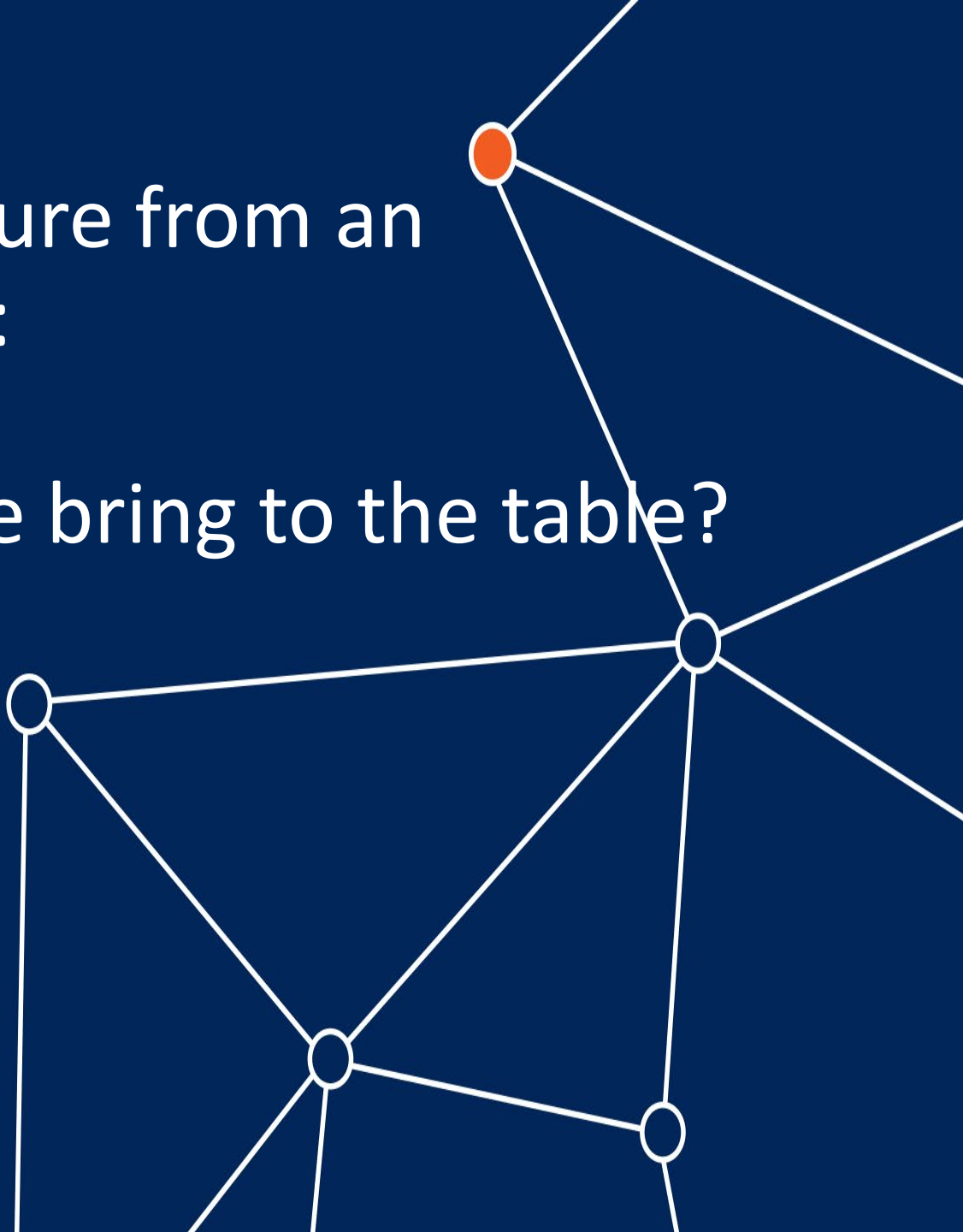
Marine aquaculture from an ICES perspective:

What can science bring to the table?

Ann-Lisbeth Agnalt,
Chair of ICES
Aquaculture Steering Group

ICES
CIEM
Science for sustainable seas



International Council of the Exploration of the Sea

- An intergovernmental marine science organization
- meeting societal needs for impartial evidence on the state and sustainable use of our seas and oceans
- Goal is to advance and share scientific understanding of marine ecosystems and the services they provide
- to use this knowledge to generate state-of-the-art advice for meeting conservation, management, and sustainability goals

Science for sustainable seas

ICES – Established 1902

- Exchange of letters between 8 participating countries (Denmark, Finland, The Netherlands, Norway, Russian Federation, United Kingdom, Sweden and Germany)
- 1964, through an agreed Convention, ICES received a legal foundation and full international status

ICES Council meeting in 1904.

Science for sustainable seas

ICES – 20 member countries

Belgium, Canada, Denmark

Estonia, Finland, France

Germany, Iceland, Ireland

Latvia, Lithuania

The Netherlands, Norway

Poland, Portugal

Russian Federation, Spain

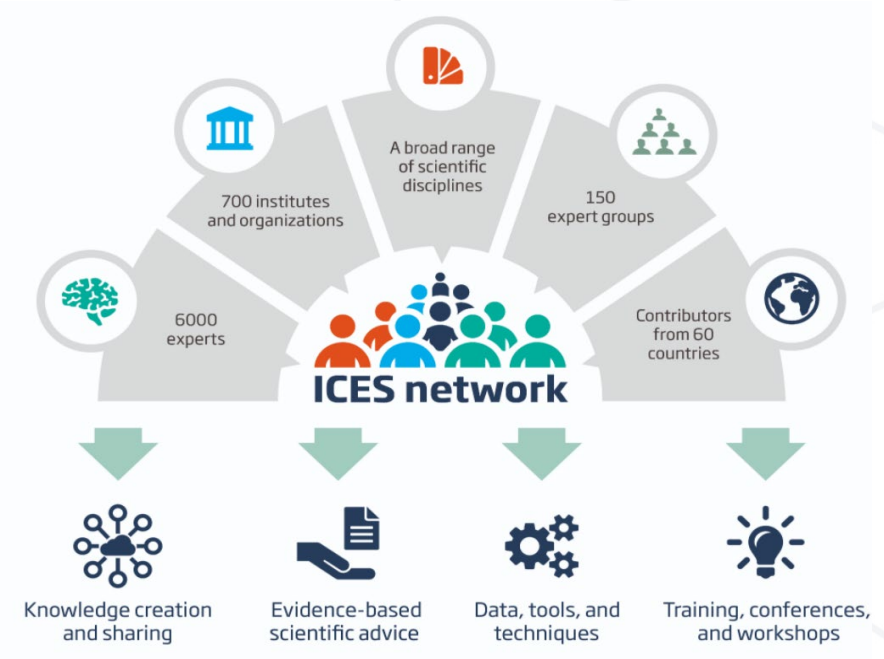
Sweden, United Kingdom

United States of America

Science for sustainable seas

ICES – A network

- Nearly 6000 scientists
- ~ 700 marine institutes
- Over 2500 scientists participate in annual activities
- Strategic partnerships. Work in the Atlantic Ocean also extends into the Arctic, the Mediterranean Sea, the Black Sea, and the North Pacific Ocean



Science for sustainable seas

The Science Committee (SCICOM)

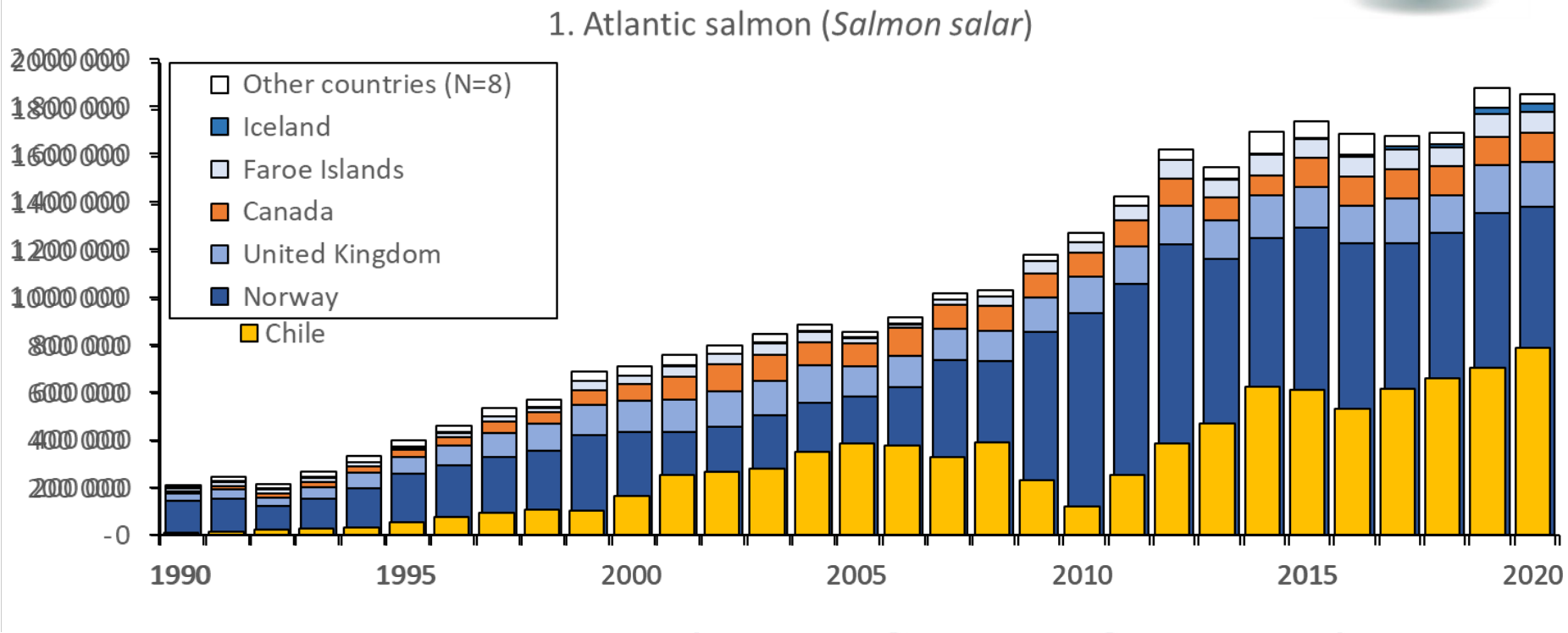
- Main scientific body in ICES
- Three main roles;
  1. keep science programme dynamic, internationally relevant & impactful
  2. ensure seamless links between science, data and advice
  3. engange scientists in ICES member countries and beyond in planning an annual cycle of meetings & workshops, including Annual Science Conference
- All member countries have representives on SCICOM, joined by representatives from other groups including steering group Chairs
- Each steering group adresses a broad and eduring area of science and advice and ”parents” a number of expert groups

7 Steering Groups

- Ecosystem Processes and Dynamics SG (EPDSG); Steven Degraer
- Human Activites, Pressures and Impacts SG (HAPISG); Andrew Kenny
- Integrated Ecosystem Assessments SG (IEASG); Debbi Pedreschi
- **Aquaculture** SG (ASG); Ann-Lisbeth Agnalt
- Fisheries Resources SG (FRSG); Patrick Lynch
- Ecosystem Observation SG (EOSG); Joel Vigneau
- Data Science and Technolgy SG (DSTSG); Jens Rasmussen

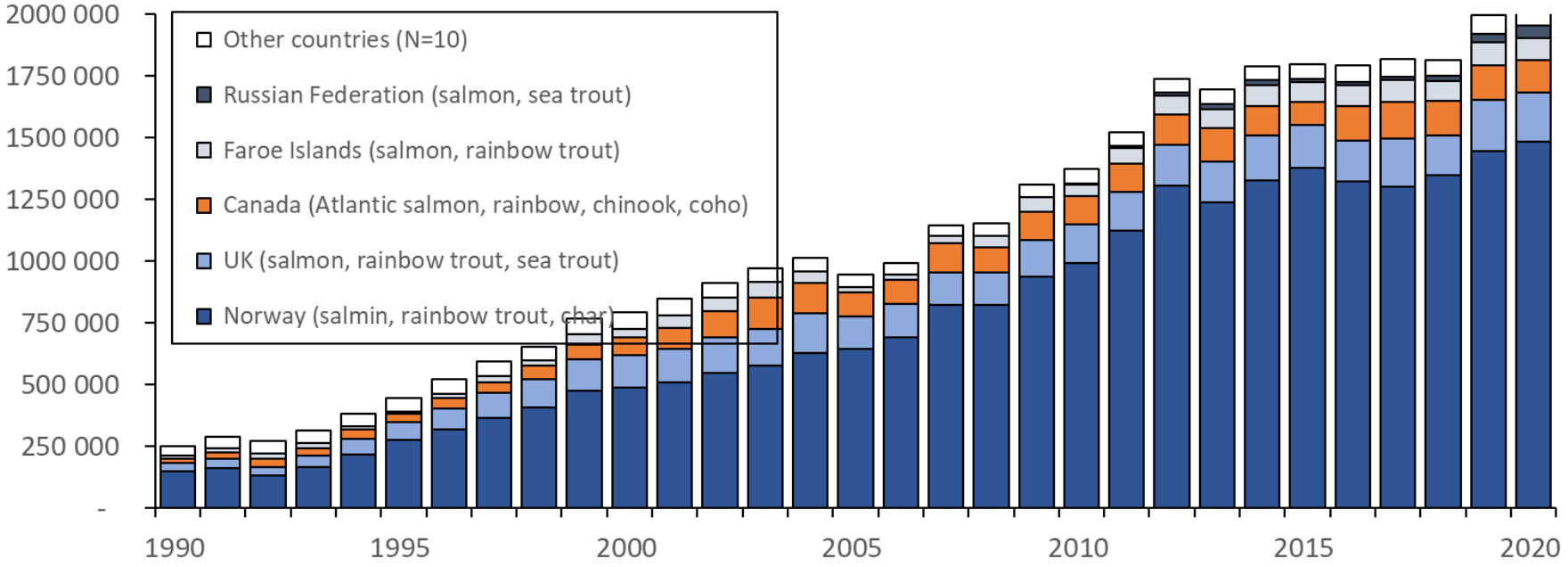
Aquaculture – ICES countries

Aquaculture – ICES countries



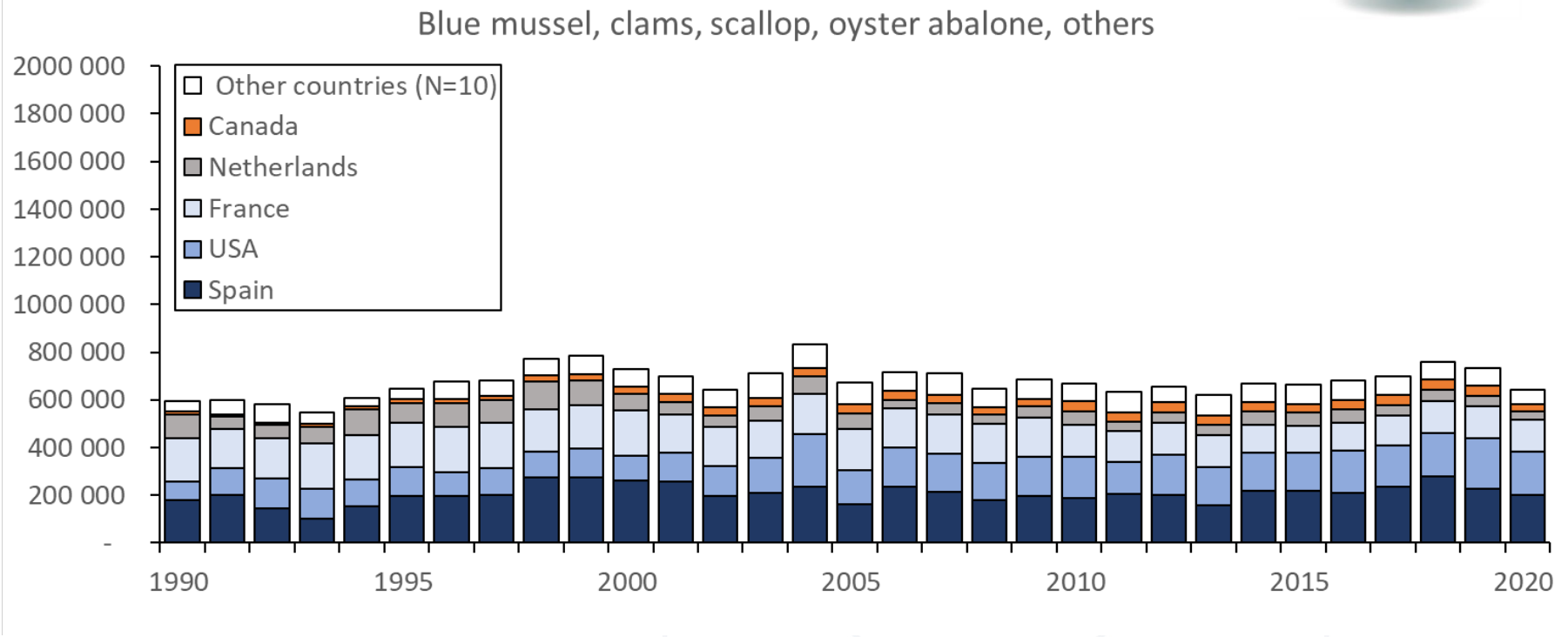
- ICES in 2020; 1 865 367 tonnes
- Norway 74 %

ICES; Salmonids



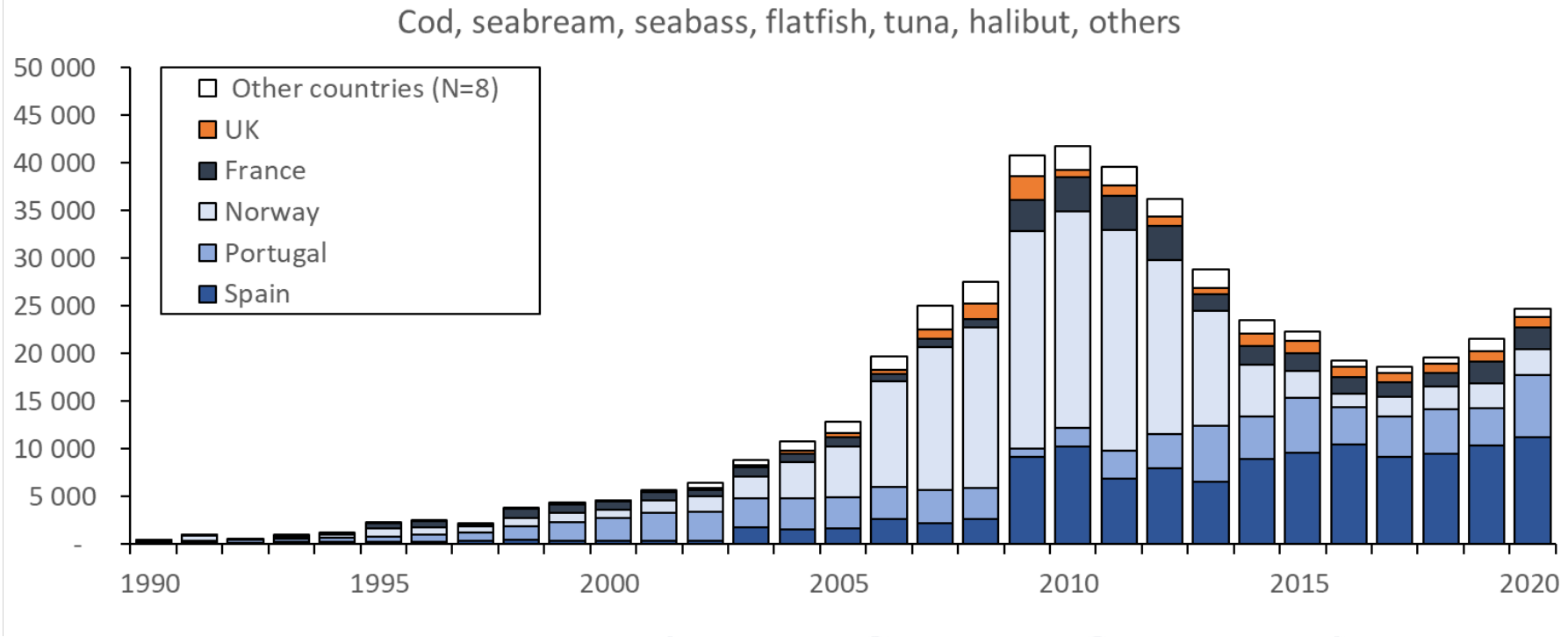
- Total ICES 2020; 2 028 833 tonnes

ICES; Molluscs



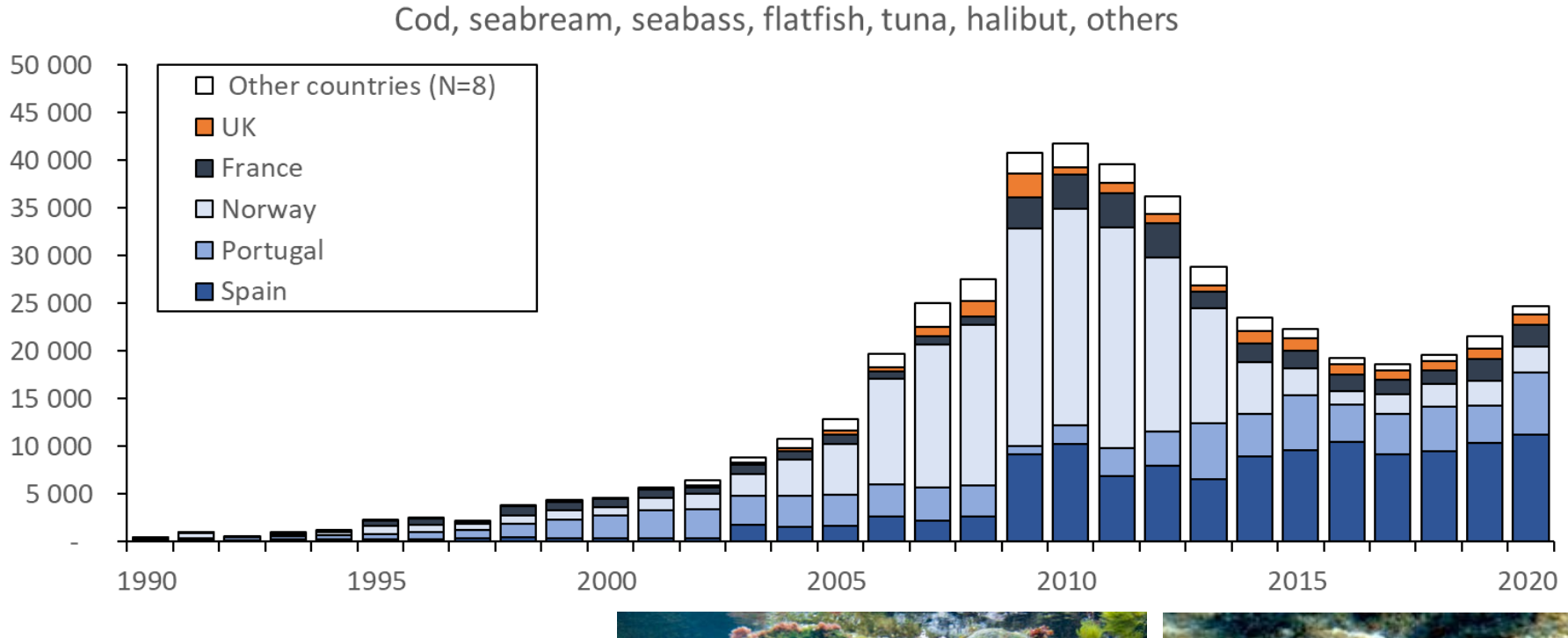
- Total ICES 2020; 642 599
- Spain 33%, USA 28 %

ICES; Other fish



- Total ICES 2020; 24 545 tonnes
- Spain 48%

ICES; Other fish

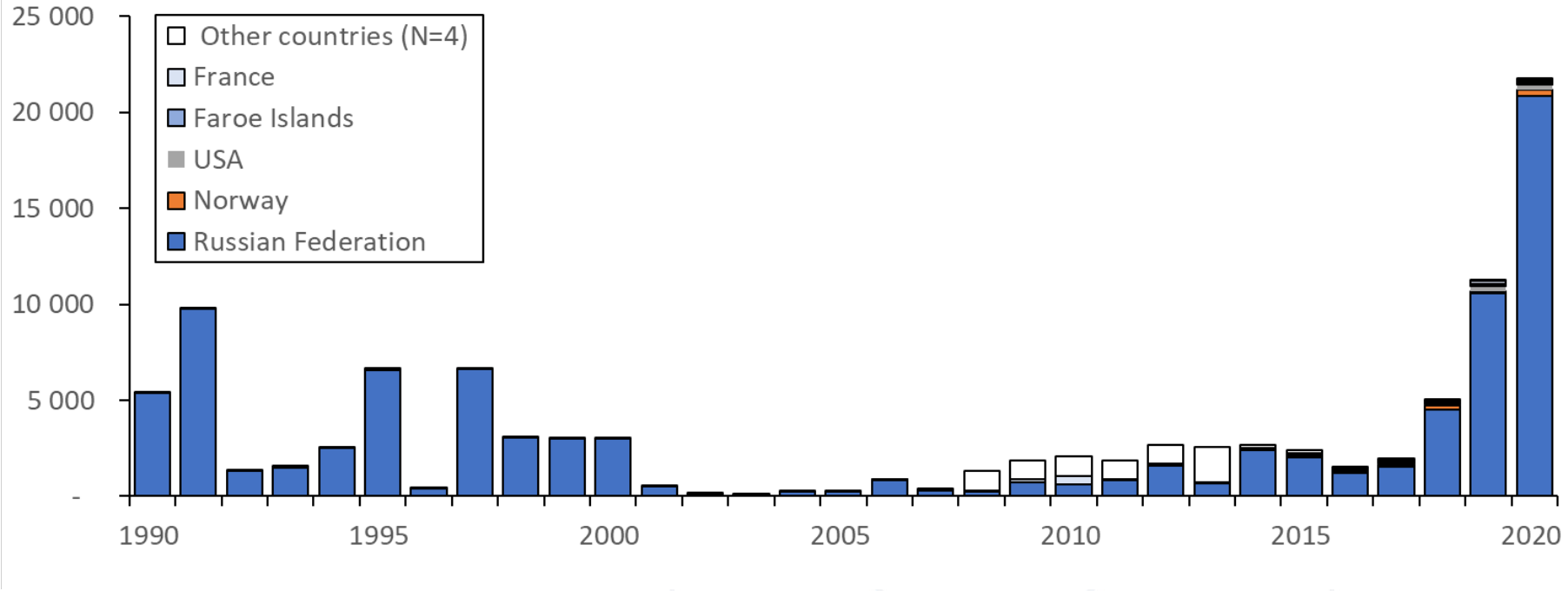


- Total ICES 2020; 24 5
- Spain 48%


European seabass (Istockphoto.com)


Gilhead seabream (wikipedia.com)

Seaweeds & algae



- Total ICES 2020; 21 742 tonnes
- Russian Federation 96% (Pacific, northwest)

Sustainable Aquaculture

- Contribute to local community development
- Generate economic profit
- Little impact on the environment

Tilapia sold at local market Mozambique

Oyster farming Namibia

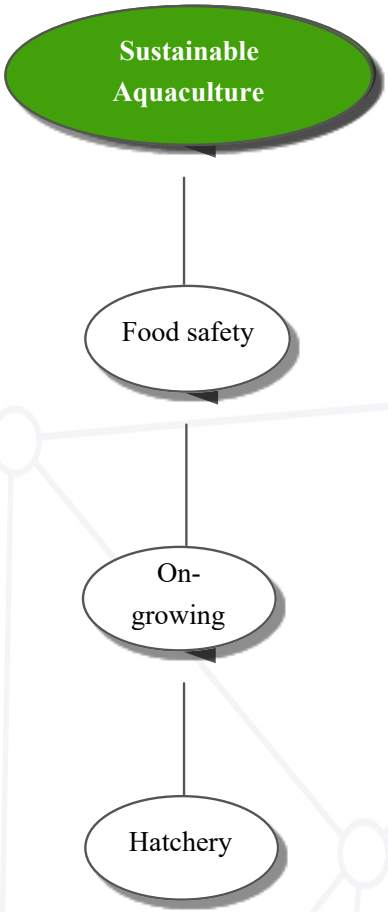
Science for sustainable seas

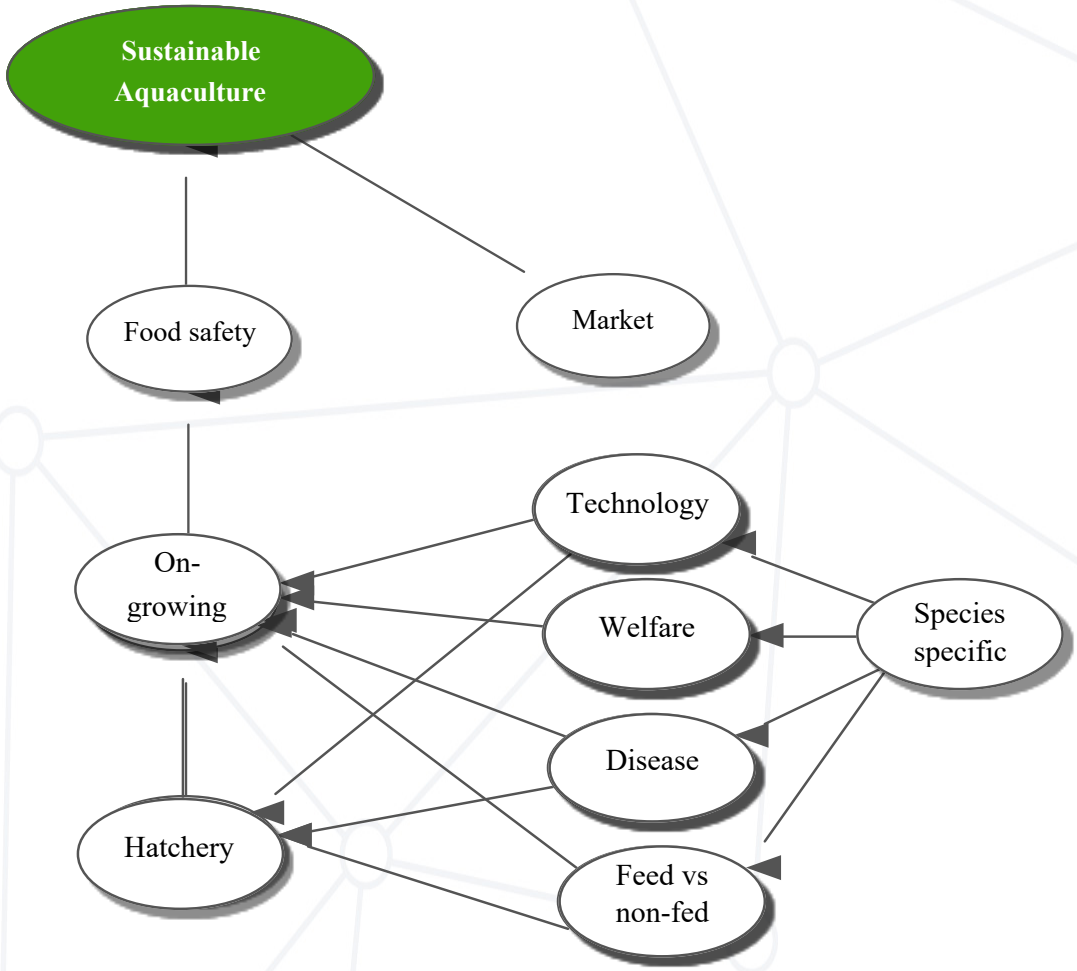
Sustainable Aquaculture Development

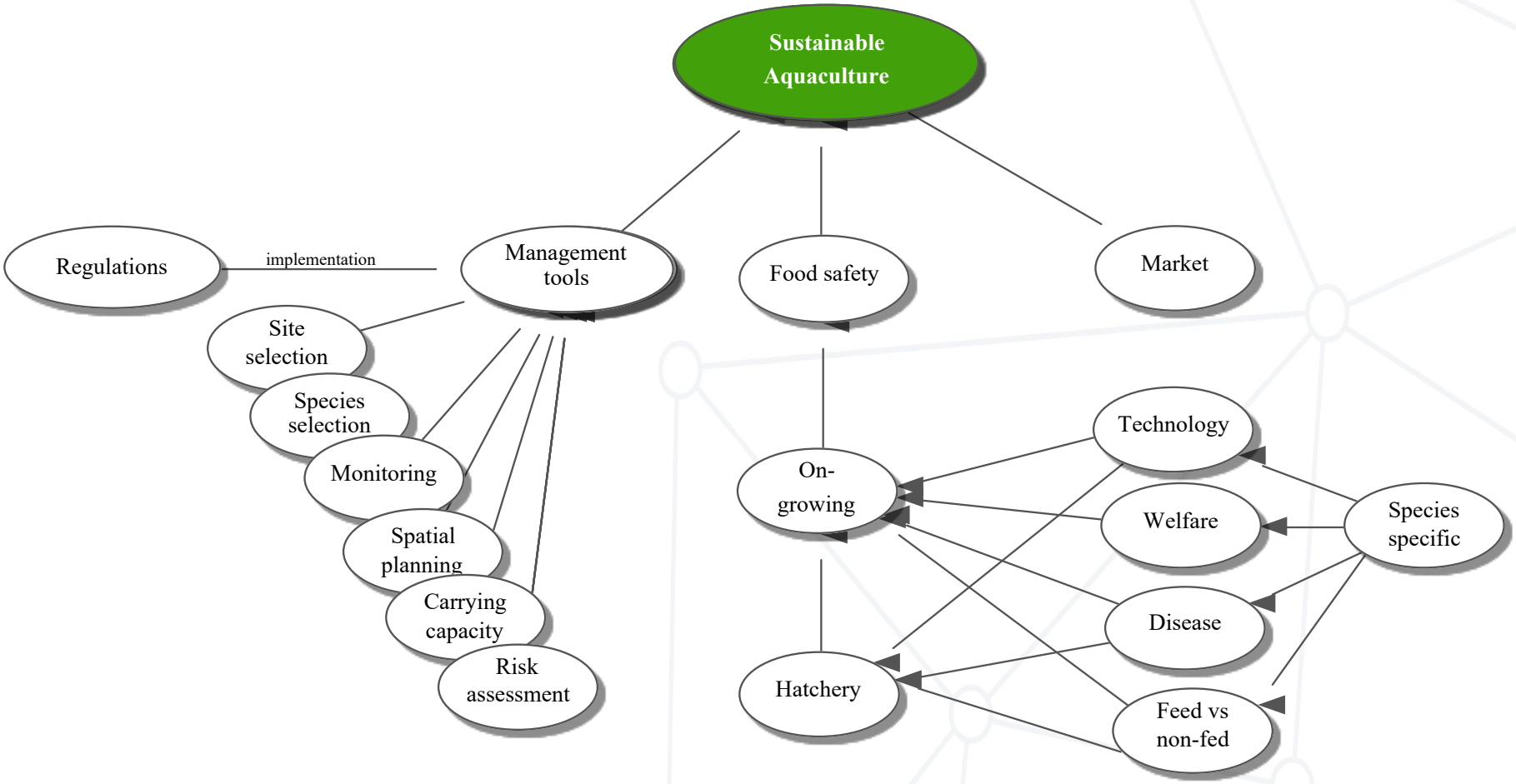
- Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (UN)
- Unacceptable footprint




Sustainable aquaculture

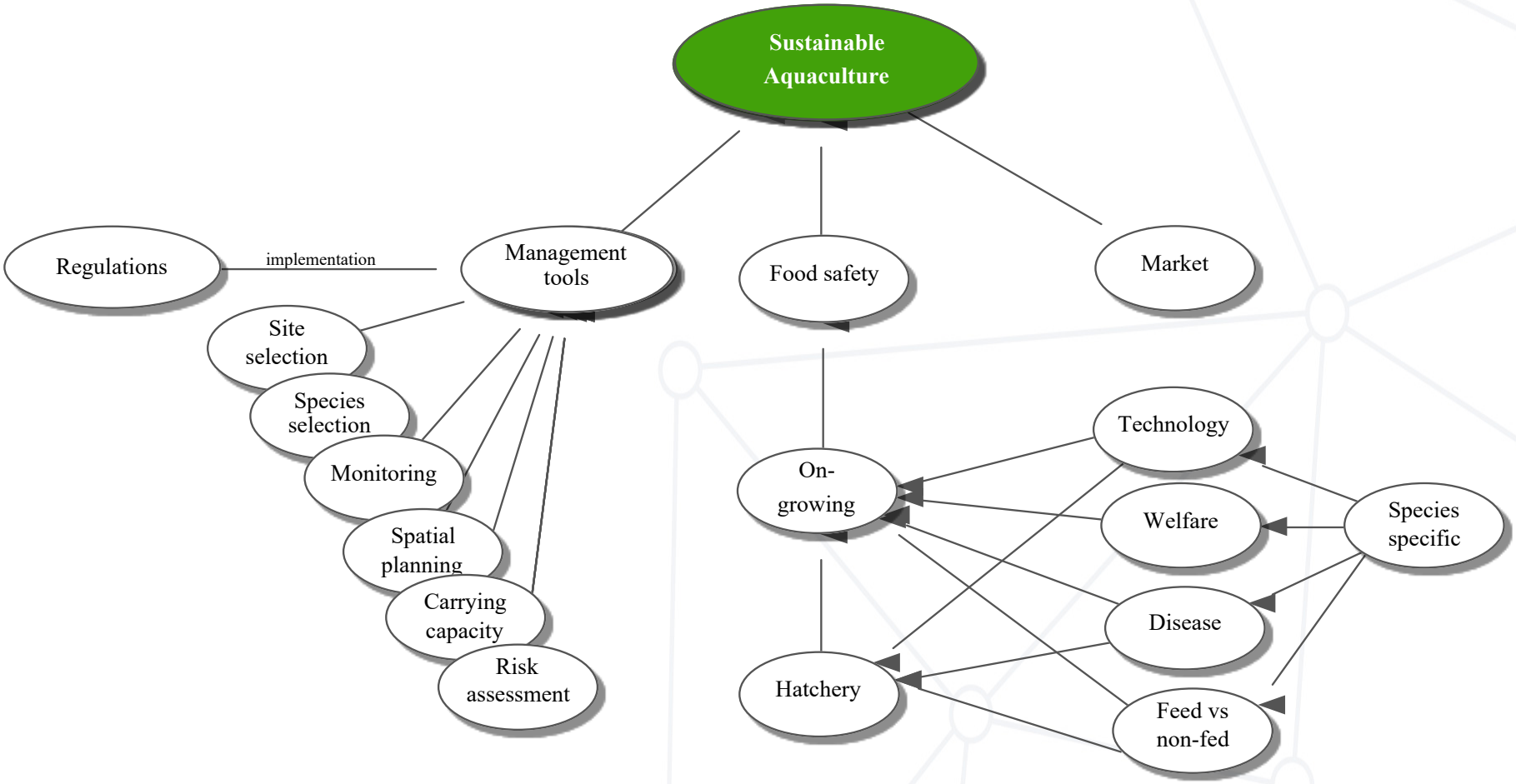



Sustainable Aquaculture
Food safety
Market
Technology
On-growing
Welfare
Species specific
Disease
Hatchery
Feed vs non-fed



Social and economic aspects/impact

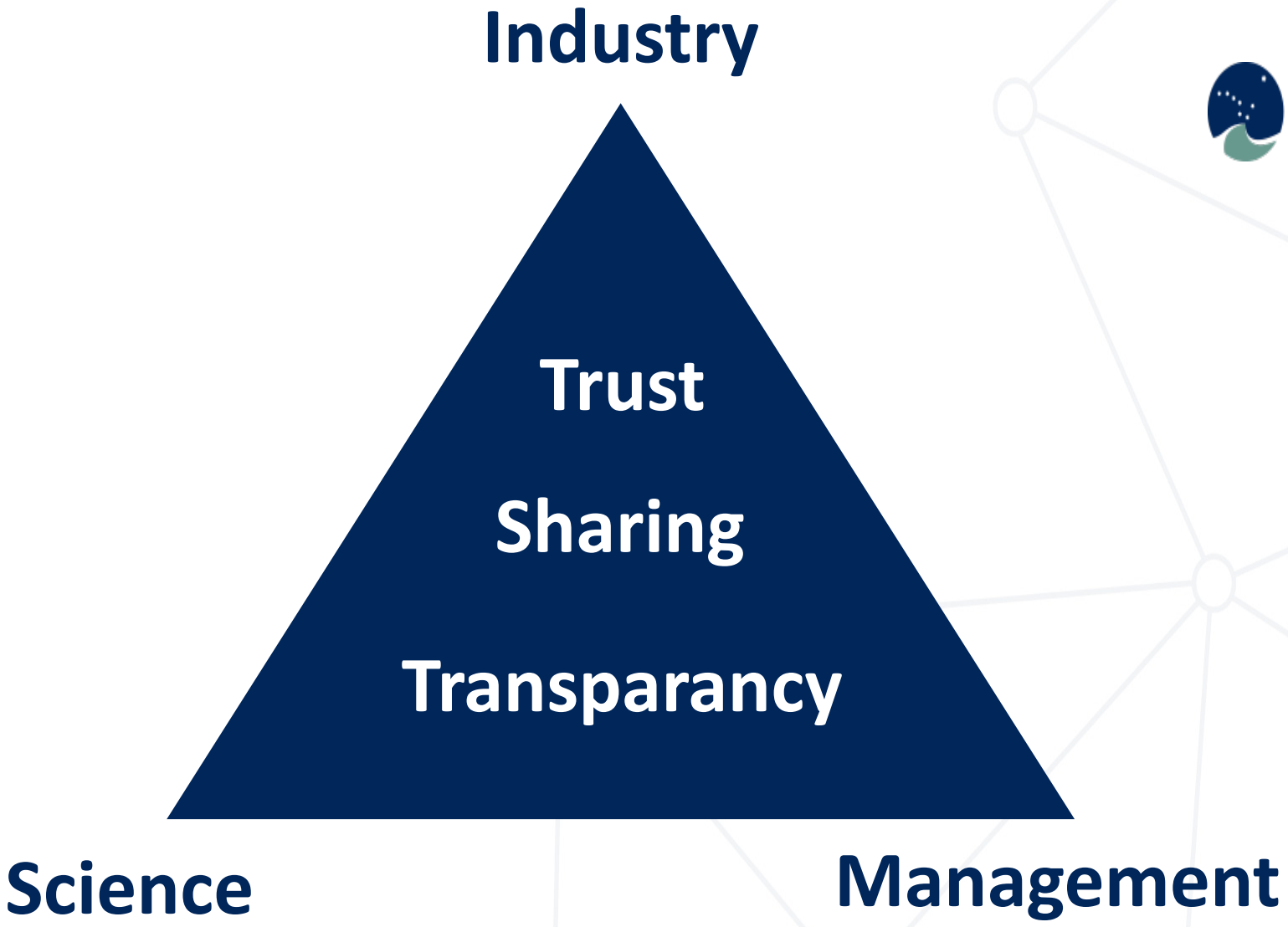
What science can bring to the table



Social and economic aspects/impact

Aquaculture SG – 7 WGs'

- Pathology and **Diseases** of Marine Organisms (WGPDMO); Richard Paley
- Application of **Genetics** in Fish and Aquaculture (WGAGFA); Naiara Rodriguez-Ezpeleta
- **Social** and **Economic** Dimension in Aquaculture (WGSEDA); Gesche Krause & Ramon Filgueira
- **Scenario** Planning on Aquaculture (WGSPA); Ben Halpern
- **Risk Assessment** of Environmental Interaction of Aquaculture (WGREIA); Ellen S. Grefsrud
- Ecological **Carrying Capacity** (WGECCA); Carrie Byron & Dror Angel
- **Open Ocean** Aquaculture (WGOOA); Bela H. Buck



Climate change and impacts