



Decision support for seafood production under climate change

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FishAdapt conference
Bangkok, Thailand, August 8th-10th 2016



About Nofima

Nofima is a private, non-profit research institute owned by the Norwegian government with head office in Tromsø and over 350 employees in six different locations around Norway.

Nofima was founded in 2008 when four former public food research institutes merged:

- Norconserv – canned and preserved foods, Stavanger
- Matforsk – food from agriculture, Ås
- Akvaforsk – aquaculture related research, Sunndalsøra
- Fiskeriforskning – seafood and processing, Tromsø

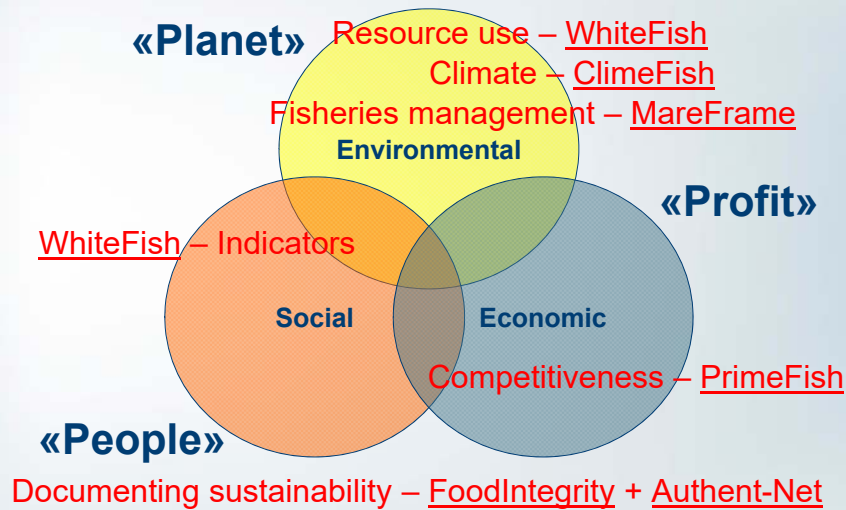
Main areas of work:

- Aquaculture and fisheries – raw materials
- Food from agriculture and aquaculture – processes and products
- Consumer and market research, which includes:
 - Consumer research, buying behaviour, food and context
 - Innovation and product development
 - Traceability, sustainability, environmental accounting

Turnover in 2013 was around 70 Million Euros



Seafood sustainability – EU projects



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Environmental sustainability – Stock management

EU project MareFrame

MareFrame

- 48 month duration, 01/2014 – 12/2017
- 7.75 MEUR total, 6 MEUR EU contribution
- Matis leads, 28 participants from 16 countries

Decision support tools developed

MareFrame objectives:

- Seeks to remove the barriers preventing more widespread use of the ecosystem-based approach to fisheries management
- Development of new tools and technologies, development and extension of ecosystem models and assessment methods, and development of a decision support framework that can highlight alternatives and consequences
- Close integration and co-creation with stakeholders in all development phases, to ensure that ownership lies with them and to increase the chance of acceptance and uptake of the project outcomes

<http://mareframe-fp7.org/>



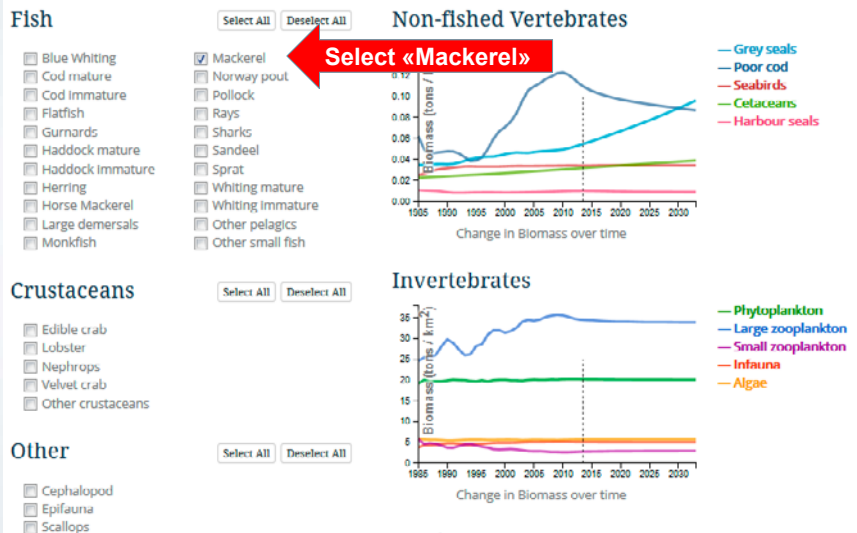
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Tool: Visualize catch and landings



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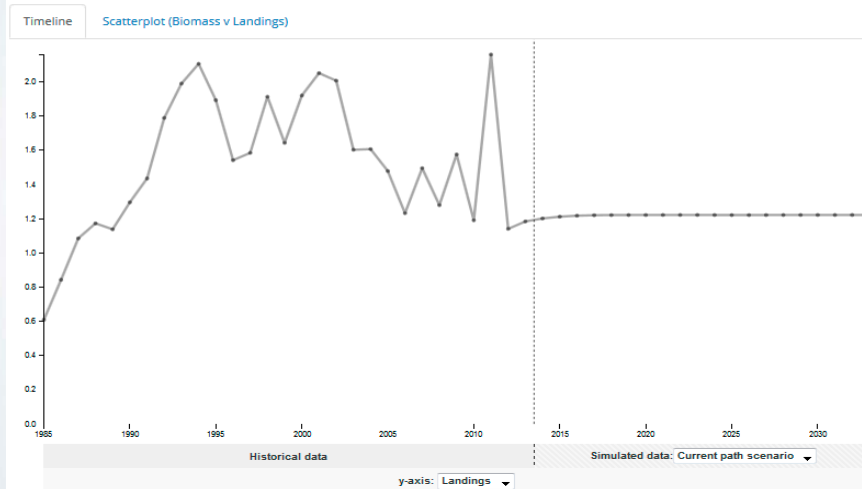
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< Case Study: West Coast of Scotland

Historical Data and Scenario Model Output



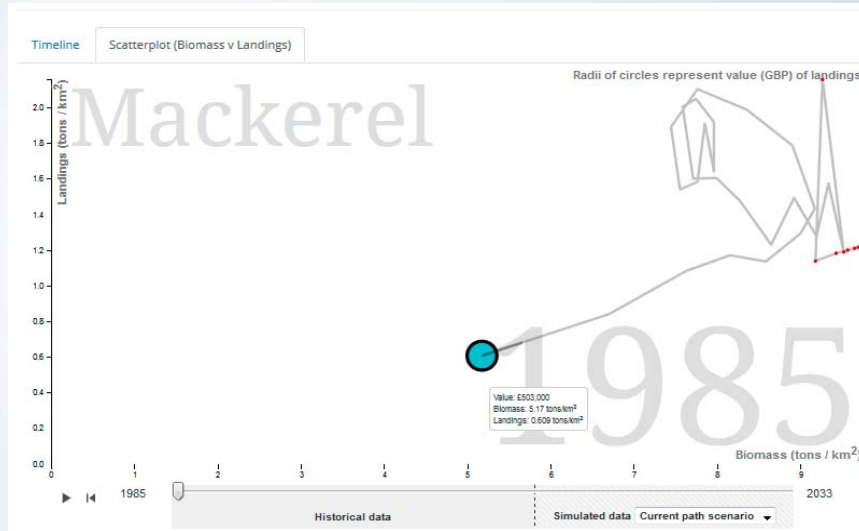
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Tool: Scatterplot of biomass vs. landings



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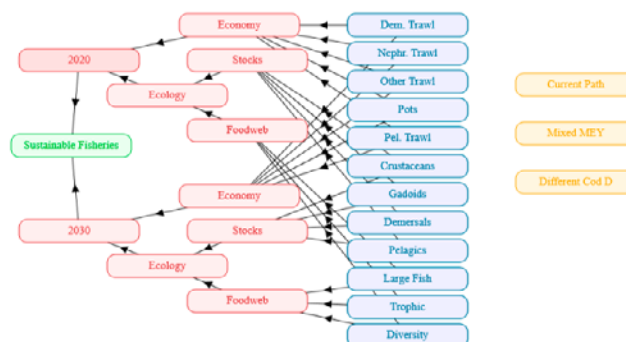


Tool: Multi-Criteria Analysis (MCA)

MareFrame The West Coast of Scotland



This is the Mareframe MCA tool. Data has been loaded into the table on the right. You may doubleclick on each element below, to access the properties panel for that element. If you doubleclick on one of the red or green elements, you may adjust the weights of it's child elements, and thus the data it points to. In the chart at the bottom, you will see the result of the analysis, with the tallest column being the highest scoring one.



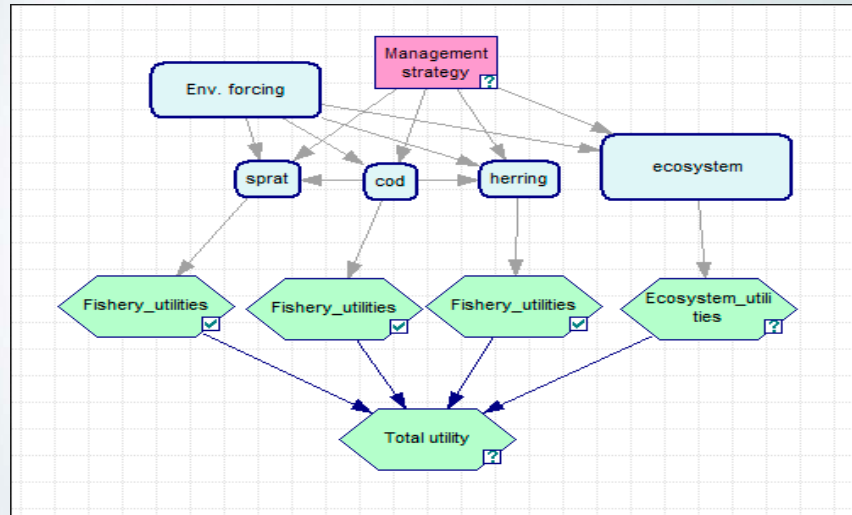
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Tool: Bayesian Belief Net (BBN)



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Environmental sustainability – Climate effects

EU project ClimeFish

- 48 month duration, 03/2016 – 02/2020
- 5.2 MEUR total, 5 MEUR EU contribution
- UiT leads, 21 participants from 16 countries



**Just started.
Engage with
project.**

ClimeFish objectives:

- Help ensure that the increase in seafood production comes in areas and for species where there is a potential for sustainable growth, given the expected developments in climate
- Forecasting models will provide production scenarios that will serve as input to socio-economic analysis where risks and opportunities are identified, and early warning methodologies are developed
- Strategies to mitigate risk and utilize opportunities will be identified in co-creation with stakeholders

<http://climefish.eu/>



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Environmental sustainability – Resource use

EU project WhiteFish

- 36 month duration, 01/2012 – 12/2014
- 2.9 MEUR total, 2 MEUR EU contribution
- Nofima leads, 13 participants from 5 countries



CWA 16960:
Self-assessment
of sustainability

WhiteFish objectives:

- To strengthen the competitiveness of the European cod and haddock industry by documenting and disseminating the relevant and desirable characteristics the products have, in particular in relation to sustainability, environmental impact and transparency.
- Specifically, to develop a methodology called Batch-based Calculation of Sustainability Impact (BCSI) that SMEs can use for self-assessment and documentation. BCSI will be developed as a European standard supported by simple software tools.

ISO 12875/12877:
Documentation of
seafood products

<http://www.whitefishproject.org/>

Environmental sustainability – Emissions

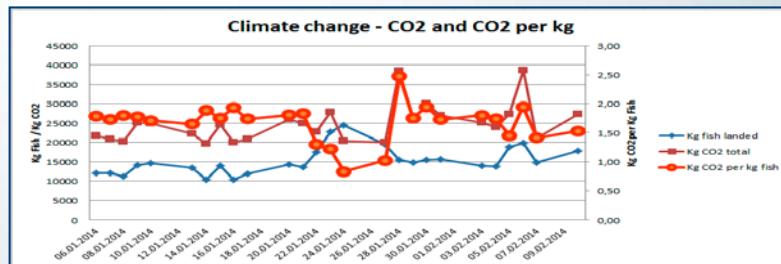
Calculating emissions per kg fish

Vessel and gear data

Vessel info - Vessel lifetime	
Reinforcing steel	12560 kg total
Chromium steel	868 kg total
Other / New	0 kg total
Sum	13428 kg total
Estimated tons fish caught in vessel lifetime	100000 tons
Gear info - Gear lifetime	
Various rubber parts	225 kg
Chain and iron parts	333 kg
Various other	266 kg

Catch data

Batch	Landed kg	MSD	MGO	Lubr	Ammo	R22	Profit
06.01.2014	12116	5682	77	34	0,27	0,03	16426
07.01.2014	12091	5419	128	34	0,27	0,03	6887
08.01.2014	11220	5236	133	31	0,25	0,02	13412
09.01.2014	14129	6546	123	39	0,31	0,03	14221
10.01.2014	14539	6509	97	40	0,32	0,03	17632
12.01.2014	12500	5788	118	38	0,30	0,03	6556



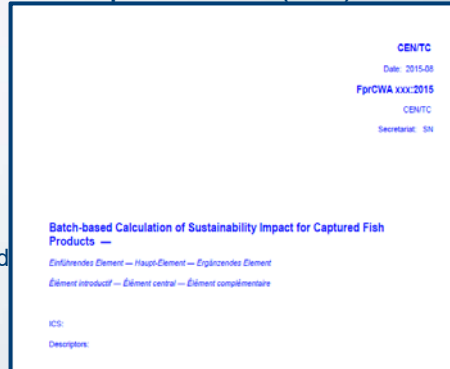
Self-assessment specification

Provide self-declaration in standardised form
 Provide a checklist for continuous self assessment

For fishing operation:

1. Fuel type used
2. Fuel amount used
3. Refrigerant type used
4. Refrigerant amount used
5. Vessel/hull/gear component type
6. Vessel/hull/gear component allocated

New European standard (CWA)



Enables calculation of impact per kg fish

Social sustainability - Traffic light system



Economic sustainability

EU project PrimeFish



- 48 month duration, 2015 – 2019
- 5.275 MEUR total size, 5 MEUR EU contribution
- Led by Matis, Iceland; Nofima large partner
- 16 scientific partners and 40+ industrial partners

**Just started.
Engage with
project.**

The overall aim of PrimeFish is to improve the **economic sustainability** of European fisheries and aquaculture sectors. PrimeFish will gather and analyze data from individual production companies, industry and sales organisations, consumers and public sources. The data will be related to the competitiveness and economic performance of companies in the sector; this includes data on price development, supply chain relations, markets, consumer behaviour and product innovation.

www.primefish.eu



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Documenting sustainability, detecting fraud

EU project FoodIntegrity



- 60 month duration, 01/2014 – 12/2018
- 11.5 MEUR total, 9 MEUR EU contribution
- FERA leads, 38 participants from 20 countries

**Matching seafood
claims to
verification methods**

FoodIntegrity objectives:

- To provide Europe with state of the art integrated capability for detecting fraud and assuring the integrity of the food chain
- For seafood: To design, create and begin to populate a database suitable for documenting the degree and scope of seafood misdescription in Europe
- For seafood: To do spot checks for selected products and analyse to what degree analytically verifiable claims about seafood products are true
- For seafood: To develop a coherent and integrated toolbox, linking seafood product claims to analytical and paper-trail methods, to facilitate verification and validation

<http://www.foodintegrity.eu/>



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EU project Authent-Net

AUTHENT NET

- 24 month duration, 04/2016 – 03/2018
- Network project, aimed to coordinate research initiatives
- FERA leads, 19 participants from 12 countries



**Just started.
Engage with project.**

FoodIntegrity objectives:

- Build a network of Member State research funding bodies
- Develop terms and definitions for use in the food authenticity area
- Map out food authenticity in Europe and undertake stocktaking and analysis of existing data. evaluate the gaps and complementarities in European funding of food authenticity R&D
- Establish a dynamic and sustainable European information platform, the Food Authenticity Research Network Hub (FARNH) for sharing and accessing information on food authenticity and related activities

Summary and conclusions

- **Climate change will significantly influence sustainability and resilience of seafood production**
- **Climate change needs to be taken into consideration when making decisions on how to produce sustainable seafood**
- **All aspects of sustainability are important; if one of them is missing then the sector as a whole is no longer sustainable**
- **We need to be sustainable, and we need to document the fact that we are sustainable**
- **Documenting sustainability for seafood can be value-adding and sometimes it is a requirement for market access**
- **There is a lot of fraud and misdescription of seafood products; false and misleading claims about sustainability are difficult to disprove**



Thank you for your attention

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The research leading to these results has received funding from the European Union's Seventh Framework Programme (FP7/2007-2013) under:

- *Grant agreement n° 286141 – WhiteFish*
- *Grant agreement n° 613571 – MareFrame*
- *Grant agreement n° 613688 – FoodIntegrity*

and from the Horizon 2020 Programme (H2020/2014-2020) under:

- *Grant agreement n° 635761 – PrimeFish*
- *Grant agreement n° 677039 – ClimeFish*
- *Grant agreement n° 696371 – Authent-Net*

