European Fisheries and Aquaculture Research Organisations

EFARO

FEUFAR

THE FUTURE OF EUROPEAN FISHERIES AND AQUACULTURE RESEARCH

The Future of European Fisheries and Aquaculture Research

the FEUFAR project

Luc van Hoof
Executive Secretary EFARO
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Partners

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HELLENIC CENTRE FOR MARINE RESEARCH

EUROPEAN SCIENCE FOUNDATION | MARINE BOARD

Funded by:

European Fisheries and Aquaculture Research Organisations

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Aim

- Develop a research agenda defining the research required in the medium term (10 years), to enable a sustainable exploitation and farming of aquatic resources.

Method

- Scenarios in stead of Oracles
- Litrature Review
- Workshops with Stakeholders and experts

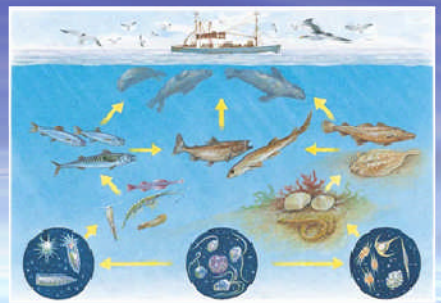
6 steps to the future

- Step 1: Define the system
- Step 2: Drivers
- Step 3: Hypothesis
- Step 4: Micro-scenario
- Step 5: Macro-scenario
- Step 6: Research priorities

Define the system

WORLD CONTEXT

ECOSYSTEM



REGULATION

PRODUCTION

RESEARCH

SEAFOOD MARKETS & ECONOMICS

SOCIAL DYNAMIC

Drivers

A WORLD CONTEXT
A1 climate change inc ocean productivity
A2 International agreements (Johannesburg, Kyoto, maritime access, WTO)
A3 world food security including demography

B REGULATION
B1 EU policies (CFP,maritime, marine strategy)
B2 Governance policies (inc. Stakeholders cooperation)
B3 management tools (inc. subsidies and relative stability, property rights)
B4 national policies
B5 Politics

C SEAFOOD MARKETS & ECONOMICS
C1 Product diversification
C2 processing
C3 distribution channel (value, quality, custody inc. Traceability)
C4 consumer choices (prices, preferences, ethics, safety...)
C5 world production of fish (finfish and shellfish) by region
C6 EU trade within world trade in fish and fish products
C7 costs and earnings for fisheries (inc risks)
C8 costs and earnings of aquaculture (inc risks)

D SOCIAL DYNAMIC
D1 Recreational fisheries
D2 public perception of fisheries/aquaculture
D3 activities in coastal areas (inc fishery act employment)
D4 competing uses of seashore
D5 Fish folk attitude towards future
D6 social capital (skills and expertise)

E ECOSYSTEMS
E1 pollutants and contaminants (inc.nutrients)
E2 recruitment
E3 invasive species
E4 escapement
E5 Impact of gears on habitat and organisms (including deep sea)

F PRODUCTION
F1 Marine "ingredients", by-products, bio prospecting
F2 fleet structure size and technology (inc. selectivity, discards)
F3 stocks development
F4 fish feed development and availability
F5 aquaculture hardware technologies
F6 species diversification aquaculture
F7 Genome manipulation breeding and selection
F8 health of animals
F9 seed availability (tuna and eel) ranching
F10 health risk of seafood

G RESEARCH
G1 sources and allocation of funding
G2 Governance of European research (research organisation)
G3 access to infrastructures (data bases)
G4 Research training and management
G5 information flows (including IPR)

Hypothesis

- For each driver:
  - Definition & Indicators
  - Past 20 years development
  - How can the future look like?
    - F.e. F3 Production: Stock Development

Hypotheses (2020)

1. **No change**: No major changes regarding stock status. Most stocks stay fully or overexploited.

2. **Back to the future**: Management measures/actions, environmental changes and restocking practices help recovery of most stocks to the levels of early 70's.

3. **Terminator**: Collapse of most commercial stocks with no possibility for recovery.

4. **Changes in fish empires**: Stocks of large predators (tunas, cod, etc) are collapsed. Modest changes in the rest of the stocks.

Micro-scenario

A: World context			
Drivers	*Hypothesis*		
A1 Climate change	Main IPCC trend	Faster warming	Fast mitigation:
A2 International agreements	New protectionism from both sides	Free trade in fishing	Johannesburg ++ / Automatic Ship Identification Systems
A3 Food security in the world, inc. demography	Fish against meat	High fish supply	Fish supply a major part of food security

Macro-scenario

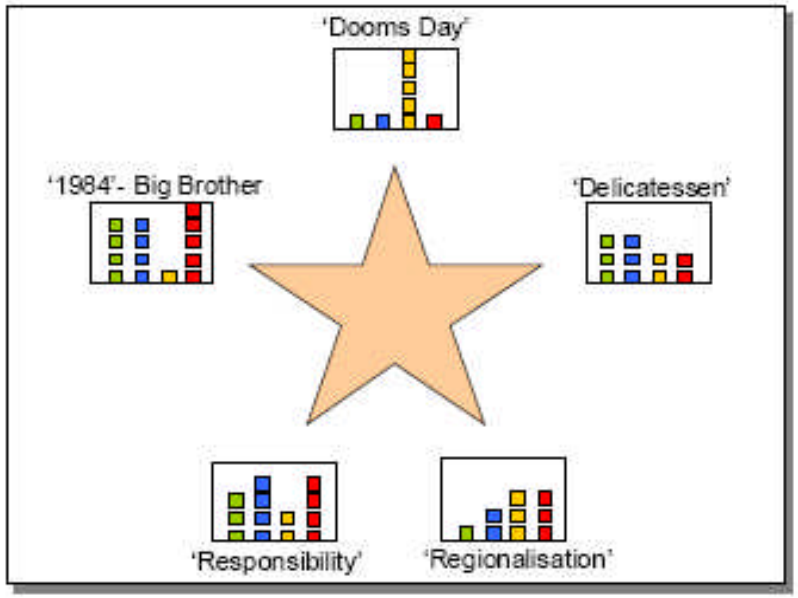
2.3 Regionalism

Subsystem	Micro-scenarios					
A World Context	Free trade and Production Specialities	Short-Term Economy	Protectionism for Food	World Governance		
B Regulation	Industry Responsibility	Integrated Europe	Local Solutions for Local Problems			
C EU Seafood markets and economics	Responsible World	Innovative World	Shopping World	Expensive Fish	Ready Made Fish Meals	
D Social dynamics	Urban Ecology	Green Industrialization	Tourist Rather than Fisher	Fishers Know Better	We Need Production from the Sea	
E Ecosystems	Starts Bad but Gets Better	Global Meltdown	Local Solutions for Global Problems	Supergreen		
F Production	Free Market	The EU Promotes Aquaculture	Healthy and Diversified Products	Fisheries bounce back and natural food is the order of the day	Fishing Feeds Poor People and Aquaculture	Big Fish is a Luxury
G Research policies	Pop Idol	European Drive to Technology Transfer	Funding Nemo	C'est la Vie	Public Money Rules Research	

- Fish Consumption (preferences, produce, technology)
- Fish Production
- Demand and Supply
- Climate development/Ecosystem
- Stock development
- Production technology development
- Regulations
- Research setting

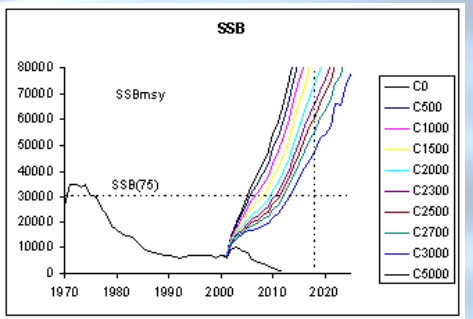
5 different scenarios

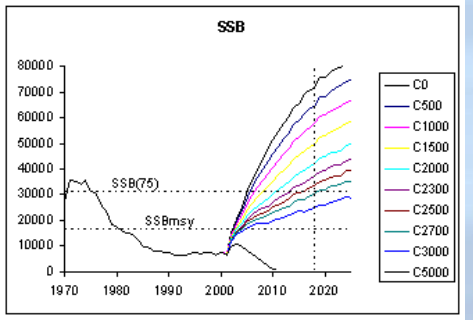
- the scale on which fisheries and aquaculture are managed (global or local) ;
- whether marine resources are to be used for production purposes or should be conserved for nature purposes ;
- whether we accept negative environmental impact or it should be avoided at all costs ;
- whether we operate under free market conditions or under strict (international) command and control .



Cross cutting themes

- **Data collection and analysis**
- **Risk management**
- **Outreach**



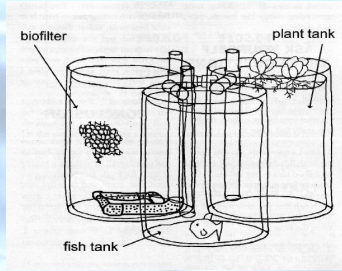


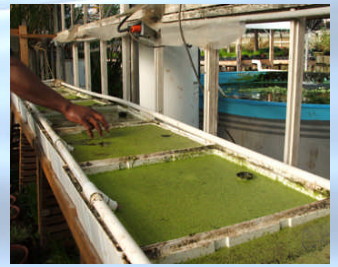
Fisheries

- Gear and operational technology
  - environmentally friendly gear
  - fuel-efficient technology.
- Management and governance
  - Operationalising multi-annual and multispecies management models and approaches.
  - Basic research into the socio-economics of fishing communities.
  - Develop monitoring and enforcement technology beyond the current VMS.
  - Artificial habitat creation and better understanding of fish behaviour.
- Valorisation of currently underused components of the catch
- Basic research on populations of lower trophic level resources

Aquaculture

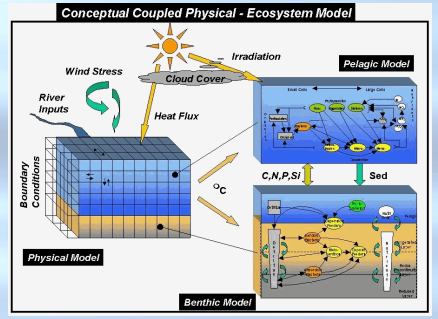
- Development of diversified healthy seafood for consumers
  - "New species" for aquaculture:
  - Species "improvement
- Decreasing environmental impact of aquaculture
  - pressure on fish wild stock
  - antibiotics and other medicines used
  - "genetic" pollution
- Development of non-food uses
  - molecules or components
  - biofuel from algae and microalgae
  - cleaning zones from pollution
- Improvement of rearing system technologies
  - Integrated systems involving algae/molluscs and finfish
  - Systems for detoxification (molluscs)
  - Off-shore farming technology associated to renewable energy resources.
  - Fish growth and welfare in high density recirculation systems.





Ecosystem Approach

- Climate Change
  - Effect activities ←→ climate
- MPAs and habitat enhancement
  - Understand the effect and C/B
- Coastal Zone Management
  - Spatial planning and uses
- Modeling ecosystems
  - multispecies and ecosystem modeling



Consumer preference and Market development

- Product development
  - “from waste to taste” (new products from by-products)
  - non-food segment: functional and healthy food ingredients and bio-prospecting:
- Consumer health
  - positive health effects & pollutants
  - cheap and quick quality control technologies
- Traceability
- Certification, branding and labeling

Socio-economics & Governance

- Socio-economic analysis & impact assessment
- Governance
  - Stakeholders, management and scientific support to policy
  - Development of innovative, adaptive, context specific (regional) management tools and systems based on inclusion of stakeholders and geared at the creation and acceptance of shared knowledge
- New management tools
  - optimal spatial location
  - conflict resolution techniques
  - more efficient and (cost) effective methods of management and enforcement through enlarged legitimacy and compliance through for example co-management arrangements, co-creation in policy development and multi-stakeholder evaluation of impact assessment.

- All the topics are to be seen in relation
- Importance of Scientific Support to fisheries and aquaculture as a policy area for the Commission and the need to ensure that appropriate research projects are funded f.e. under the EU Framework 7 Programme.