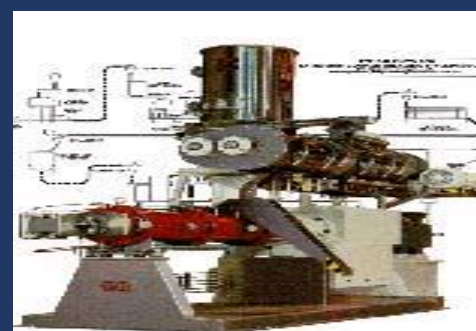


ADVISORY COMMITTEE ON ANIMAL FEEDINGSTUFFS

70th Meeting of ACAF on 17 June 2016

**Presentation by University of Stirling – A vision for avian proteins in
salmon feeds in Scotland**

**Professor Brett Glencross
June 2016**



A Vision for Avian Proteins in Salmon Feeds in Scotland

Brett Glencross (b.d.glencross@stir.ac.uk)

10th June 2016 – Institute of Aquaculture, Stirling University



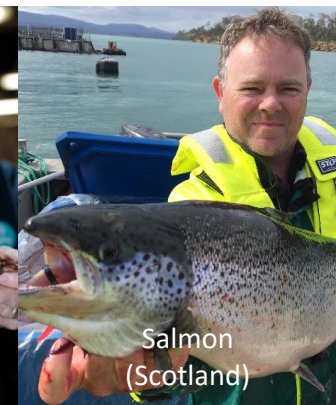
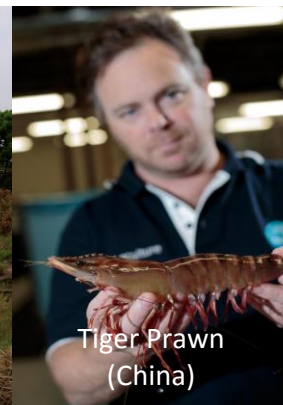
**UNIVERSITY OF
STIRLING**

Agenda

- Background – Who am I ?
- Why is salmon farming important to Scotland?
- Feeding salmon
- What do we feed salmon with
- Some of the problems we have with feeding salmon
- Why feed avian proteins to salmon?
- Why is the UK NOT feeding avian proteins to salmon now?
- The APIS Project...

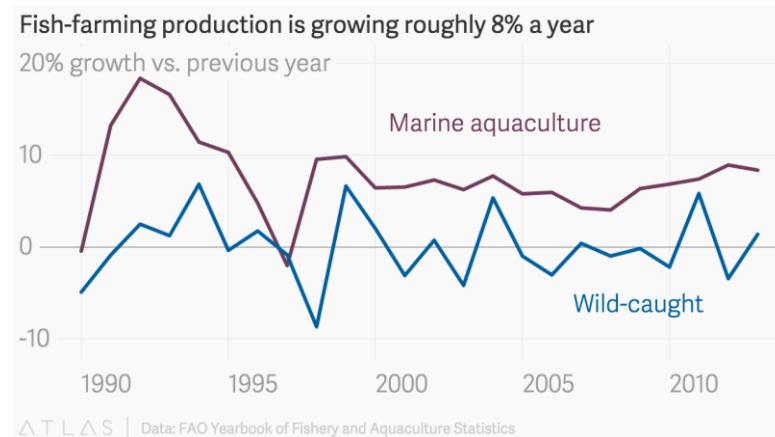
Who is Brett Glencross ?

- Director of Research at Institute of Aquaculture, University of Stirling (2016 – onwards)
- Professor of Nutrition at Institute of Aquaculture, University of Stirling (2016 – onwards)
- Was Previously the Technical and R&D Manager at Ridley (largest supplier of aquafeeds in Australia)
- Prior to that was a Principal Research Scientist, Commonwealth Scientific and Industrial Research Organisation
- Prior to that; R&D Manager in various private and public sector roles (from 1998 – 2008)
- Ex-Editor, Aquaculture Nutrition (from 2008 - 2016)
- Editorial Boards; British Journal of Nutrition, and Fisheries and Aquaculture Journal
- Board Director – Asia Pacific Chapter of World Aquaculture Society
- Deputy Chair of Scientific Committee, International Society of Fish Nutrition and Feeding
- Chair of Organising Committee, 2014 International Symposium of Fish Nutrition and Feeding
- PhD – Animal Nutrition 1998 (University of Queensland, Australia – QS Ranking 46₂₀₁₅)
- MSc – Biochemistry 1995 (University of Western Australia – QS Ranking 98₂₀₁₅)
- BSc(Hons 1st) – Biochemistry 1993 (University of Western Australia – QS Ranking 98₂₀₁₅)



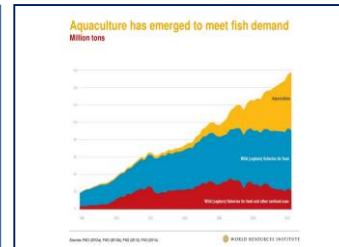
Economic Scale of Salmon in Scotland

- Salmon is Scotland's largest food export
- Second largest food industry after whisky production
- The worldwide retail value of Scottish farmed salmon is over £1 billion
- Over 60 countries imported fresh Scottish salmon in 2014
- USA is the largest export market for Scottish farmed salmon
- Scottish Government estimates that more than 5,000 jobs are reliant on the aquaculture industry in Scotland



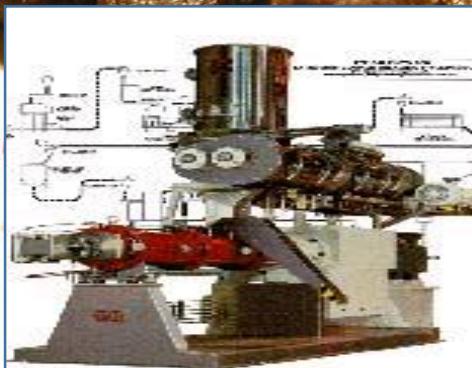
Feeding Aquaculture

- Aquaculture now accounts for over 50% of the world's food fish.
- In salmon aquaculture the feed accounts for over 50% of all operating costs.
- Feed and feeding account for the majority of aquaculture environmental footprint*



*Previous studies (e.g. Nijdam et al 2012, Roberts et al 2015 and Pelletier et al 2009) have shown that over 90% of some environmental impacts from salmon farming are related to the manufacture and use of feed.

What's in A Feed?



Atlantic Salmon

Energy

Protein

Water – H₂O

Arg

His

Iso

Leu

Lys

Met

Phe

Thr

Try

Val

Tau

18:2n-6

18:3n-3

20:4n-6

20:5n-3

22:6n-3

Sterols

Phospholipids

Ca

Mg

P

K

Na

Cu

I

Fe

Mn

Se

Zn

A

D

E

K

B₁

B₂

B₆

Pa

Ni

Bio

Score = ~32/47

B₁₂

Fo

Ch

In

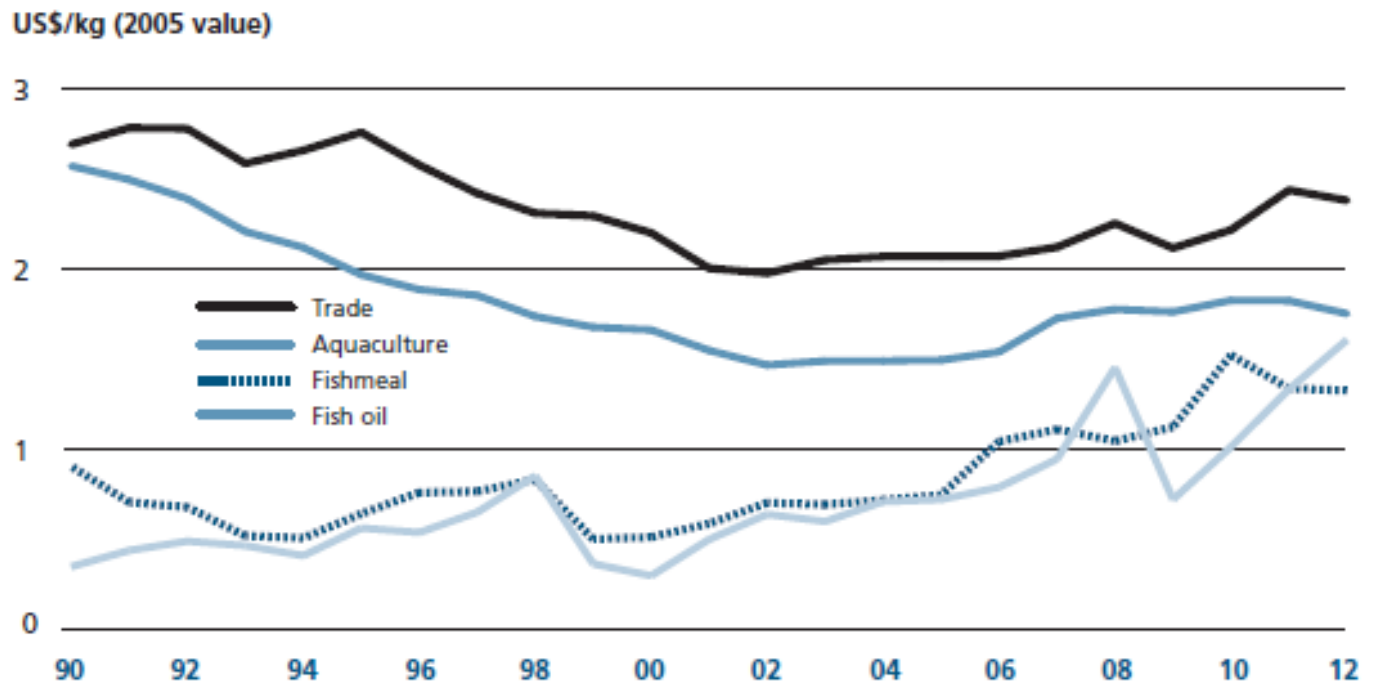
C



Google Scholar : 41,700 hits on “Atlantic Salmon Nutrition”

The Cost : Price Squeeze

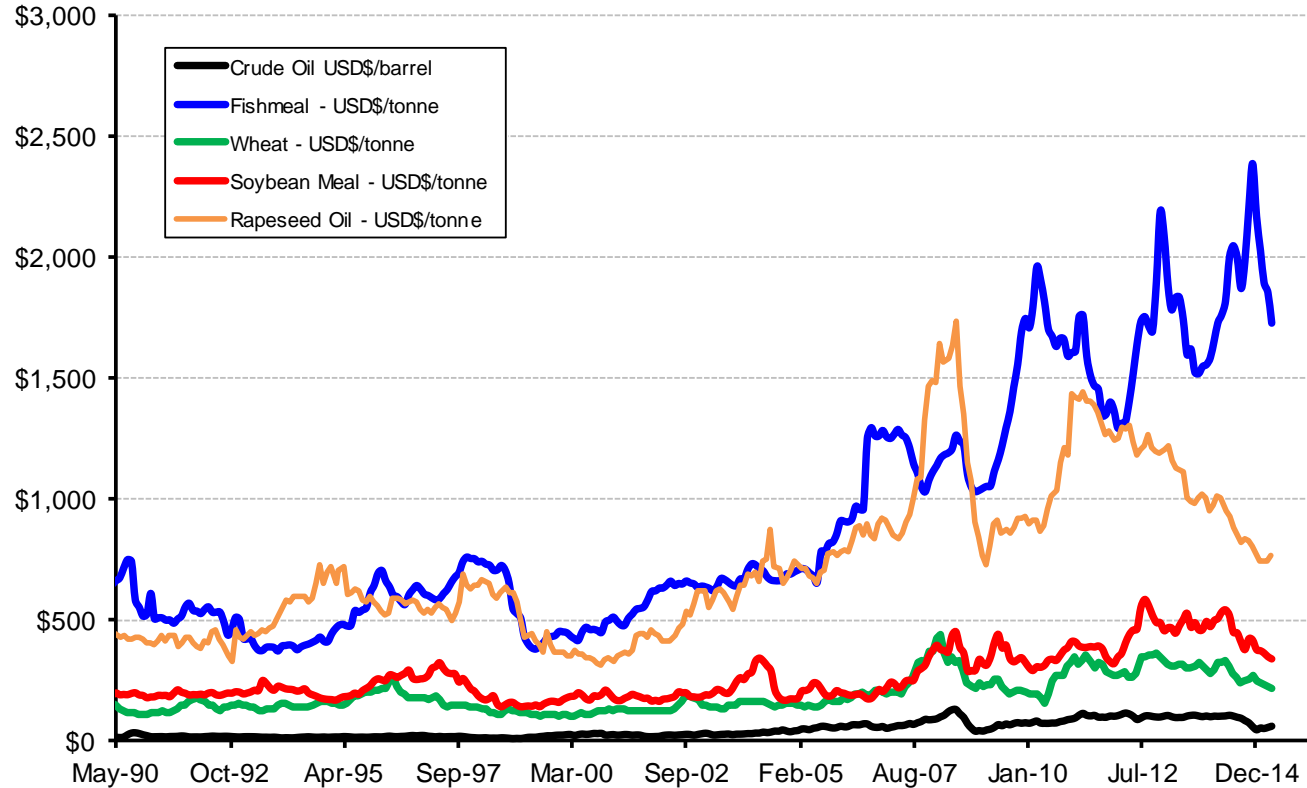
Average fish prices in real terms (2005)



FAO (2014) State of the World Fisheries and Aquaculture

Growing Volatility

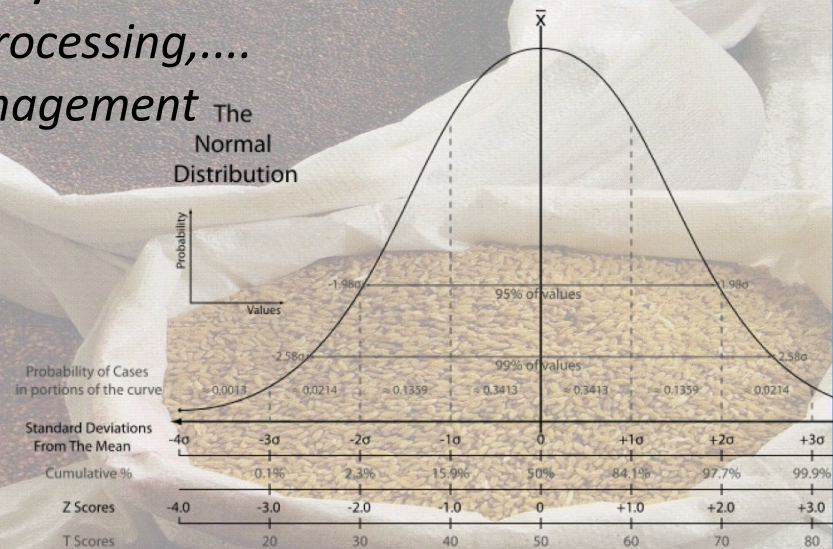
Price (US\$/tonne fob)



Data Source: indexmundi.com

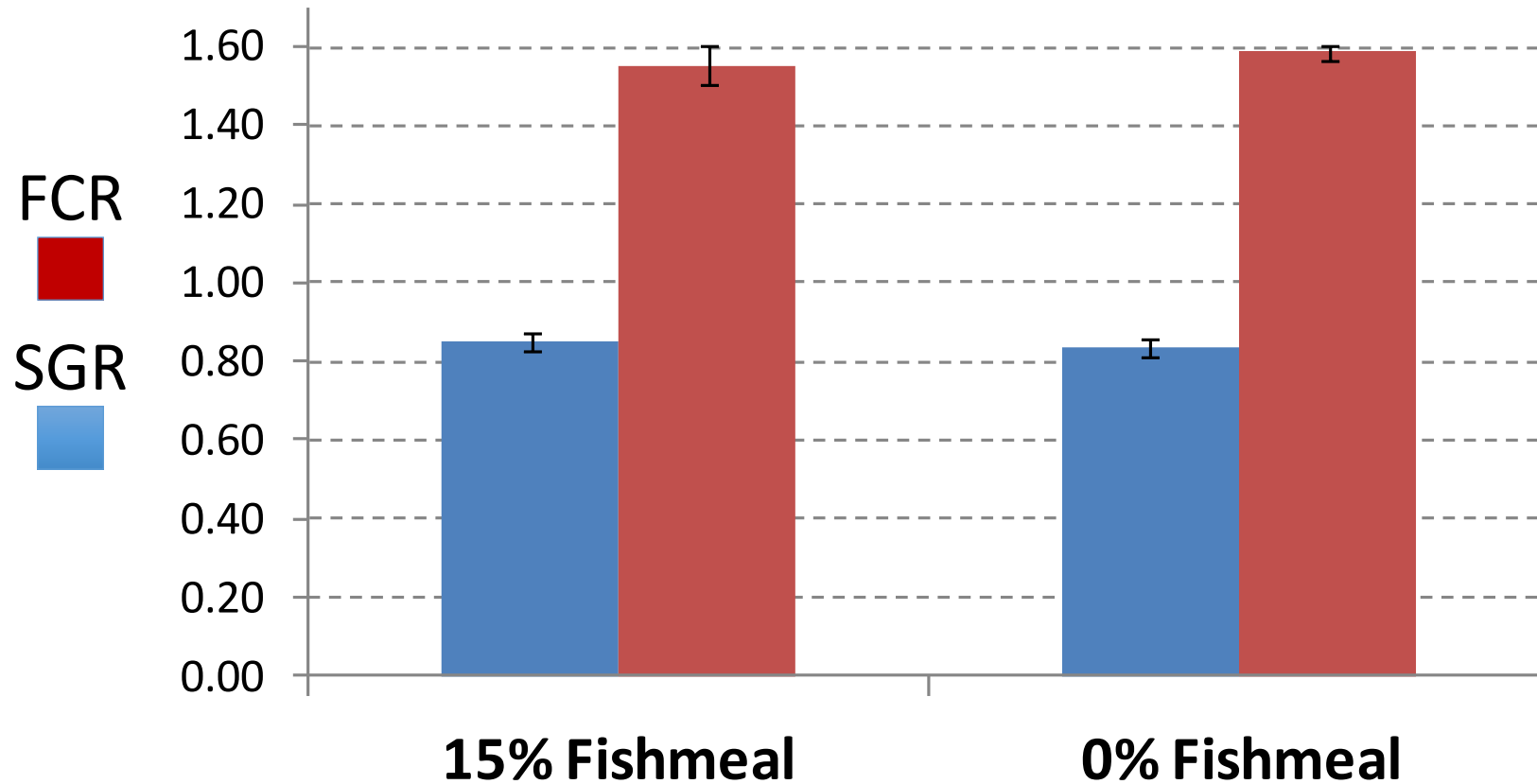
Moving Beyond Fish Meals and Oils

- Animals need nutrients and energy – NOT raw materials
 - *Same proteinogenic 20 amino acids exist in all plant and animal proteins*
 - *Energy from protein, fat and starch is unaffected by whether it is of animal or plant origin*
- All raw materials have issues with variability
 - *Nutritional variability is affected by source, processing,....*
 - *Understanding variability is the key to its management*



Zero Fishmeal Salmon Diets

2014-2015 : Commercial cages – Commercial diets in Australia



Raw Materials for Salmon ?



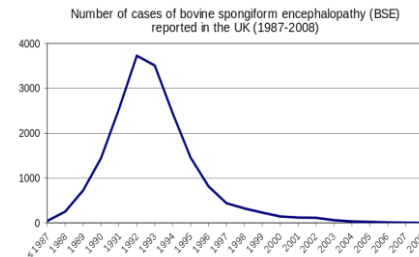
So How Did We End Up In this Situation?

1945 – 1990

- All Animal By-Products (ABPs) processed together (only a single category)
- Meat and Bone Meal (MBM) widely used in animal feeds (most species)
- Focus on continuous processing

1990 – 2000

- New standards introduced based on some level of risk assessment
- Bovine Spongiform Encephalitis (BSE) outbreaks occur in UK and Europe
- MBM becomes banned in UK and Europe
- Over 4 million cattle slaughtered, with 180,000 positive BSE cases



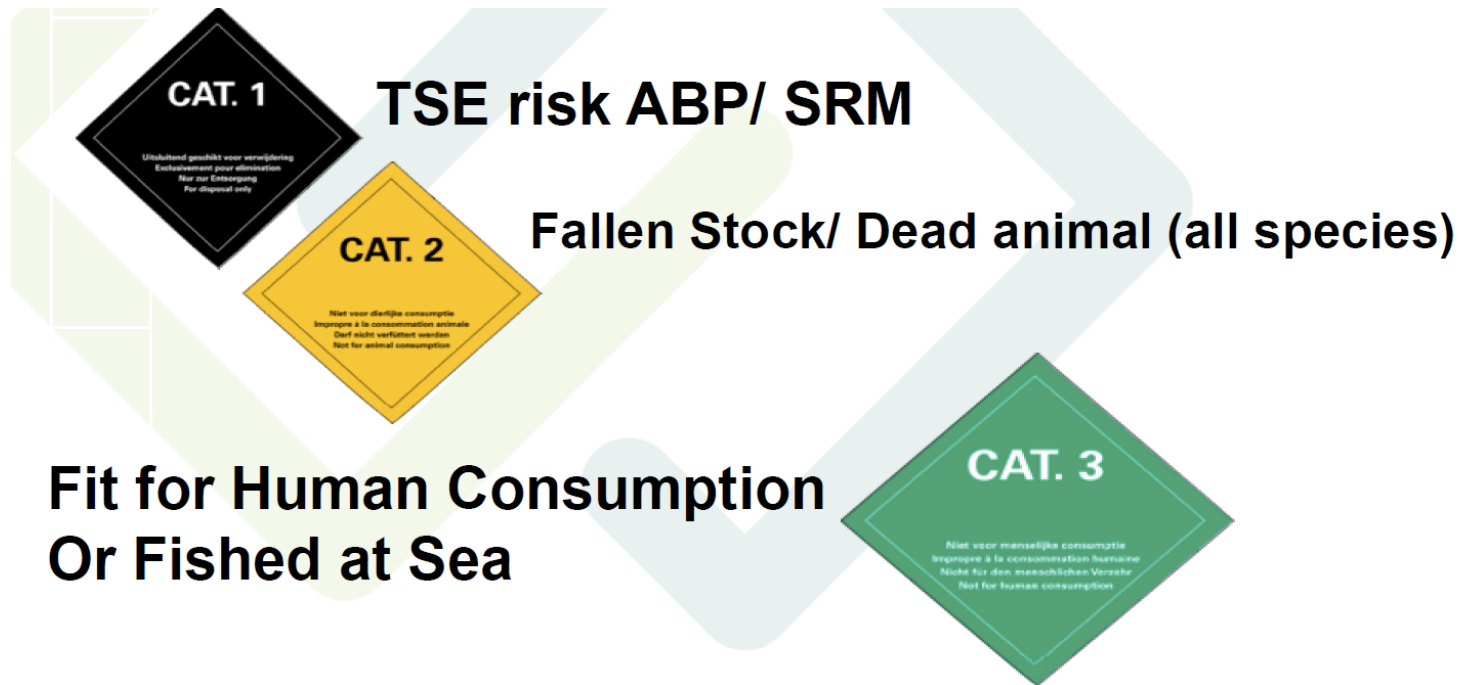
2000 – 2010

- New Transmissible Spongiform Encephalitis (TSE) regulations introduced [EU999/2001]
- New ABP regulations introduced [EU1774/2002]
- A risk based approach to processing ABP's is introduced
- A large degree of “precautionary principle – zero tolerance” exists
- Some Processed Animal Proteins (e.g. fishmeals) are allowed to be used in feeds

So Is the Situation Now?

2013 onwards...

- EU regulations now permit use of Avian (Poultry) Proteins in Salmon feeds [EU Regulation 56/2013]
- Now three categories of ABPs



Animal By-Products

CAT. 1

Uitsluitend geschikt voor verwijdering
Exclusivement pour élimination
Nur zur Entsorgung
For disposal only

CAT. 2

Niet voor dierlijke consumptie
Impropres à la consommation animale
Darf nicht verfüttert werden
Not for animal consumption

CAT. 3

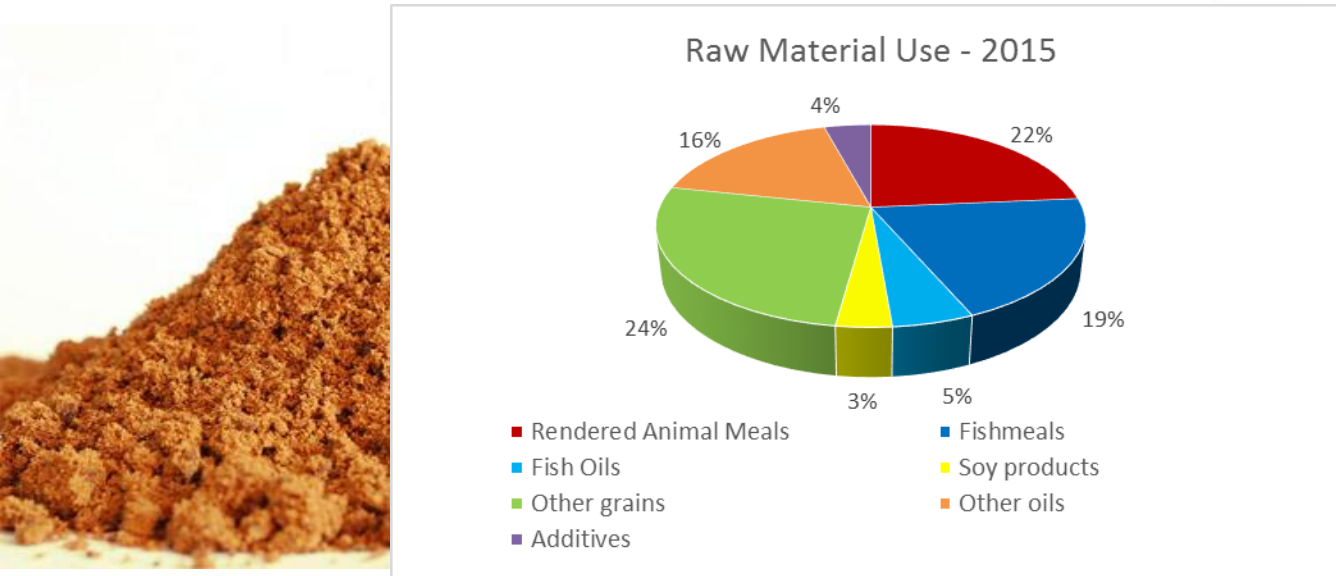
Niet voor menselijke consumptie
Impropres à la consommation humaine
Nicht für den menschlichen Verzehr
Not for human consumption

Biomass Renewables
for **Energy**

Ingredients for
the **Foodchain**

Avian Proteins In Salmon (APIS) Feeds

- Long history of use outside the EU without any biosecurity issues
- In 2015 Australian salmon feeds used more ABPs than Fishmeal
- Arguably one of the most sustainable protein sources available
- Provides key opportunity for protein and lipid recycling
- REAL opportunity to value-add a growing UK agriculture sector



Why We Need The APIS Project

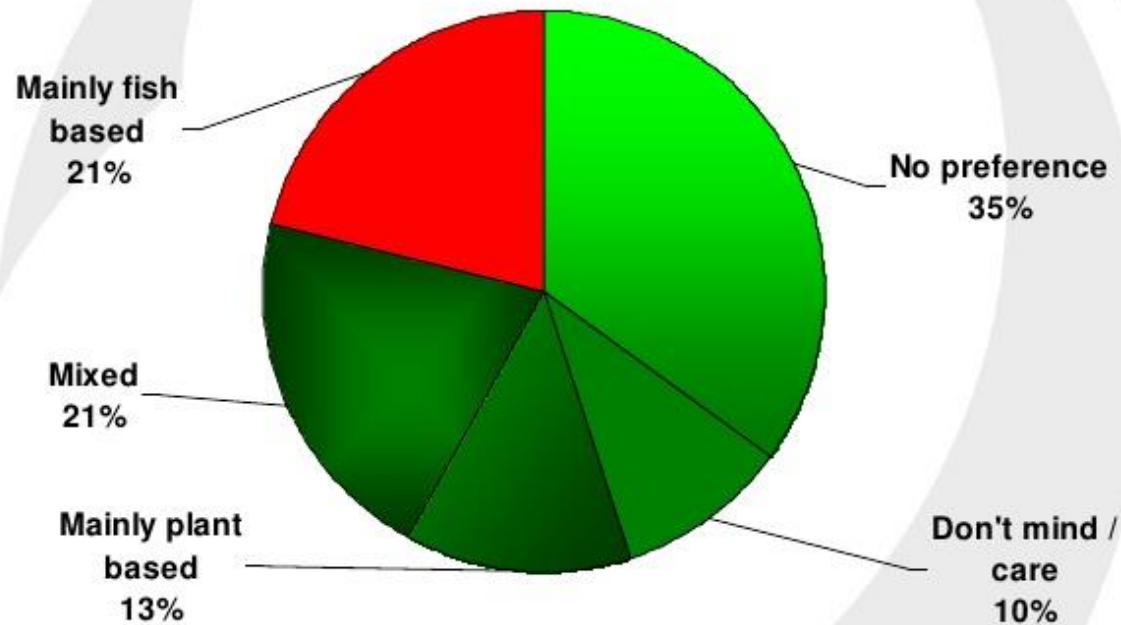
- UK has a higher degree of reliance on marine resources.
- UK also has a high reliance on imported vegetable protein.
- There is over 100,000 tonnes of avian protein products (APPs) that are unused by the aquaculture feed sector in the UK alone.
- Recent changes to legislation (EU Regulation 56/2013) now make it permissible to use avian protein products (APP's) such as offal and blood meals.
- Reluctance to adopt the use of APP's due to perceived issues of consumer acceptance.

We need to find a way to move past this impasse

Consumer Sentiment?

Responses in consumer attitude survey carried out by IPSOS MORI for SARF Project

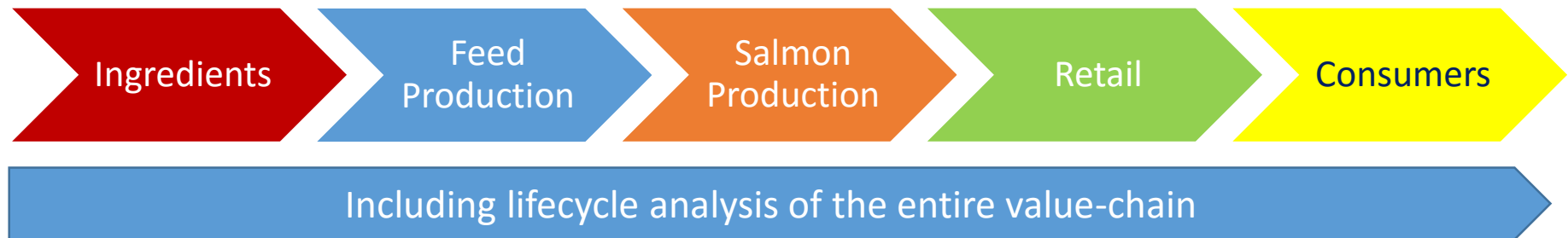
- What is your preference, if any, for the type of diet that farmed salmon should be given?



Thistle Env. / SARF, 2008



An Integrated Value-Chain Approach

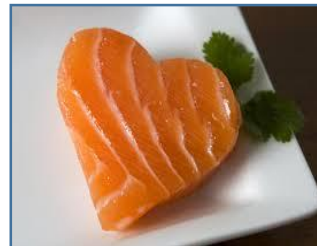
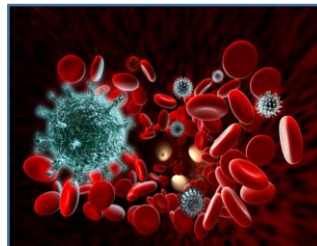


To attempt to assess the complete impacts on different points of the value-chain, the fish and the consumer

Objectives to the APIS Project

1. Identification of the perceived versus real risks
2. Identification of chemical and biological qualities of UK produced APP's.
3. Assessment of the impact on fish health
4. Assessment of the impact on fish quality
5. Determination of the environmental impact (LCA analysis) of using APPs, marine ingredients and alternatives.
6. Re-evaluation of the perceived versus real constraints

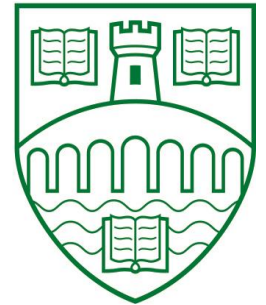
A MULTIDISCIPLINARY TEAM TO ADDRESS ALL THE ISSUES



Who is Involved in the APIS Project ?



UNIVERSITY *of*
STIRLING



MORRISONS



Multiple Benefits

- Environmental savings through more efficient use of UK food by-products
- A reduction of imported ingredients (both marine and terrestrial) which have sustainability concerns
- Reduced risk (currency, trade, contaminants...)
- Improved profitability of rendering – feed milling – salmon production
- Cheaper salmon to the consumer

