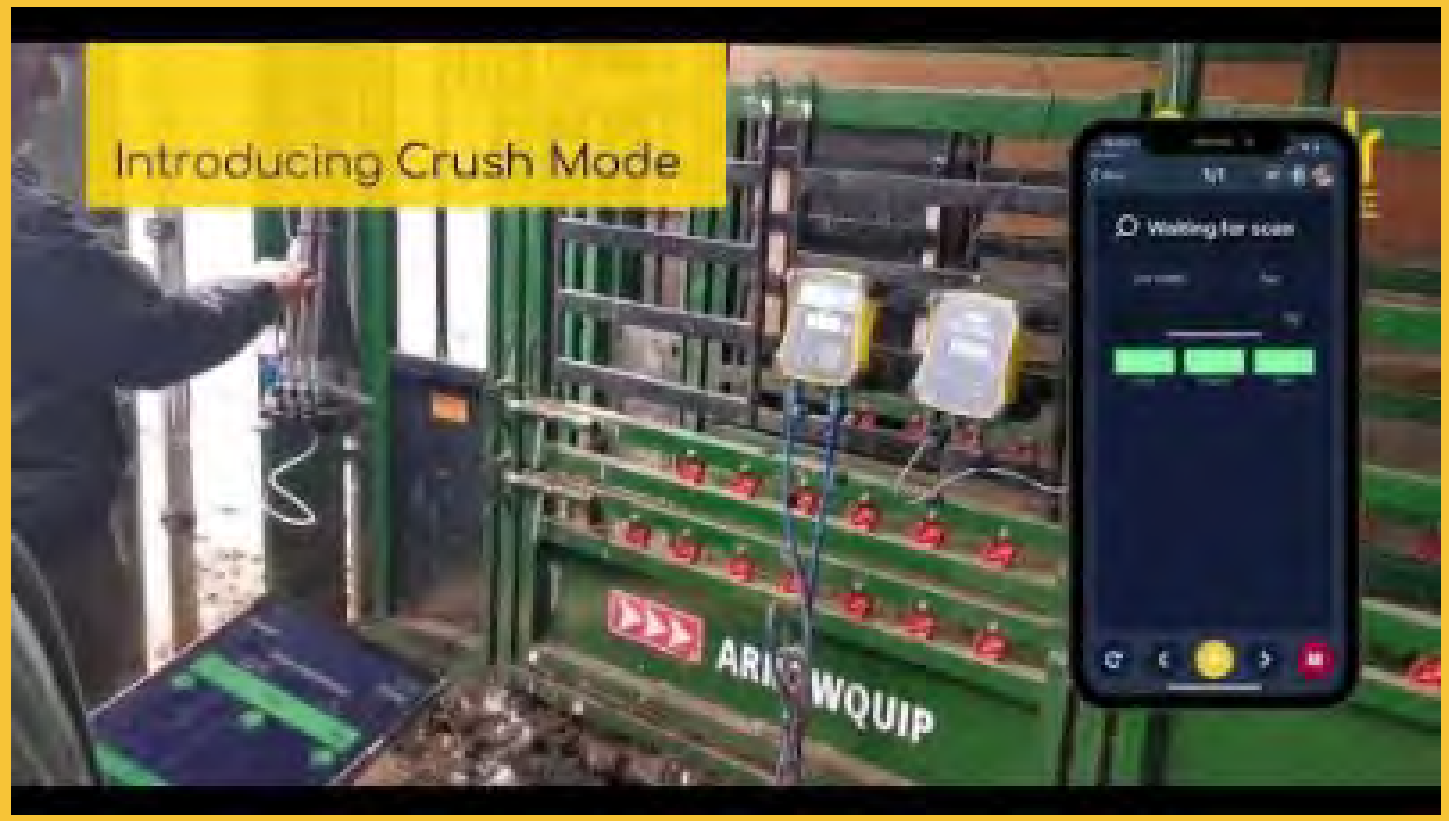
18%
Less cattle needed [1]

1.8 tonnes
Less feed per cow [2]

28%
Less carbon [3]

[1] Based on Breedr data for finishing, and average age at slaughter in the UK of 27 months
[2] Based on 12kg / day fresh weight consumption at 65% dry matter intake for animal av. weight 340 kilos)
[3] Based on 474,000 prime beef cattle x 151 days (5 months x 30.5 days) x 4.2kg / day as per https: / / www.fwi.co.uk / livestock / beef / beef-farmers-split-over-carbon-tax-plan-for-older-cattle
[5] @ £180 / t – based on AHDB book values for silage ration: https: / / ahdb.org.uk / beef-ration-calculator)

Focused on ease of use, regulatory, meds, weighing and sourcing cattle



British Cattle Movement Service

ScotEID
LIVESTOCK TRACEABILITY

RED TRACTOR CERTIFIED STANDARDS

NOAH

Breedr

Opportunities open to farmers

Suckler & Beef Farmers

Arable and Estates

Dairy & Dairy Beef

Regenerative farming

Breedr

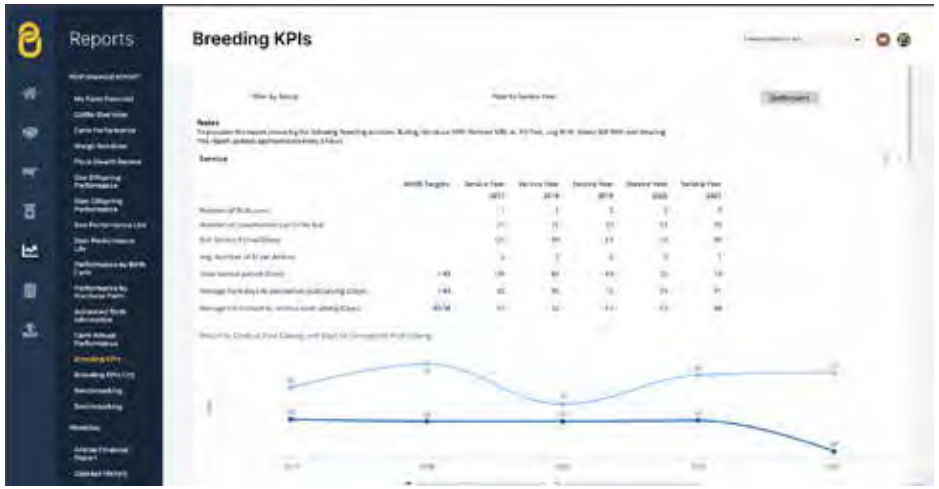
Opportunities open to farmers

Suckler & Sheep Farmers

Weigh

+

Regulatory data



- Improve SIRE genetics
- Improve DAM genetics
- Improve weening and grazing growth
- Improving diets and rations

Improve Profit per animal + reduce age to slaughter =

30% reduction in emissions

Breedr

Opportunities open to farmers

Arable Farms & Estates

Cash flow

+

Sourcing of Cattle

- Source animals that will grow
- Part purchase to reduce cash needs
- Reduce synthetic nitrogen, improve weed control
- Profit from cover crops and extended rotations

Low Working Capital + Reduction in Synthetic Fertilizer

10-20% reduction in costs

Breedr

Opportunities open to farmers

Dairy Beef & Rearing

Improved Rearing & Welfare

+

Supply chain Tools

+

Cashflow

- Build supply chains
- lifetime data to support retail contracts
- Improve weening and lifetime efficiency
- Improve value for dairy farmers

Higher Value animal + No cost of the cow =

40 to 60% more efficient

Breedr

Opportunities open to farmers

Regenerative Livestock

Focus on soil and root growth, and grazing

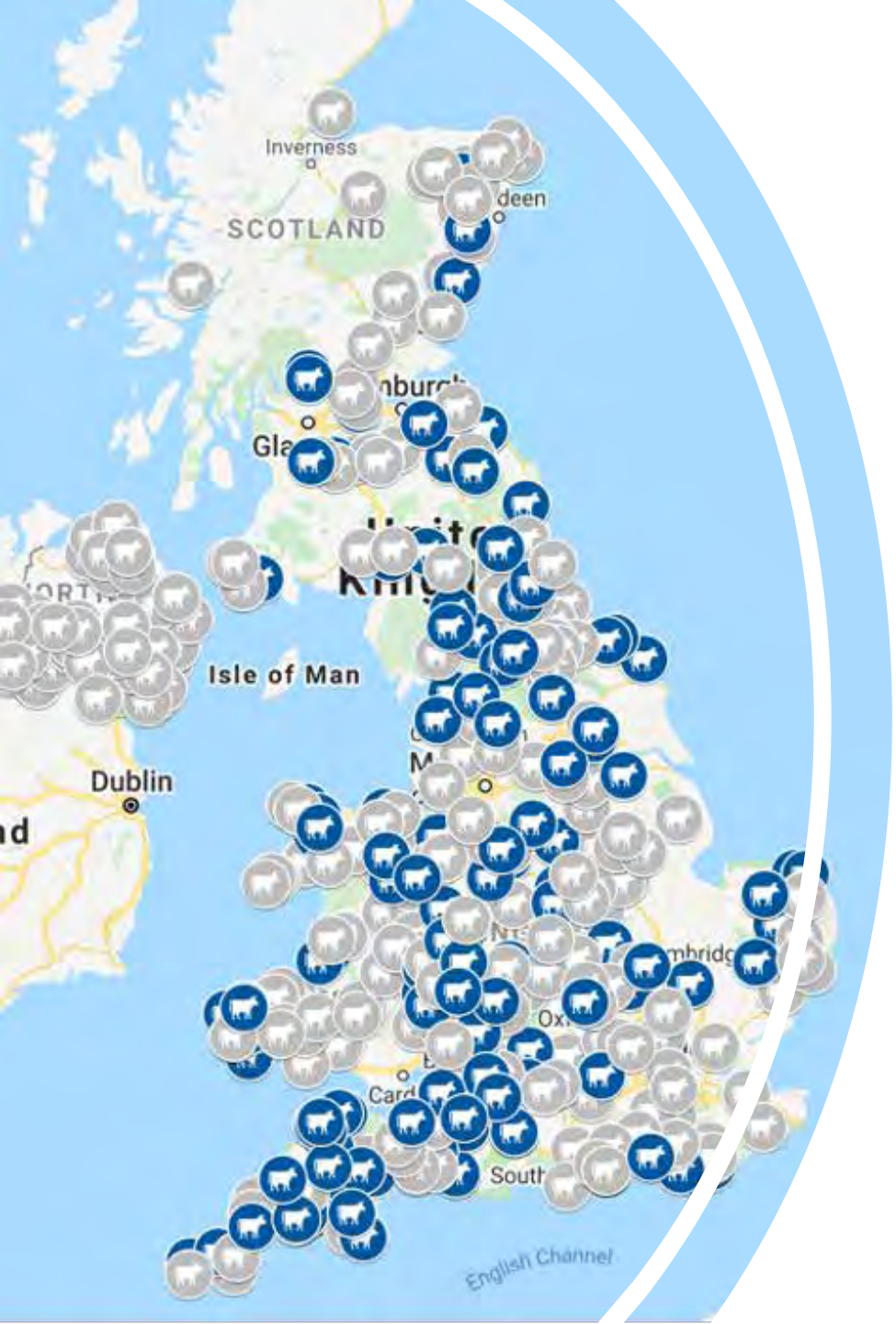
+

Livestock growth and productivity

+ Reduction in Synthetic Fertilizer

20 to 80% reduction inputs

Breedr



Supporting over 2000 farms in the UK

fai

Regenerative and Cattle Supply

Cornish Valley FARMING

Suckler and Cattle Supply

dunbia

Dairy Beef

Dairy Beef

What does the future look like

Breedr

Farm to Farm Supply chains

Machine Learning supply predictions

Improve genetics and performance

- ü Regulatory, Assurance and Weights
- ü Lifetime animal data
- ü Contracting transaction management
- ü Livestock finance to build supply

+ Genetic improvement and progeny validation

+ Knowledge exchange and benchmarking

+ Yield and meat quality supply predictions

+ Environmental tracking and beef efficiency

Breedr

TRADE
SMARTER

GROW BETTER
ANIMALS

SUSTAINABLE CASHFLOW

SUSTAINABILITY

BUSINESS SHOWCASE

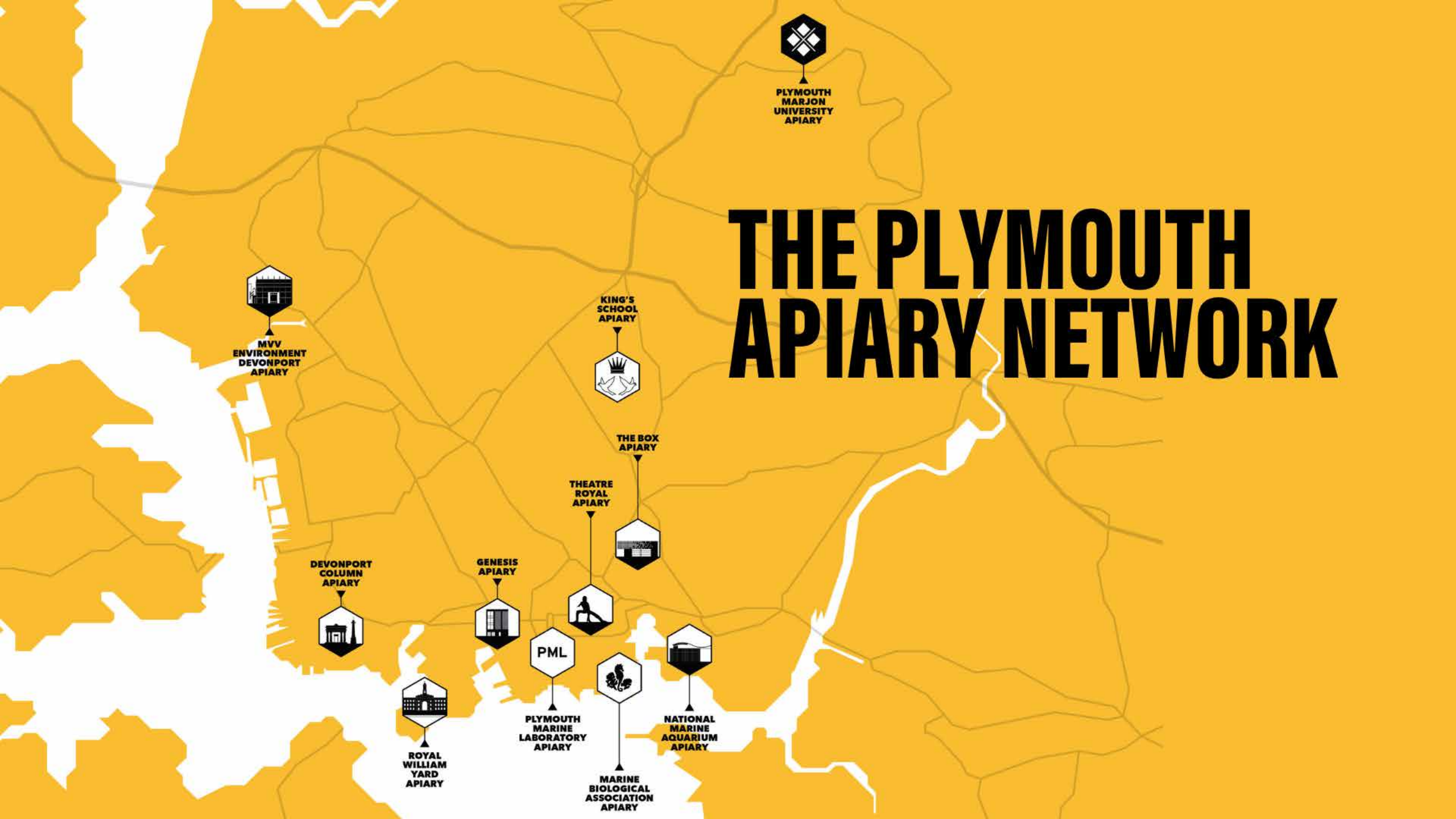
MATTHEW ELMS
DIRECTOR

Pollenize

PRESENTATION TITLE


Pollenize

THE PLYMOUTH APIARY NETWORK



BEES AS BIO INDICATORS

Circular Beekeeping

Each hive has a pollen range of 1074m and a nectar range of 1408m.

Bee leaves the hive

Honey Bee colonies visit 1-4 million flowers a year spread between 159 different plant species.

Bee returns to hive

Pollen is deposited in collection tubes at entrance of hive

We analyse DNA from pollen to identify which species the colony is visiting.

With this data we can identify the floral gaps in the hive's area. We then use this information to create our seed packets.

The public then sow these seeds, helping to create a more diverse, healthier ecostystem.

This process is then repeated every year.

SEEDS FOR BEES

Pollenize

SEEDS FOR SCHOOLS

Pollenize successfully raised over £75, 000 for the Seeds For Schools Project (S4S). A scheme that will equip **EVERY SCHOOL CHILD** in Plymouth with a **FREE** packet of wildflower seeds for World Earth Day 2022! (That's 82 Schools and approximately 36,000 eco-heroes)

Pollenize

THANK YOU

Please come and see us at our stand
and grab some free rewilding seeds

hello@pollenize.org.uk

www.pollenize.org.uk

SUSTAINABILITY

BUSINESS SHOWCASES

DIGBY SOWERBY
STRATEGIC PROJECTS MANAGER

5G Rural Dorset
Agriculture and aquaculture

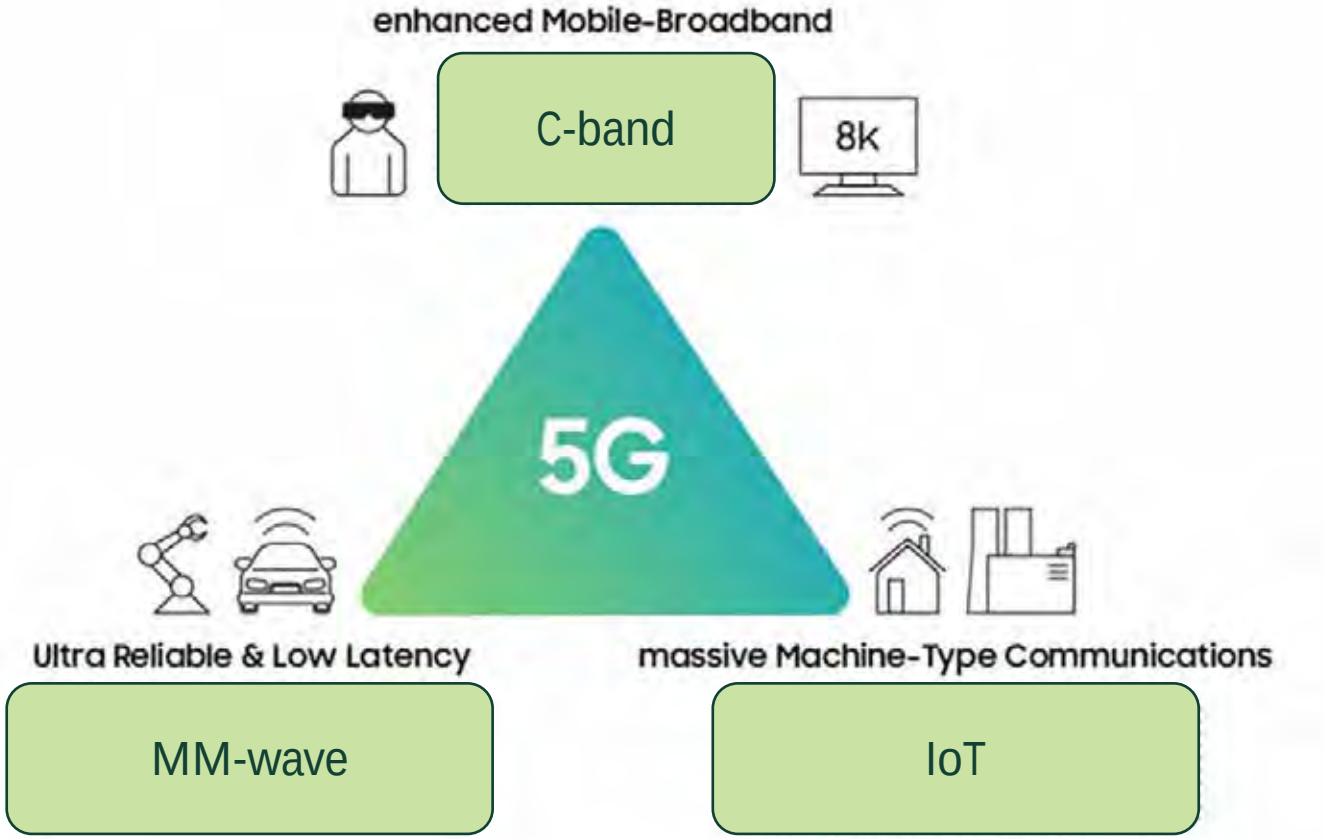
Wessex Internet

5G RuralDorset

Agriculture and Aquaculture

What is 5G?

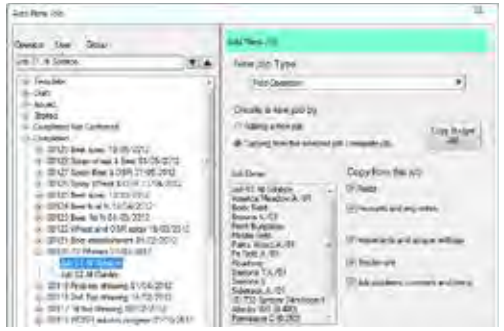
- 5G is fit for purpose
- 5G is flexible
- 5G means ‘live’ and ‘remote’



The project

Aim: Show how 5G connectivity will work for agriculture

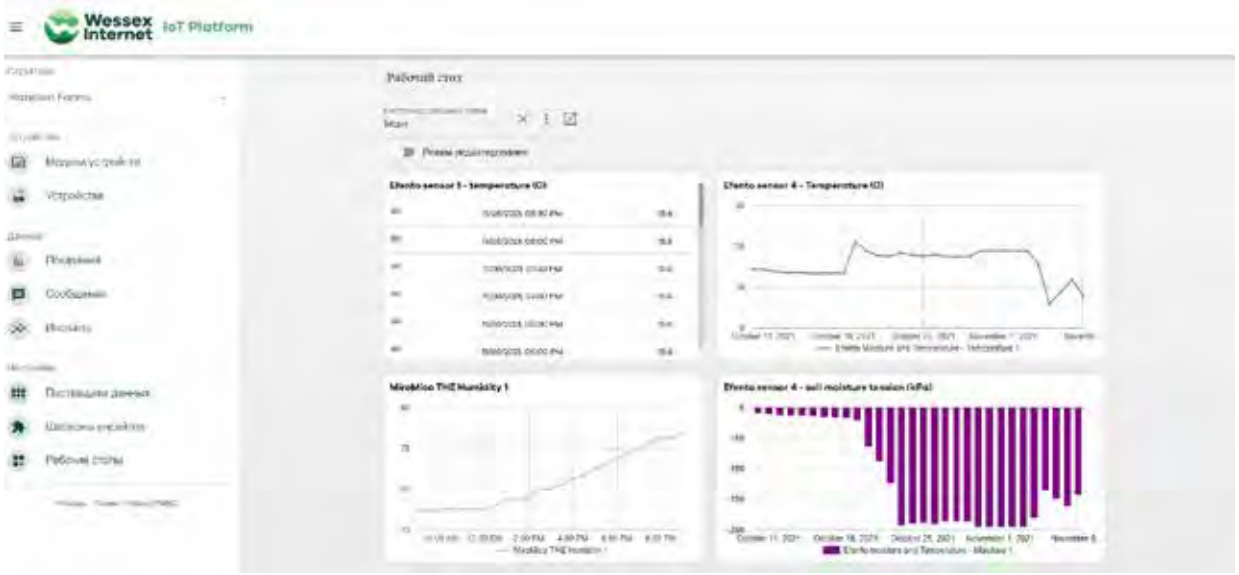
- Affordability
- Interoperability
- Reliability



Build

UK’s largest 5G deployment in agriculture

Trial 1 – Farm Sensors

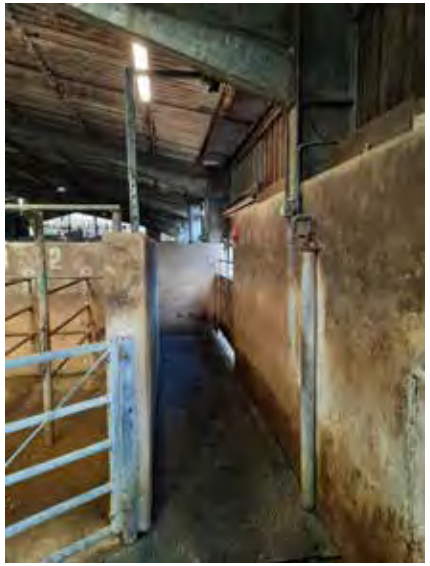


- Saving time and money
- Live, constant information
- Useable data
- Multiple sensors
- Environmental reporting
- Last up to 10 years
- Better coverage than 4G

Trial 2 – Drone Scout

- Automating heavy data transfer
- Defined images for precision
- Use on private 5G network
- Days into hours
- Exploiting good conditions

Trial 3 – Cow health



- Health and wellbeing
- Environmental sensors
- Information for management
- Cameras without wires
- Reaching farm buildings
- Reduced cost

Trial 4 – Automated farm vehicles

- Trialling March/April
- Up to 6 terabytes a day
- Automation
- Two-way communication
- Interaction with rest of farm
- Saving data costs

Next

- Live alerts
- Environmental reporting
- Useable records

- Next generation ecosystem
- Farm-centric network

Wessex Internet

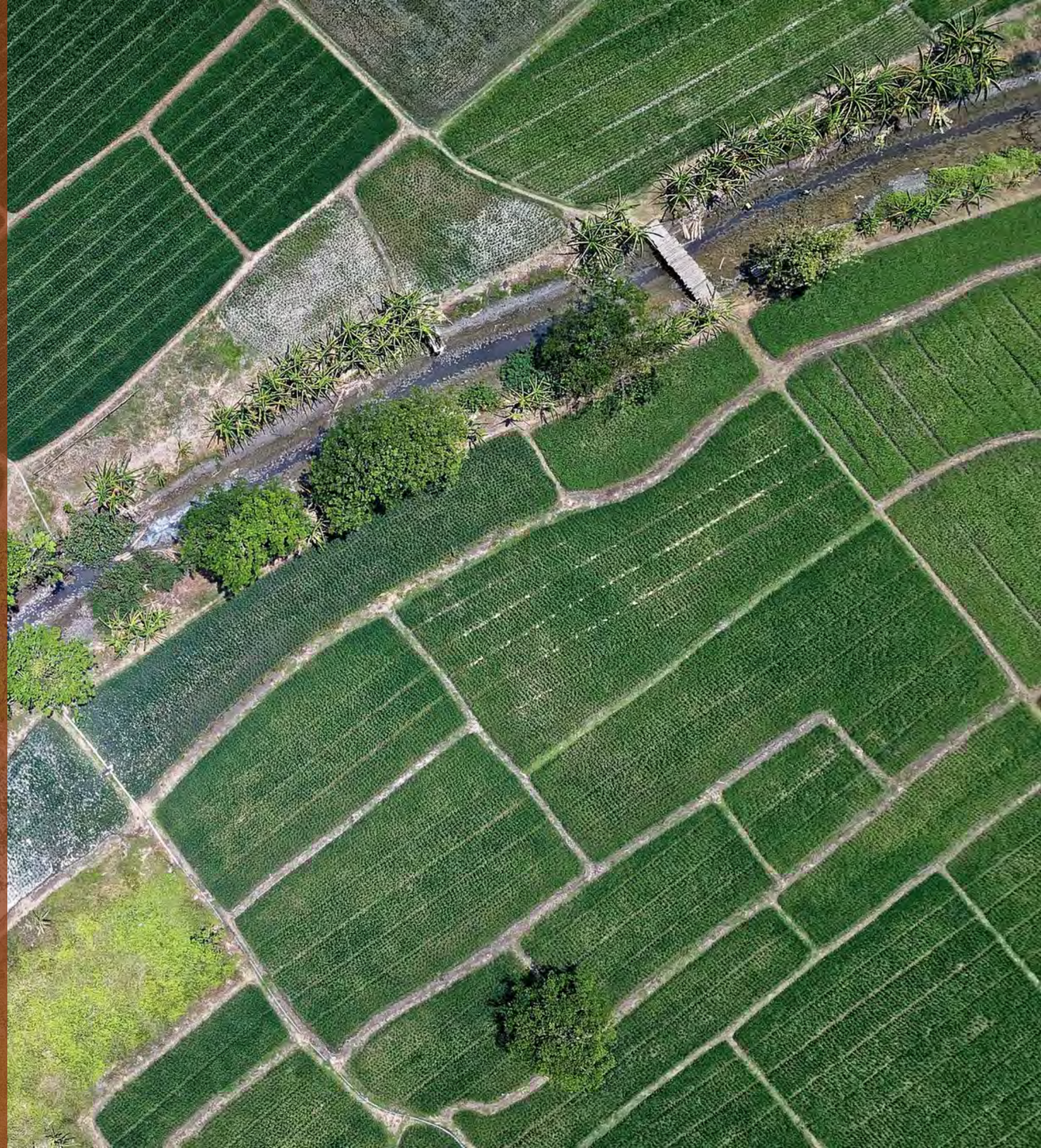
Thank you

INTREPID MINDS

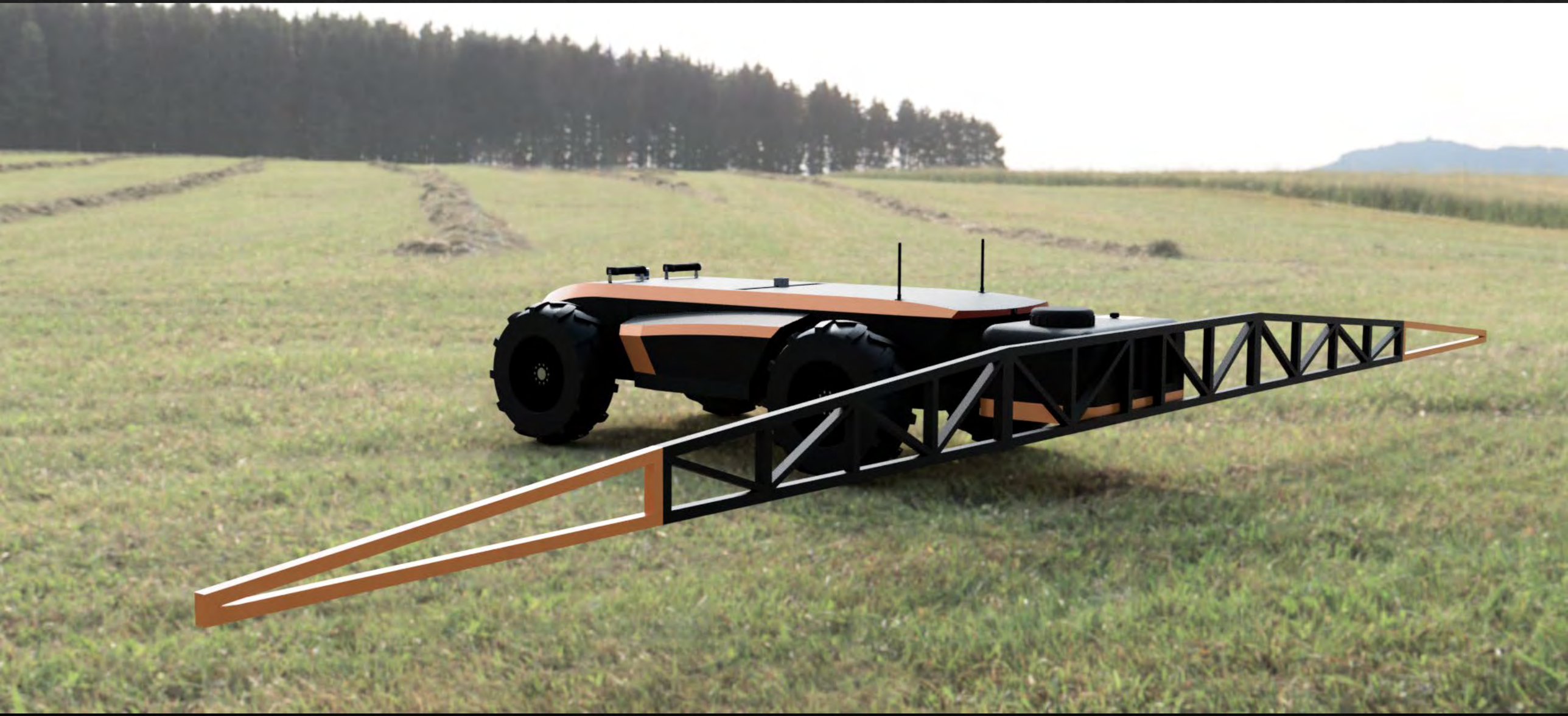
THE ART OF THE POSSIBLE

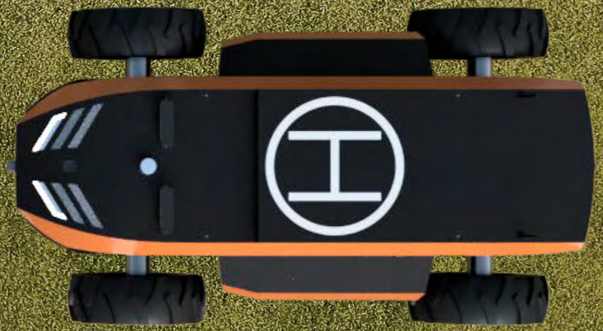
Farming 4.0

AUTONOMOUS TRACTOR



Presented by
Adam Smith





CONTACT US

- CONTACT@INTREPIDMINDS.CO.UK
- WWW.INTREPIDMINDS.CO.UK

SUSTAINABILITY

INNOVATION FUNDING OPPORTUNITIES

KEVIN BROOKS
ONE HEALTH PROGRAMME SUPPORT
DIRECTOR – BID WRITER

DORSET GATEWAY — BrooksKebbey —

SUSTAINABILITY

DORSET Local Enterprise Partnership

defra
Department for Environment Food and Rural Affairs

Farming Futures R&D Fund – Theme 1 (Expression of Interest)

This competition is for UK businesses and research organisations who want to work on longer-term projects that will benefit farmers, growers or foresters in England.

Projects should focus on reducing emissions in agricultural practices and adapting to a changing climate.

SIGN UP FOR OUR BRIEFING AND CONSORTIA BUILDING EVENT - 22 MARCH

Large R&D Partnership Projects

This competition is for businesses, research organisations, farmers, growers and foresters who want to develop an idea for a new farming product or service.

Your idea must have the potential to improve the productivity and environmental sustainability of farming.

SIGN UP FOR OUR BRIEFING AND CONSORTIA BUILDING EVENT – 24 MARCH

SUSTAINABILITY

DORSET Local Enterprise Partnership

Innovate UK Smart Grants: January 2022

UK registered organisations can apply for a share of up to £25million for game-changing and commercially viable R&D innovation that can significantly impact the UK economy. This funding is from Innovate UK, part of UK Research and Innovation.

Eligibility

This competition is open to single applicants and collaborations.

To lead a project your organisation must:

- be a UK registered business of any size
- be a UK registered research and technology organisation (RTO)
- carry out all your research and development (R&D) project activity in the UK
- intend to commercially exploit the project results from the UK
- be or involve at least one micro, small or medium-sized enterprise (SME)

Open now

Opened: 17 January 2022

Closes: 13 April 2022

SUSTAINABILITY

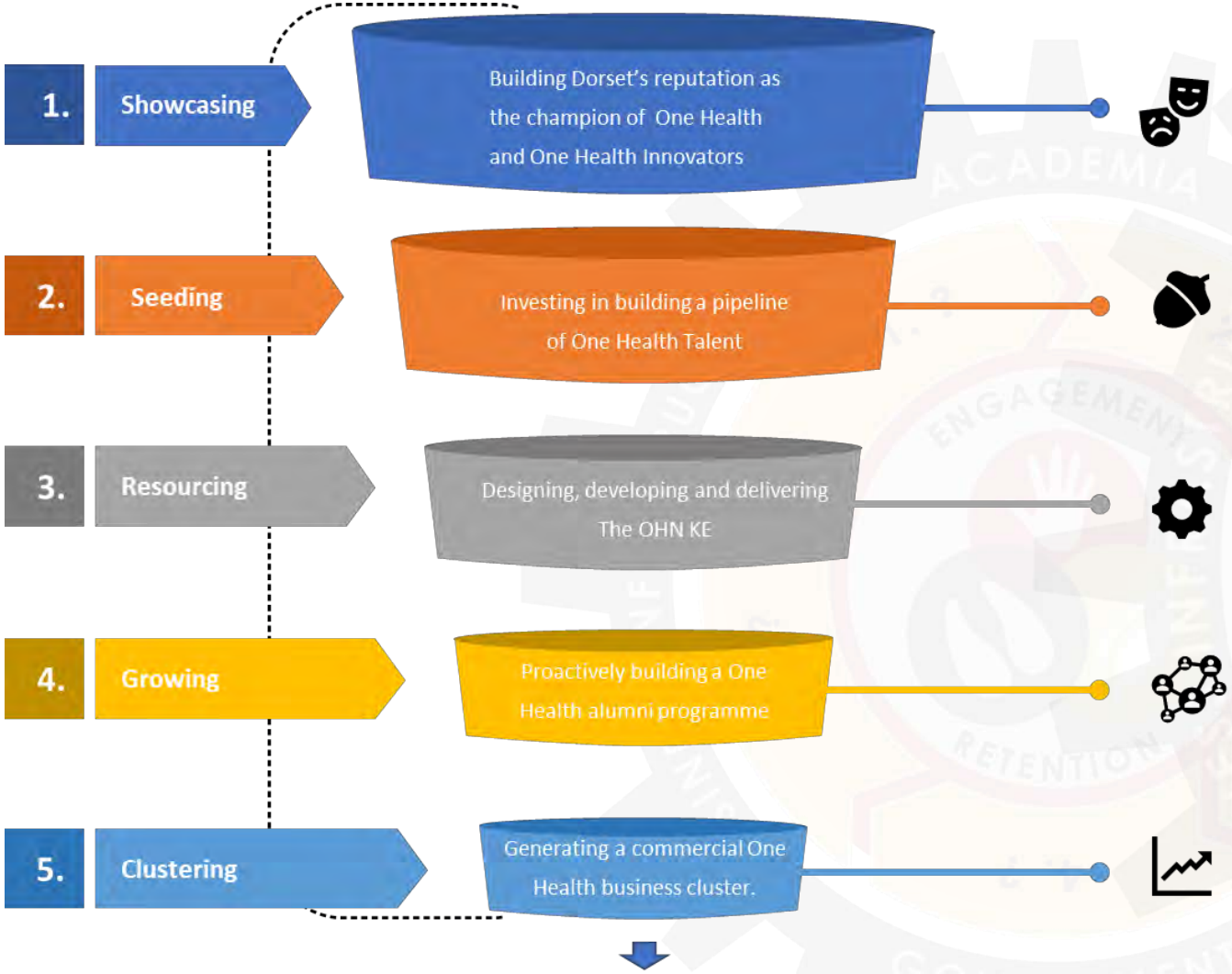
LAUNCH OF THE ONE HEALTH NUCLEUS

LUKE RAKE
ONE HEALTH
DORSET LEP BOARD LEAD

KEVIN BROOKS
ONE HEALTH
OHN PILOT LEAD

AMBITION: ONE HEALTH PROGRAMME 2022-2040

DORSET Local Enterprise Partnership



Outputs: a) annual showcase conferences; b) Weekly social media – showcasing companies, publishing One Health stats and celebrating Dorset-based One Health companies' successes; c) Public talks/ presentations, etc.

Identify/engage with up to 30 new One Health companies per year.

A transdisciplinary knowledge exchange model – physically located in the KM University Centre and Rural Business Hub - to be accessed by One Health companies with the aim of accelerating their business growth.

An alumni network made up of those that have been part of the One Health Programme.

All of the above generating a commercial One Health business cluster (some virtual – regional, national and international – and some in Dorset and close borders).

2040: £100M+ generated from OH businesses in Dorset and close borders and a new local, regional, nation and international One Health business cluster/eco-system generating circa £12 billion in exports annually.

ONE HEALTH NUCLEUS - PILOT

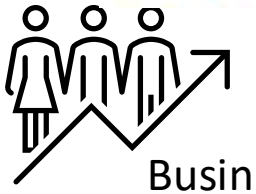
1/**Entry:** Expression of Interest

2/Triage meeting (due diligence)

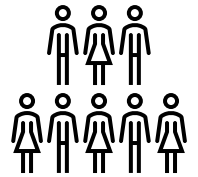
3/Capture Business Plan Summary

4/Connect with Innovation Agencies for advice, data transfer, incubation or acceleration

5/**Exit:** Showcase (which may include connecting with funders).



Business on path to sustainable business growth.



Alumni

Business Cluster

SUSTAINABILITY

DORSET Local Enterprise Partnership

One Health Nucleus – Initial Programme Areas