

MareFrame



THE NORTH SEA CASE: PELAGIC ADVISORY COUNCIL

The Hague February 26th, 2016

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This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 61571


MareFrame

Outline

- EAF and MareFrame
- Decision support
- The three tasks
- Discuss & decide next steps



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Decision support

Structured approach to compare / evaluate alternatives


DSF helps:

- § Identify GOALS AND CONCERNS
- § Analyse WHAT MATTERS
- § Supports the design of a SOLUTION

MCA: accommodates multiple aspects of the decision issue

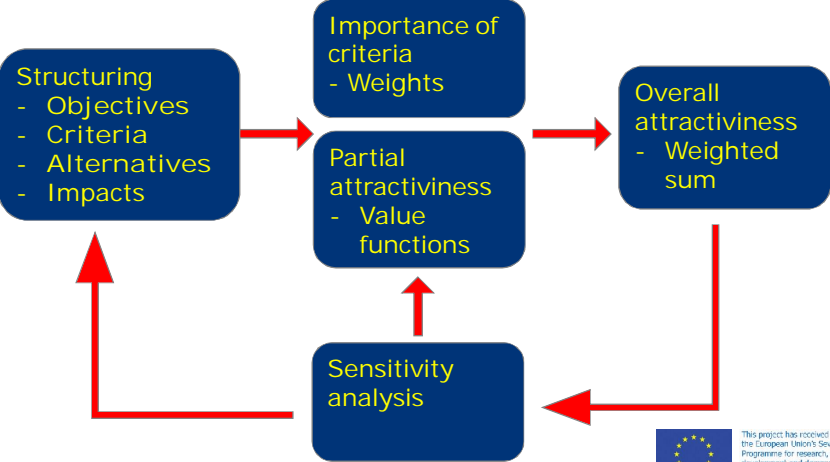



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Multi-Criteria Analysis (MCA)

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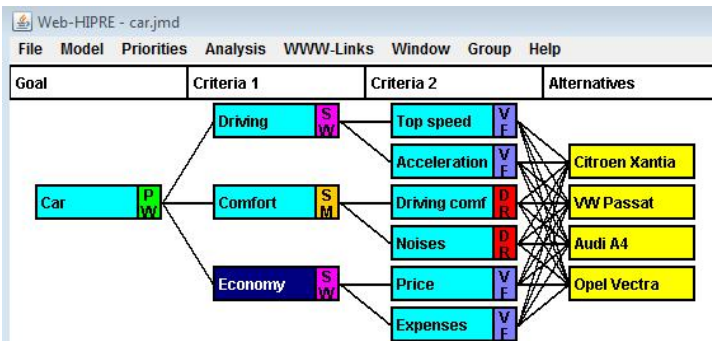


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Multi-Criteria Analysis (MCA)

- Objectives and criteria are typically laid out in a hierarchy (value tree)
- Good decisions require good objectives AND GOOD ALTERNATIVES
- Good criteria is specific, measurable, agreed, realistic

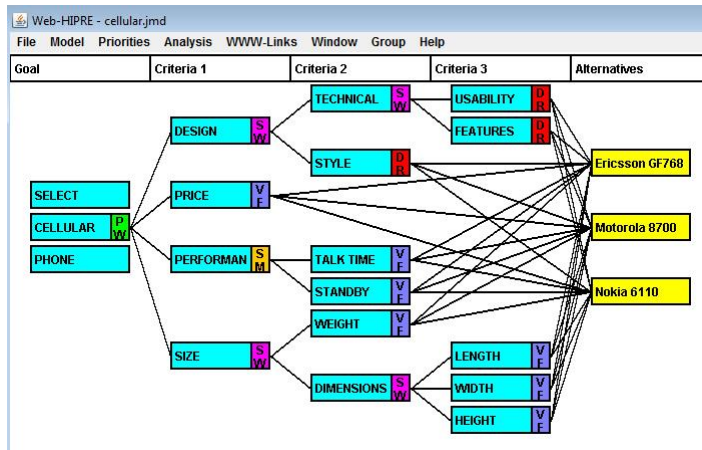
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Hierarchy structure of a value tree

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Using the MCA tool

1. Decide relative importance of criteria



2. Describe how does changes in a variable relate to preferences?

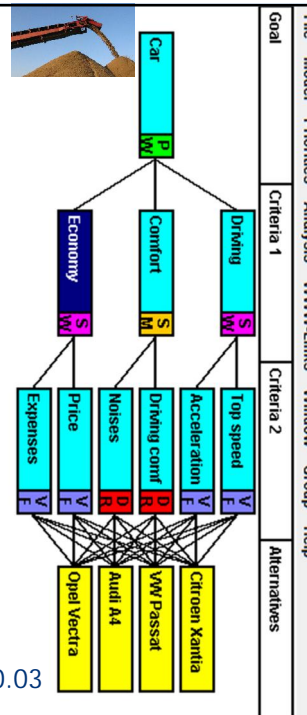
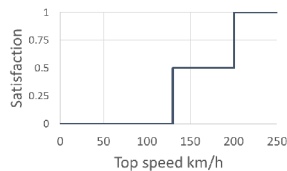


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Multi-Criteria Analysis (MCA) = sand in a funnel


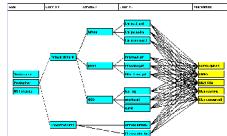
- Test drive, technical manual, reviews
- Weight of driving 0.6
 - Weight of top speed 0.2
 - Weight of acceleration 0.8
 - Top speed receives $0.6 * 0.2 = 0.12$
- Value function
 - Opel: 0.5
 - Audi: 1
 - VW: 0.5
 - Citroen: 0
- Opel will receive $0.12 * (0.5 / (0.5 + 1 + 0.5 + 0)) = 0.03$




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How to achieve a good planning outcome?

- Good alternatives!
- Relevant problem framing
- Clear objectives
- Clear indicators
- Relevant models and reliable data
- Stakeholder preferences
- Time to use the decision support tool and discuss
- **A cooperative process**

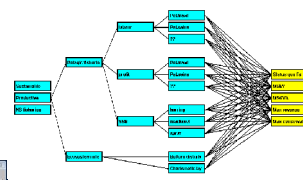
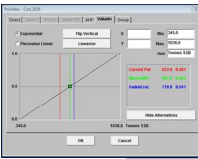
%GVA and %Profit by Country



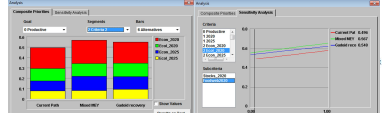

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Tasks: when and how?

- Task 1: Define the goal (objectives and concerns)
- Task 2: Agree on the problem structure (indicators)
- Task 3: Develop management alternatives
- Task 4: Simulate the consequences
- Task 5: Weight the indicators
- Task 6: Conclude, learn, iterate

Stocks_2020 0.850
Foodveh2020 0.550



Focus for the meeting

- **Task 1**
- DESCRIBE the key management objectives for the North Sea fisheries management with respect to ecosystem, marine resources and fishing communities
- <http://mareframe.mapix.com/>



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Task 1: GOAL (The Baltic Sea case)

- Management of cod, herring, and sprat fisheries considers trophic interaction among the stocks in the Central Baltic, as well as the major environmental drivers influencing the dynamics of the harvested populations. The social and economic benefits that can be derived from these fisheries are explicitly acknowledged in the management process. Management recognizes the small scale fishery targeting cod with gill nets as this segment provides employment opportunities for the coastal communities in particular. Sustainable harvesting of the major commercial stocks is the primary management interest and both spawning biomass and size structure of large predatory species should contribute to a resilient state. This will also indicate good status of a relevant biodiversity component preserving ecosystem functioning.
- WHEN should this ideal state be reached?



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Management issues

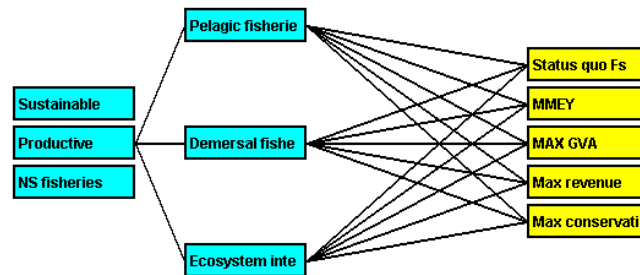
Goal	Objective/concern	Modeling approach
"need to achieve Fmsy"		The Green model
"meet the landing obligation"		The Amber model
"avoid the risk of incompatible legislation"		The Red model



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Task 2

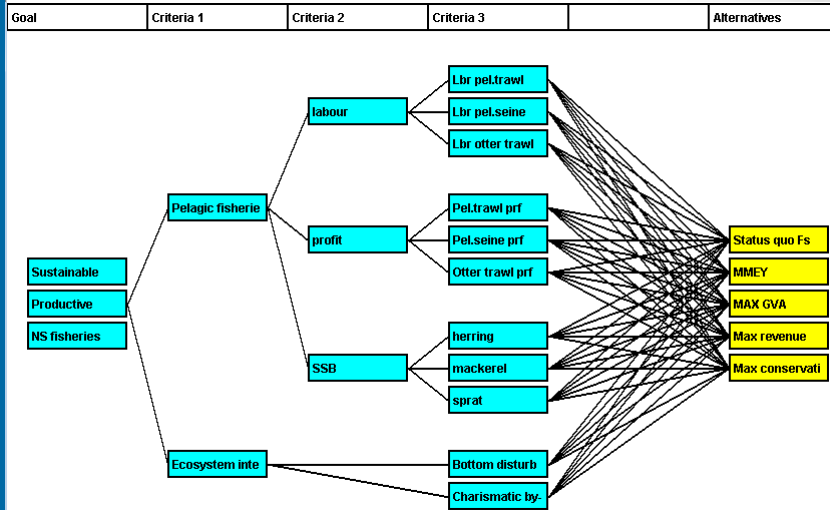
- Agree on the problem structure



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Task 2

- Agree on the problem structure



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Decision Support Tools in MareFrame

<http://mareframe.mapix.com/>

MareFrame Decision Support Framework

The MareFrame Decision Support Framework is a pragmatic planning process for moving towards an Ecosystem Approach to Fisheries Management. Please select from the case studies below to review the available information and decision support tools.



1. Iceland
2. West Coast of Scotland
3. North Sea
4. Baltic Sea
5. Gulf of Cádiz
6. Strait of Sicily



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Decision Support Tools in MareFrame

<http://mareframe.mapix.com/dev/DST.html>

Open Document Save Document Reset New Element Delete Element Select All Connect Tool

Fullscreen Editor Mode

Editor Mode

www.mareframe-fp7.org

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Decision Support Tools in MareFrame

<http://mareframe.mapix.com/dev/DST.html>

	Charismatic species by-catch	Bottom disturbance	Pel.seine labour	Otter trawl labour	Pel.trawl labour	Otter trawl profit	Pel. seine profit	Pel.trawl profit	herring
Minimum rating	0.56	0.56	2117232	13219793	42627751	21945881	10227369	129558813	1141572
Baseline	1	1	3709698.586	22648665.9	74102976.99	32715376.55	14572436	194846993	1598159
MMEY	0.8980629	0.8156127	2952812.459	17780664.89	58378892.51	36279005.97	15980009	222143516	1712476
Max GVA	1.1382498	1.1271585	4313947.487	25445299.29	84988411.34	33754217.04	14609728	200025581	1632936
Max conservation	0.75	0.75	2822975.752	17626390.33	56837001.59	29261175.28	13636492	172745085	1522096
Status quo Fs	1	1	3763967.67	23501748.2	75782668.79	32161433.94	14666613	190489351	1547650
Max revenue	1.248200766	1.226786949	4694789.56	28889226.79	94527910.73	32121050.51	13969338	188831433	1575639
Units	Relative scale	Relative scale	Cost, €	Cost, €	Cost, €	€	€	€	Tonnes
maximum	1.56	1.53	5868487	36111533	118159888	45348757	19975012	277679395	2140595

www.mareframe-fp7.org

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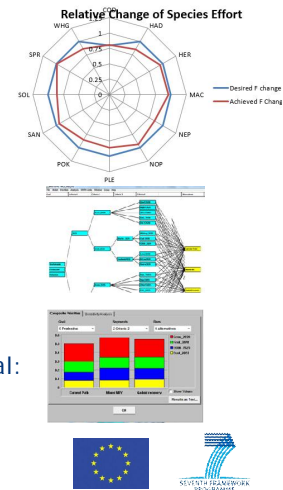
Contact information

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

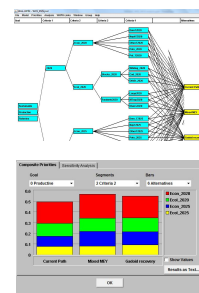
Dropbox folder for the decision support material:
 invite!
 Pelac_YYY.xdsI



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MCA analysis with Web-Hipre

- <http://hipre.aalto.fi/>
- Follow installation procedure (enable java)
- User name:
- Password:
- Example value tree: YYY.jmd
- Open the file: YYY.jmd
- Analyse using your own weights and value functions
- Save as: YYY.XXX.jmd
- Contact: mika.rahikainen@helsinki.fi



Installing software

GeNIe (for Bayesian inference)

- Download the software at <https://dslpitt.org/genie/index.php/login-form> and install it in your laptop. You will have to sign in first to download the software.

WEB-HIPRE (for multi-criteria analysis):

- Go to <http://hipre.aalto.fi/> and click "Bring Web-HIPRE to Front"
- then, in a new window, click Start WEB-HIPRE.
- Web-HIPRE is a Java-applet. Java needs to be installed in your PC and enabled in your browser. You may have to add <http://hipre.aalto.fi> in Control panel/Java/Security/Exception site list.
- If you are using Chrome as your browser, you need to enter "chrome://flags" into your address bar and search for NPAPI, and enable it. Then restart chrome.
- Apparently, we will not integrate Web-HIPRE in the MareFrame DST but we will anyway use it for educational purpose at the workshop.



Task 3

- Develop management alternatives (candidate solutions to problem)
- What is the time period considered w.r.t. optimization or maximation?
- A long term steady state and a specific year such as 2020?
- Cumulative value or an average during 2017-2025
- Net Present Value during 2017-2025



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Task 3

Acronym	Description
Status quo Fs	Business as usual F all +100% of current (2014?)
Max MEY	Maximum value of profit for all fleets combined
Max GVA	Maximum value of GVA for all fleets combined (GVA = profit + labour costs (ie the societal value of the fishery))
Max Revenue	Maximum overall value of landings: a multispecies analog to MSY but with value weightings by species
Max Conservation	Fs all equal 75% of current (2014?)



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	BAU	MS Fmsy	Profit Cod	Profit Sprat	Profit All	GES optim
Single species Fmsy Cod 0.46 sprat 0.29 her 0.26	✓					
Multi-species Fmsy, cod opt		✓				
MEY cod			✓			
MEY sprat				✓		
MEY all					✓	
Bpa cod 88 200 t	✓					
Bpa sprat 570 000 t	✓	✓	✓			
Max x% change in catch						
F translated to TAC	✓	✓	✓	✓	✓	✓
Landing obligation	✓	✓	✓	✓	✓	✓
Temporal regulations (when?)	✓					
Spatial regulations (where?)	✓					✓
Consideration of the small scale cod gill netters (how?)		✓	✓	✓	✓	✓
GES optimization (specify)						✓
Minimum mesh size (specify)	✓	✓	✓	✓	✓	✓



Simulate the consequences: input data from the ecosystem model

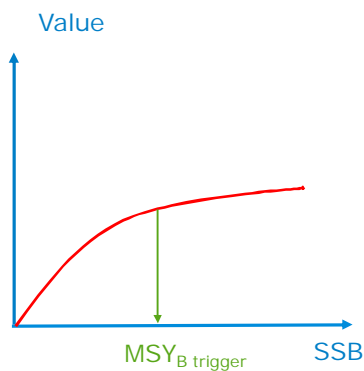
	Cod_2020	OtherT2020	Whit_2025	OtherT2025
Min Rating	345.0	15.0	2139.0	9.0
Current Path	622.0	17.7	4100.0	17.7
Mixed MEY	692.0	19.6	4382.0	19.6
Gadoid recov	719.0	17.6	4351.0	17.6
Max Rating	1036.0	45.0	6417.0	27.0
Unit	Tonnes SSB	1000€	Tonnes SSB	1000€



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Value function – e.g. spawning stock biomass



Priorities - Cod_2020

Direct SMART SWING SMARTER AHP Valuefn Group

Exponential Piecewise Linear

Flip Vertical Linearize

X Y

Min. 345.0 Max. 1036.0 Unit Tonnes SSB

Current Pat 622.0 0.401
Mixed MEY 692.0 0.502
Gadoid rec 719.0 0.541

Hide Alternatives

OK Cancel



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Example of weighting

Short vs. longer term:

2020	0.600	
2025	0.400	

Ecology vs. economy:

Ecol_2020	0.400	
Econ_2020	0.600	

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Composite analysis – more detail (The Celtic Sea case)

Analysis ✕

Composite Priorities | Sensitivity Analysis

Goal: 0 Productive | Segments: 2 Criteria 2 | Bars: 6 Alternatives

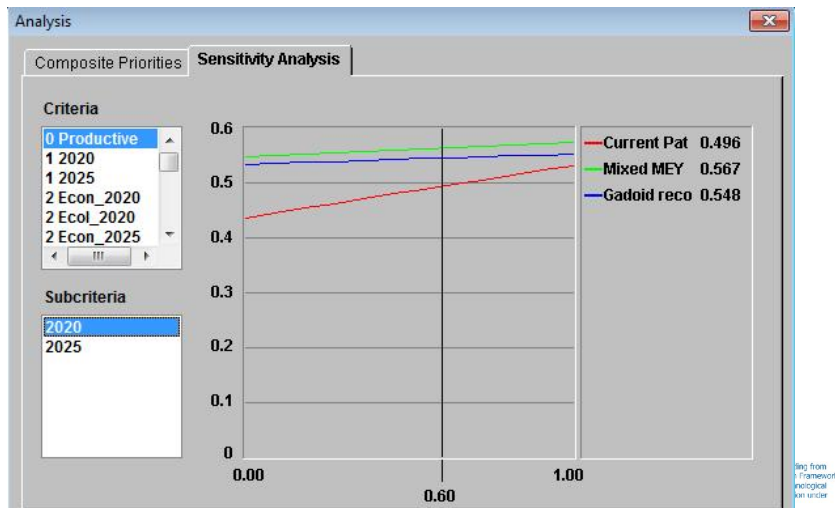
Alternative	Ecol_2025 (Yellow)	Econ_2025 (Blue)	Ecol_2020 (Green)	Econ_2020 (Red)
Current Path	0.08	0.10	0.12	0.20
Mixed MEY	0.08	0.15	0.12	0.25
Gadoid recovery	0.10	0.13	0.12	0.20

Show Values

Results as Text...

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Sensitivity – influence of weighting



The Ocean's Eleven

- D1 Biodiversity
- D2 Non-indigenous species
- D3 Commercially exploited fish and shellfish stocks
- D4 Marine food webs
- D5 Eutrophication
- D6 Sea-floor integrity
- D7 Hydrographical conditions
- D8 Contaminants in sea
- D9 Contaminants in seafood
- D10 Marine litter
- D11 Noise and other energy

How to define GEnS taking into account these descriptors?

How will we know when the GEnS has been achieved?

Multiannual plans as EAF instrument

- A first step to EAF in EU
- Wide areas; more species; consider MSFD (D3+)
- Regionalisation
- Baltic template?



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The Baltic plan - a template?

Process:

- Lead by the Commission
- Interactions: STECF, BSAC, Baltfish...
- Decision making standoff



Content:

- Predator and prey species
- Fmsy ranges: target or max?
- Min. SSB levels
- Empower regional measures
- Review clause




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The Green model


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Strengths and weaknesses

§ ?



§ ?




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Next steps?

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- Invitation to NSAC on 11th, April: develop MCA value tree; improve alternative
- MareFrame draft recommendation: 01.01.17.
- The Green model elaborated by March 2016?

Practical issues:

- When and how to continue?
- MCA: Small team?