Introduction to Cefas, the importance of bivalves and the FAO Reference Centre for Bivalve Shellfish Sanitation

Workshop of the FAO Reference Centre for Bivalve Mollusc Sanitation
Hotel Ole Sereni, Nairobi, Kenya, 11 – 12 November 2019

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Centre for Environment Fisheries & Aquaculture Science

Food and Agriculture Organization of the United Nations

Cefas

Overview

Place, Cefas – Centre for Environment, Fisheries and Aquaculture Science
Perspective, the global importance of food from water
Role, of an FAO Reference Centre for Bivalve Sanitation

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Who we are…

Defra Executive Agency, part of UK government, 100 years of history.

Marine and Freshwater Science – evidence, advice and services for Government, Public and Private Sectors

600 staff: (500 scientists 120+ PhD; 80+ PhD students)

Top 5% of 2,500 International scientific institutes (leading citation score in EU)

Strong Partnerships and University alliances

Food Standards Agency
Marine Management Organisation
EDF ENERGY
Foreign & Commonwealth Office
Food Standards Scotland
defra
Department for Environment Food and Rural Affairs
FAO FIAT PANIS
OIE
University of East Anglia
University of Exeter
BBSRC
Newton-Bhabha Fund
UKaid
E·S·R·C Economic & Social Research Council
Newton Fund
Innovate UK
Technology Strategy Board

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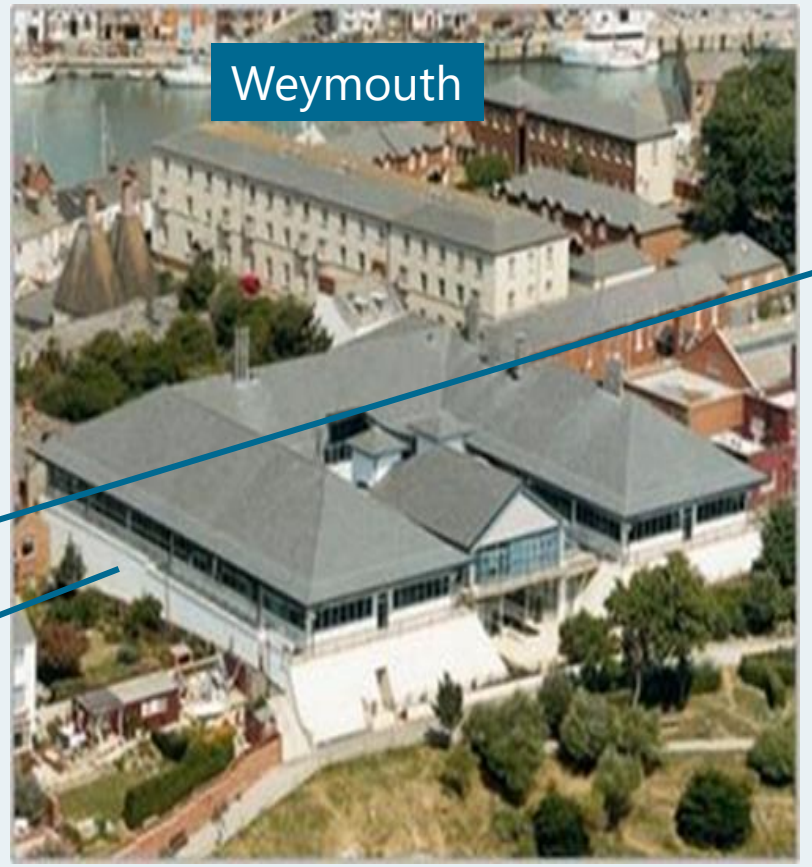
Where we are….. Weymouth, **Lowestoft,** Cefas ENDEAVOUR, Kuwait and Oman



Where we are.....

Working in over x countries, on x s of projects with a turnover of $70k per year

Centre for Environment Fisheries & Aquaculture Science

Cefas

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WHAT DOES CEFAS DO?

Cefas
www.cefas.co.uk

The Centre for Environment, Fisheries and Aquaculture Science provides world class science for the marine and freshwater environment. Our scientists and technical experts work in the UK and across the world to ensure our seas remain healthy and our seafood is safe and sustainable, in support of sustainable blue growth.

ENSURING **SAFE AND SUSTAINABLE SEAFOOD**

600 seafood species are farmed.

Globally, aquaculture produces **more** seafood than wild capture.

Disease in global farmed shrimp costs **$3bn** per year.

In the UK, we import **more** seafood than we export.

Our food safety scientists help ensure seafood and shellfish is safe to eat by testing for contamination with bacteria and viruses.

We work with fish farmers across the world to help detect and prevent disease outbreaks.

Our Fish Health Inspectorate advise UK Government on disease effects on fish populations.

Our advice supports improvements in fish stocks.

FORECASTING **ECOSYSTEM CHANGE**

Our Marine Climate Change Centre helps identify climate change impacts, such as coral bleaching, and options for reducing and adapting to these challenges.

Our models of marine climate change allow businesses to adapt to high waves and storminess.

We model fisheries data to advise on how to best manage fish stocks sustainably.

We predict and help prevent the risk of invasive non-native species to UK biodiversity and native species.

Our models predict the impact of spills and emergencies at sea, enabling managers to mitigate adverse effects.

DEVELOPING **INNOVATIVE MONITORING**

Our R/V Endeavour monitors the health of our seas up to 300 days a year.

We aim to predict our customers' future needs through data analysis and modelling future scenarios.

We innovate with technology and software to meet customer needs for data and evidence.

In our laboratories, we analyse the water quality of our seas and fresh water using remote sampling and direct measurements at sea.

We use a range of cutting-edge technology, such as SmartBuoys, wave gliders and remotely piloted aircraft, to support a wide range of customer needs.

PROVIDING **OPEN AND TRANSPARENT EVIDENCE**

Cefasdatahub

Data is at the centre of our scientific work.

We collect data to provide evidence of the impact of human activities on the marine/freshwater environment.

We develop bespoke computer software to analyse and model data.

We have collected data on fish stocks for over 100 years, and we can use this data today to support our work.

SUPPORTING **SUSTAINABLE BLUE GROWTH**

By 2050, **9bn** people will live on Earth – **50% of which** will be in coastal communities.

The UK marine economy is worth **£49 billion**.

We work with the energy sector to manage the impact of offshore developments and support the development of renewable energy production.

We provide advice to governments to ensure we use our seas sustainably and safely.

We monitor the marine environment to support achievement of international biodiversity targets.

The role of food from water

Globally fish contribute between **15-20%** of **animal protein** to the diet, almost **trebled** since **1960s**.

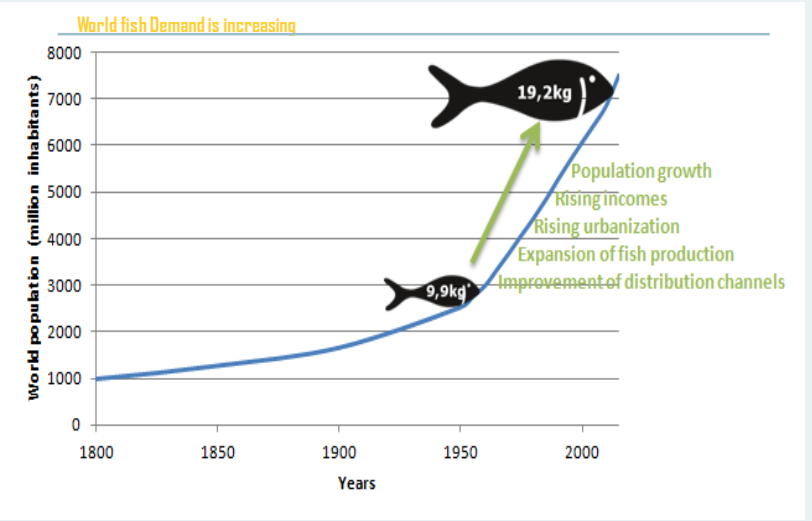
Seafood per capita consumption has risen **~1.5% pa^{-1}** since 1961

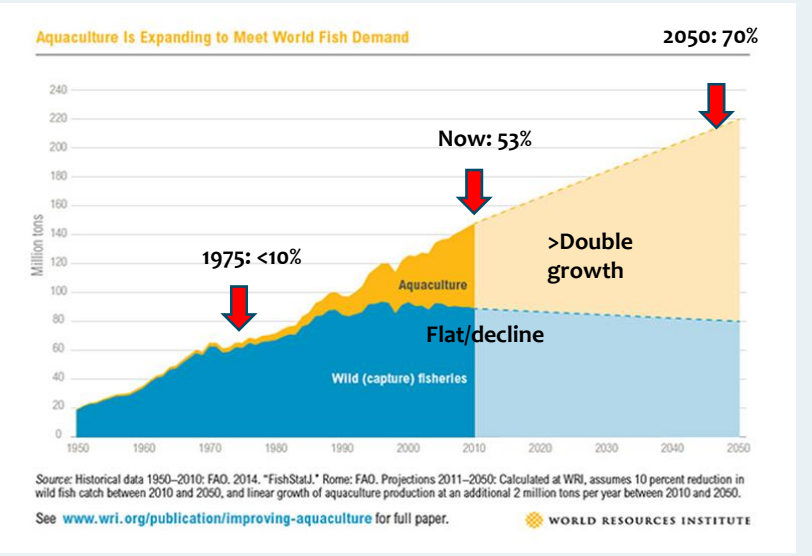
Global per capita fish cons
20kg/yr (9.9kg/yr Africa, 8.5

Aquatic products provide **3bn** people with >20% of daily protein intake

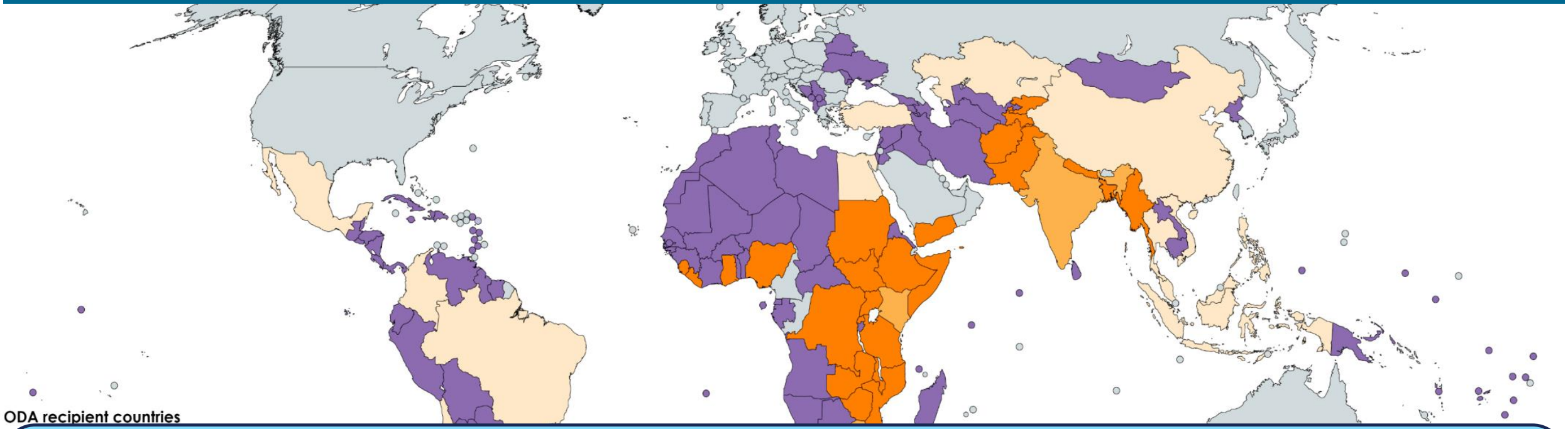
Drivers for increase,

Increase in availability - in **2018 53%** of fish eaten was **farmed**
Increased middle class within a **growing population** (demand outstrips population growth five-fold)
Sustainable management practices





A substantial proportion of this demand will be filled by production in countries eligible for UK government Overseas Development Assistance



Significant potential for increased (sustainable and safe) production of bivalve molluscs, both aquaculture and wild caught in LMIC = food poverty alleviation and generation of increased GDP

Fish and fisheries products are good for you…….

Fish-based products to

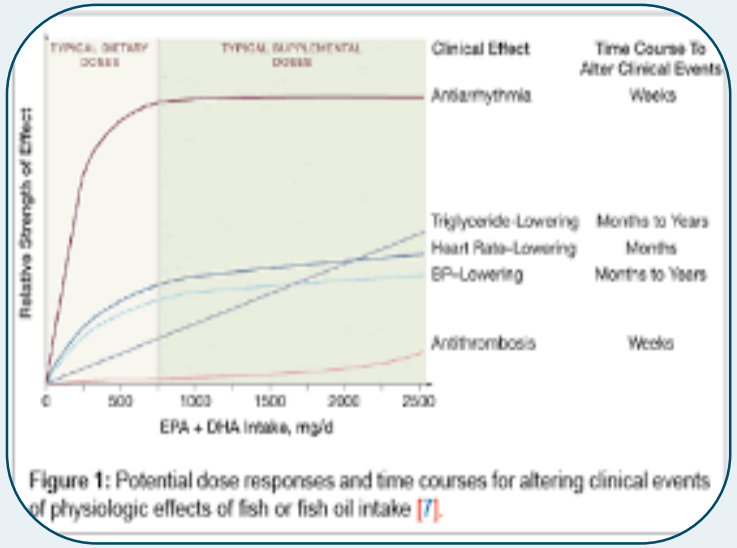


Figure 1: Potential dose responses and time courses for altering clinical events of physiologic effects of fish or fish oil intake [7].

Fish are high in nutrients **vital** for **growth** and **development**

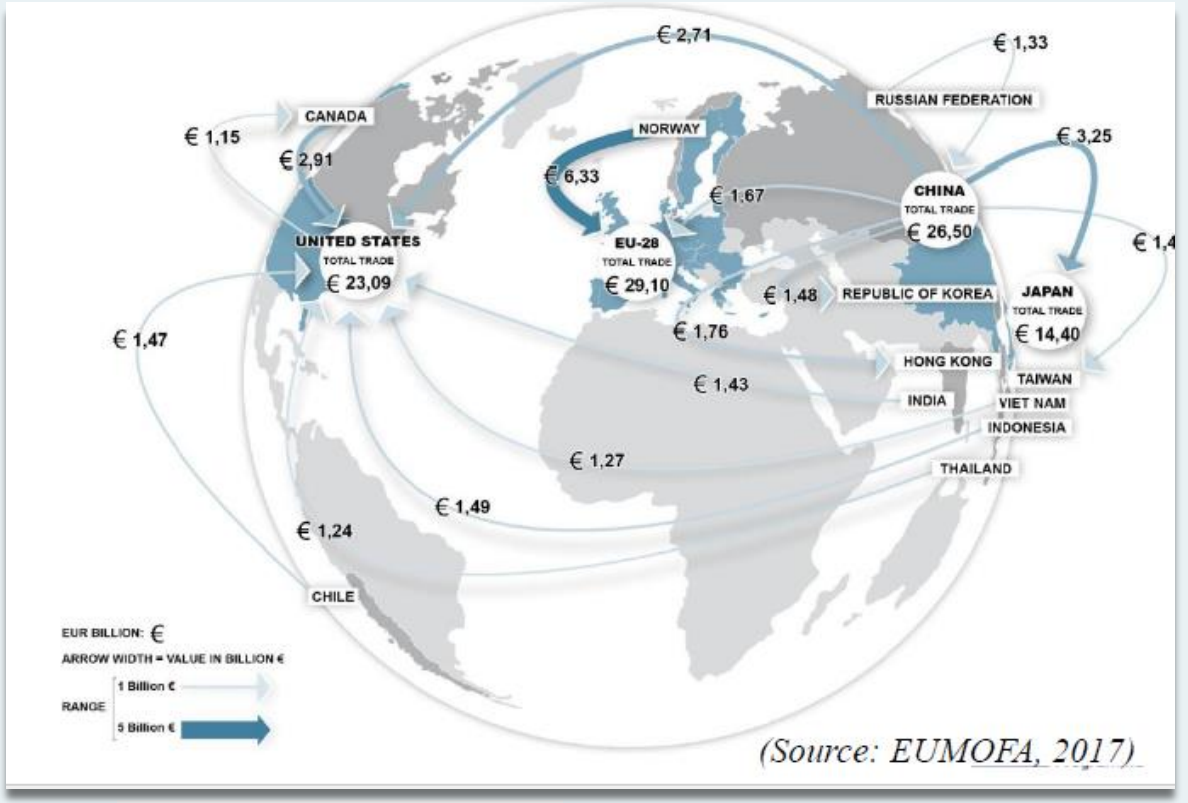
Production and trade

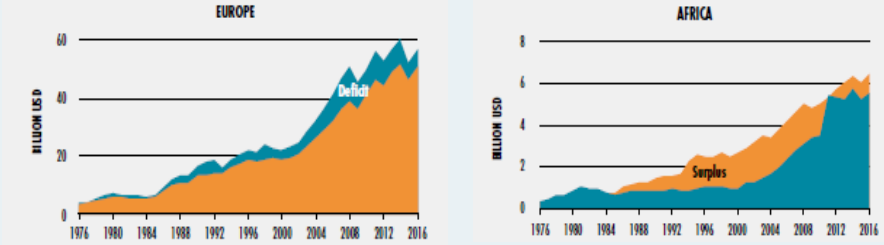
Total production by first sale value ≈US$362bn or 171 million tonnes

Highly traded product, **35-40%** of production enters the **international market,** export value of **US$143bn**

EU, US and **Japan -** top 3 markets (64% total value). LMIC **export value US$76bn**. More than meat, tobacco, rice and sugar.

Complex trade flows and imbalanced import and export profiles.

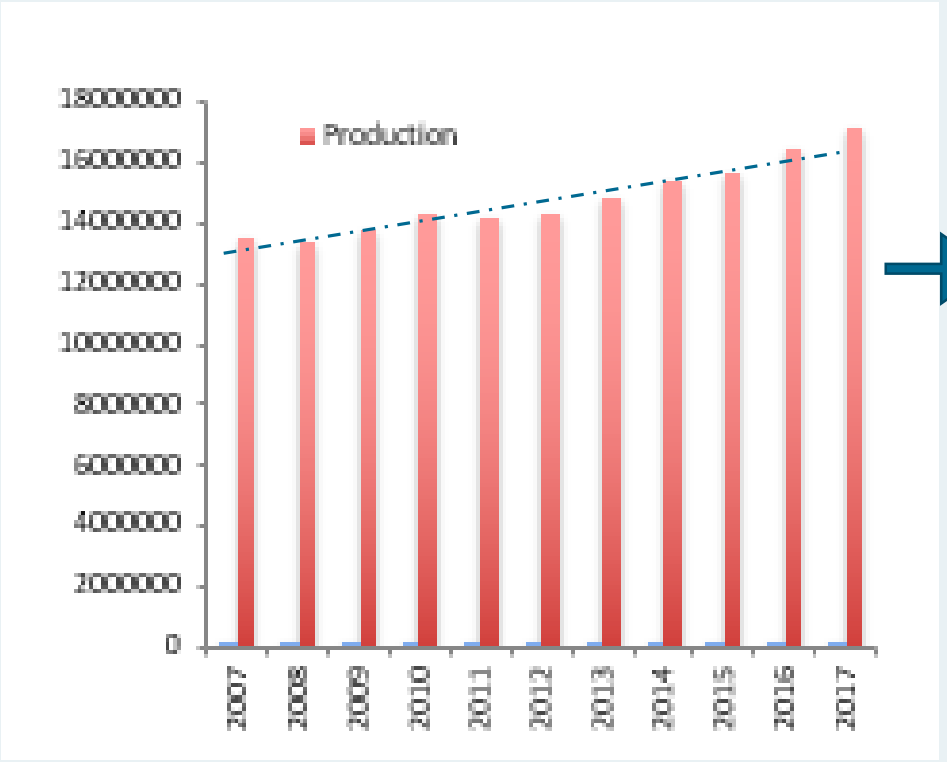




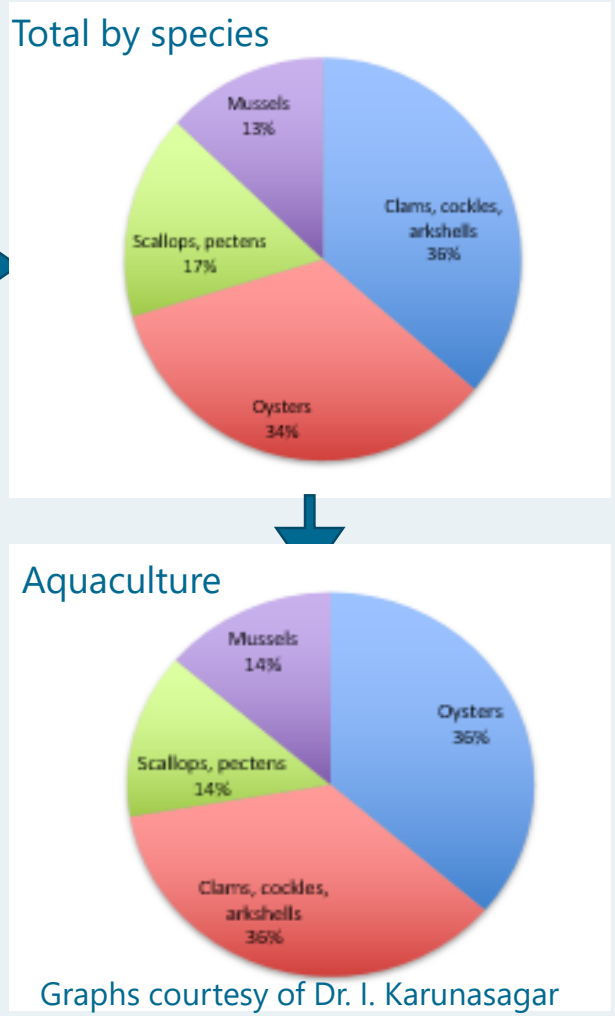
Africa is a net exporter in terms of value, Europe is a net importer

State of the worlds fisheries and aquaculture FAO 2018

Bivalves as a % of total fish production globally…….



Increase in production in the last 50yr 1m tonnes in 1950, 17.1m tonnes in 2017. 80% aquaculture (≈14m tonnes)
First sale value of ≈ US$23bn



Graphs courtesy of Dr. I. Karunasagar

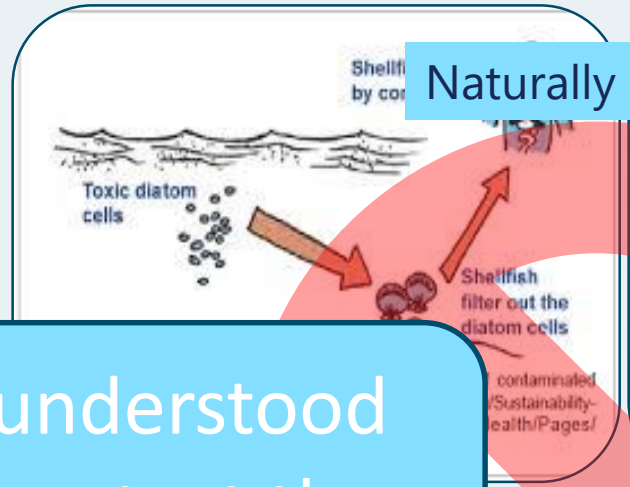
Bivalve production is widely considered to have **less environmental impact** than some other forms of aquatic protein production (finfish)

It's more eco-friendly, there is no feeding needed or antibiotic use, relatively low infrastructure and bivalves can filter (clean) the water, but……..

But safety of bivalve molluscs is not certain……..

Risks need to be understood and managed to protect the consumer

Naturally occurring



Man-made

Bivalve mollusc trade and trade rules…….

WTO requires that countries base their **sanitary and phytosanitary (SPS)** measures on **international standards**

Unde… agree… safet… bivalv… **Codex Alimentarius Commission** (CAC)

Barriers to trade are, in part, compliance with or equivalence with food safety legislation, and demonstration of product safety

…**nd** …n on live and raw bivalve molluscs – lacks details

Separate trading blocks (e.g. EU, US, Japan, Russia) all have different additional Food Hygiene Law

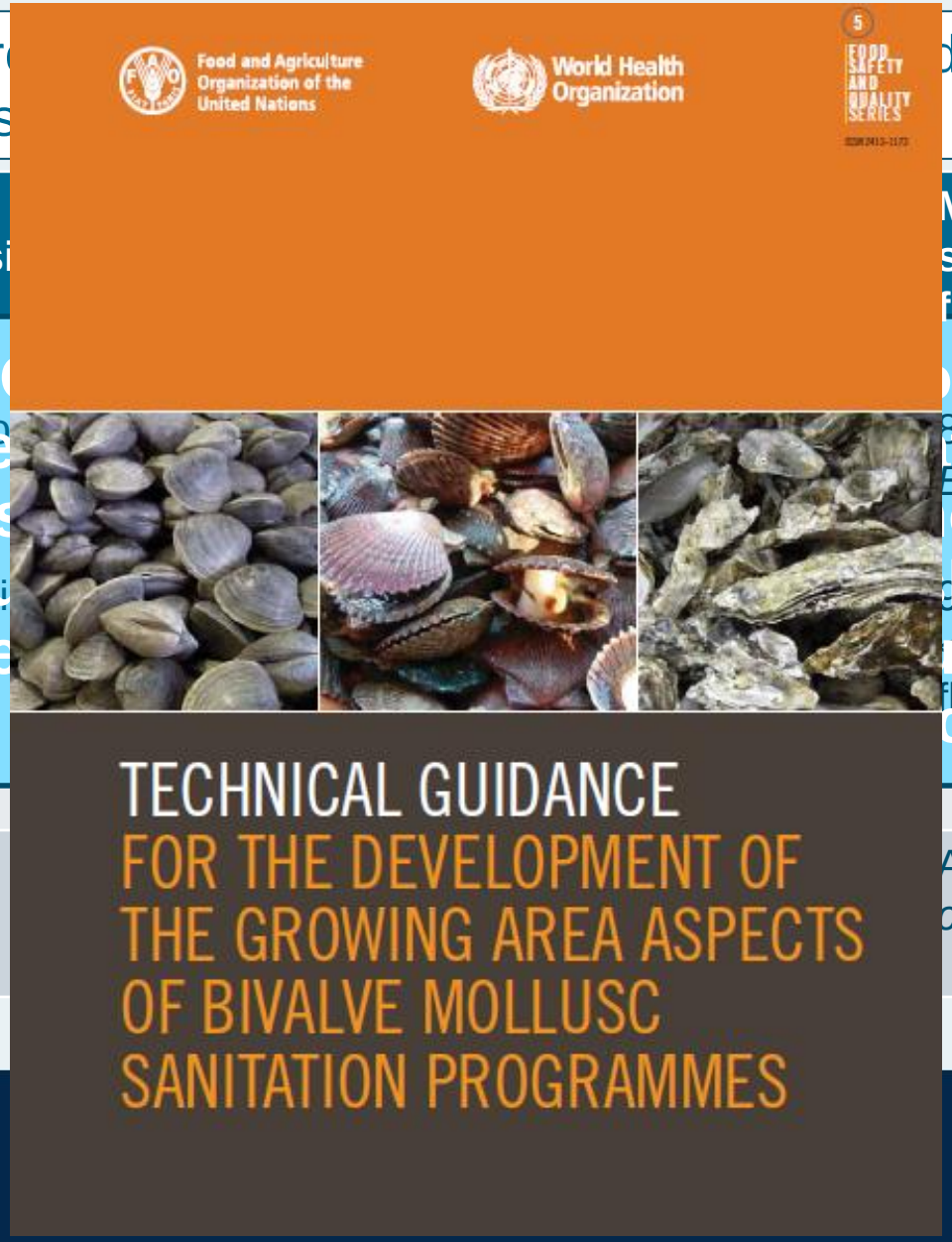
Relatively little volume of **bivalve mollusc (raw or processed)** is **traded** outside of the **country of production** (500,000 tonnes)

So what are those barriers for bivalve molluscs…?

The different appr… different countries
e.g. US, EU, Russ…

Shellfish treatment needed	US classi…	Microbiological standard in shellfish flesh
None	Appro…	…vides a …tion of …estic …k. Assists …ction (and …cs 80% <230, 20%<700 *E. coli*/100g flesh
Purification or relaying	Restr…	90% <4300, all <46,000 *E. coli*/100g flesh
Protected relaying (>2 months)		All samples <46,000 *E. coli*/100g flesh

FAO … produ… a wide…

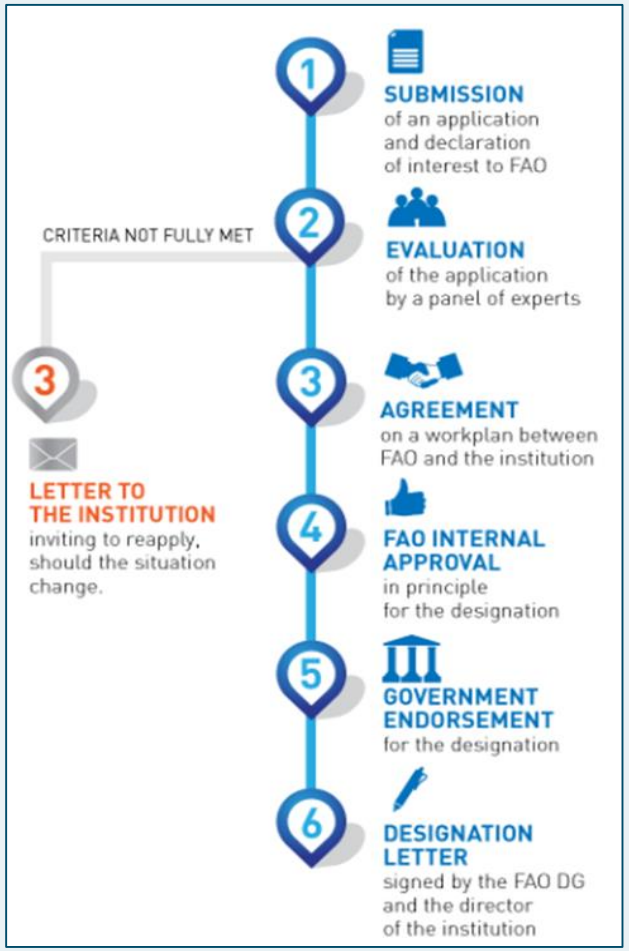


Precepts and process – FAO/WHO Reference Centres

- One of **FAO's global missions** is to provide field and technical support to member countries
- **Reference Centres** designated by FAO are regarded as **centres of excellence** in providing,
  - Scientific and technical expertise,
  - Diagnostic and reference services,
  - Laboratory and field training,
  - Coordinating research and developmental studies

- All contributing to FAO/WHO projects

Steps to FAO designation



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World Health Organization

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FAO Reference Centre for Bivalve Mollusc Sanitation

- The growing **importance** and **potential** of **bivalves** in assisting with our **global food security** challenge is well recognised
- FAO have established the **1st FAO Reference Centre for Bivalve Mollusc Sanitation** (November 2018) to support existing bivalve molluscs **sanitation programmes** and to assist in their future **development**
- **UK government** recognise the importance of the initiative and have committed to support **operational delivery (£)** of an agreed work programme

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