Update on EFIMAS Project: Evaluation tool for Alternative scenarios for Northern Hake fisheries management (Management Strategies Evaluation (MSE))

NWW RAC Focus Group on Northern Hake
Long Term Management
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1. Introduction: The EFIMAS project

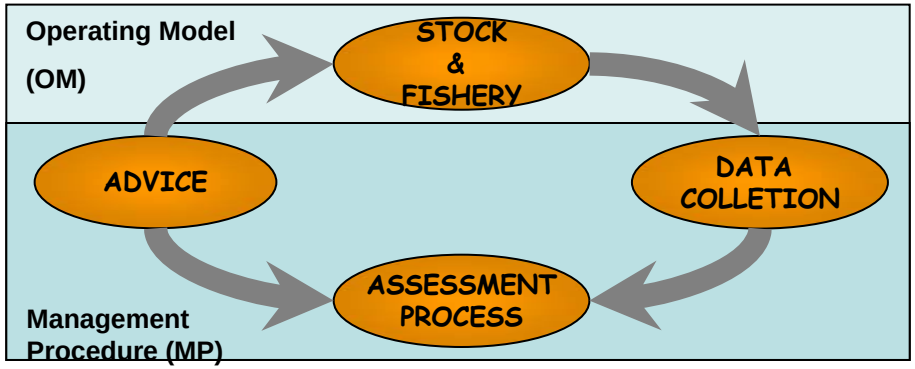
The Operational Evaluation Tools for Fisheries Management Options (EFIMAS) project

- To develop a set of new tools to simulate and evaluate the biological and economic consequences of a range of fishery management options and objectives.

- The idea is to provide managers and stakeholders with a better idea of the consequences of a management intervention before opting for a particular management approach

1. Management Strategy Evaluation (MSE)

- The **Operating Model** simulates the **real stock** and the **fishery** under certain hypothesis about their dynamics and interactions.



- The **Management Procedures** simulates **how the population is observed** in three main processes**:**
  - Data collection: Simulate the sampling of the necessary data to run the assessment
  - Assessment: Compile the data and obtain an estimated population through an assessment model.
  - Advice: Apply a predefined HCR to the observed population to obtain the management advice (TAC, TAE, spatio-temporal closures…).

1. Management approaches

- **Traditional Approach.**

  Find the **assessment model** that best fits to the data and the knowledge about the population and the fishery. The **management advice** is based in a single hypothesis about the true system dynamics.

- **MSE Approach**.

  Find the **management procedure** that gives the best results in terms of biological, economical and social robustness taking into account the **main uncertainties** in the system. The **management advice** is based in different hypothesis about the true system dynamics.

2. Why do we need a Long Term Management Plan?

- In 2004, a recovery plan (RP) for the NH stock (EC Reg. No 811/2004) followed up a previous emergency plan (EC Reg. No 1162/2001, EC Reg. No 2602/2001 and EC Reg. No 494/2002). The RP aimed at achieving a SSB of 140,000 t (Bpa), by limiting fishing mortality to 0.25, and by allowing a maximum change in TAC between consecutive years of 15%.

- The RP is foreseen to be replaced by a management plan when, in two consecutive years, the target level for the concerned stock has been reached (Article 6 of EC Reg. No 2371/2002).

- Recent assessments indicate that, a management plan should be put into place to replace the RP, to ensure a sustainable exploitation of this stock in the long-term.

- Thus, **tools** as developed in EFIMAS are very **useful to evaluate the robustness of Management Strategies in the long term** to, for instance, different levels of effort, TAC constraints and /or exploitation patterns.

3. Update of scenarios and Management Strategies since October 2007

- **Scenarios**
  - Stock-Recruitment relationships: Ricker, Segmented Regression (Ockham) and Beverton& Holt.
  - Growth: normal and twice faster.

- **Management Strategies:**
  - **F = Fmsy = 0.17** (fishing mortality related to the MSY)
  - **F = Fpa = 0.25 (Fsq = 0.244).** (F *precautionary approach*).
  - **F = 0.8*Fmsy.**
  - **F = 1.2*Fmsy.**

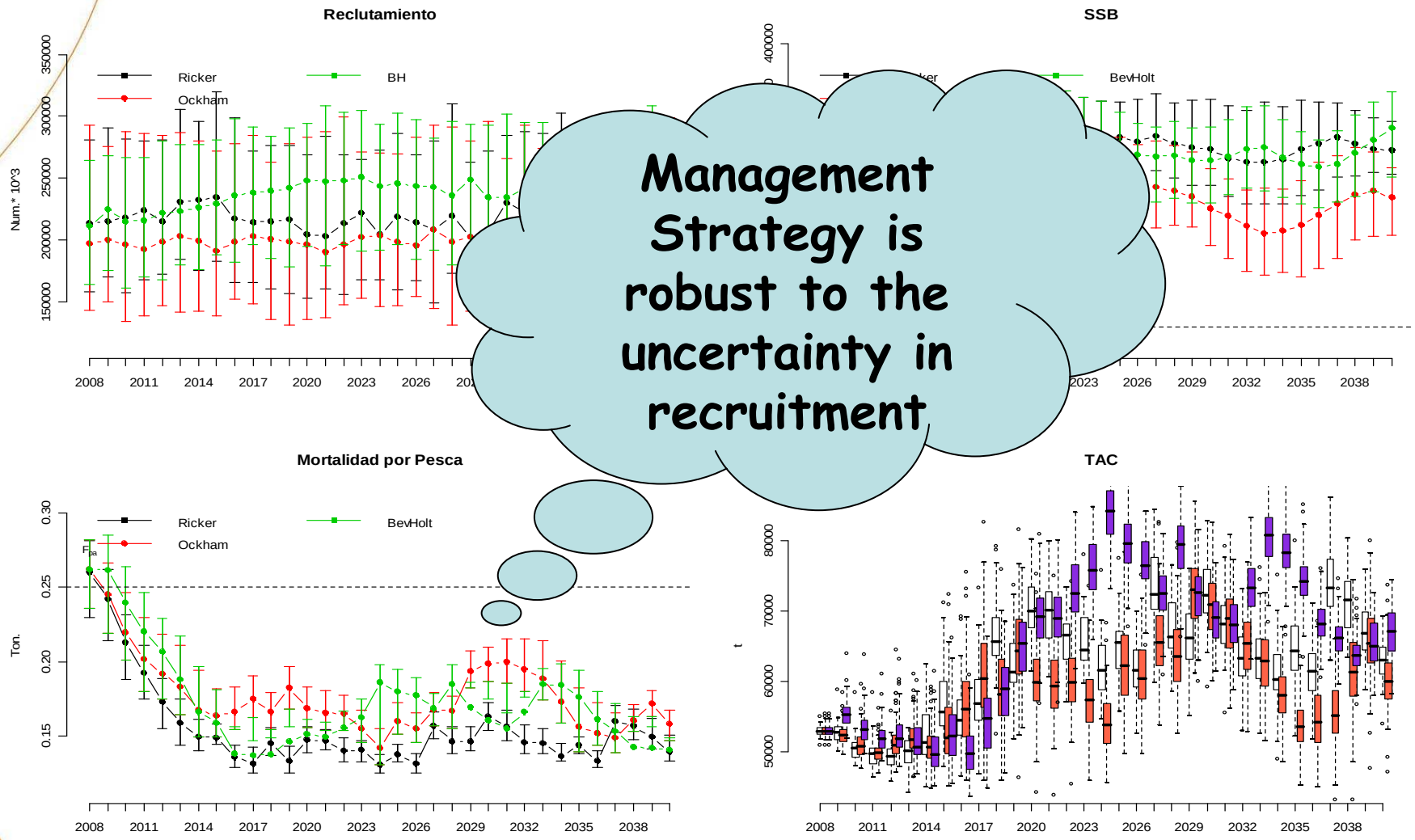
  - **F= Fsq= 0.21** F estimated for the simulated initial population 2006, generated in the OM.

3. New: Socio-Economic Analysis

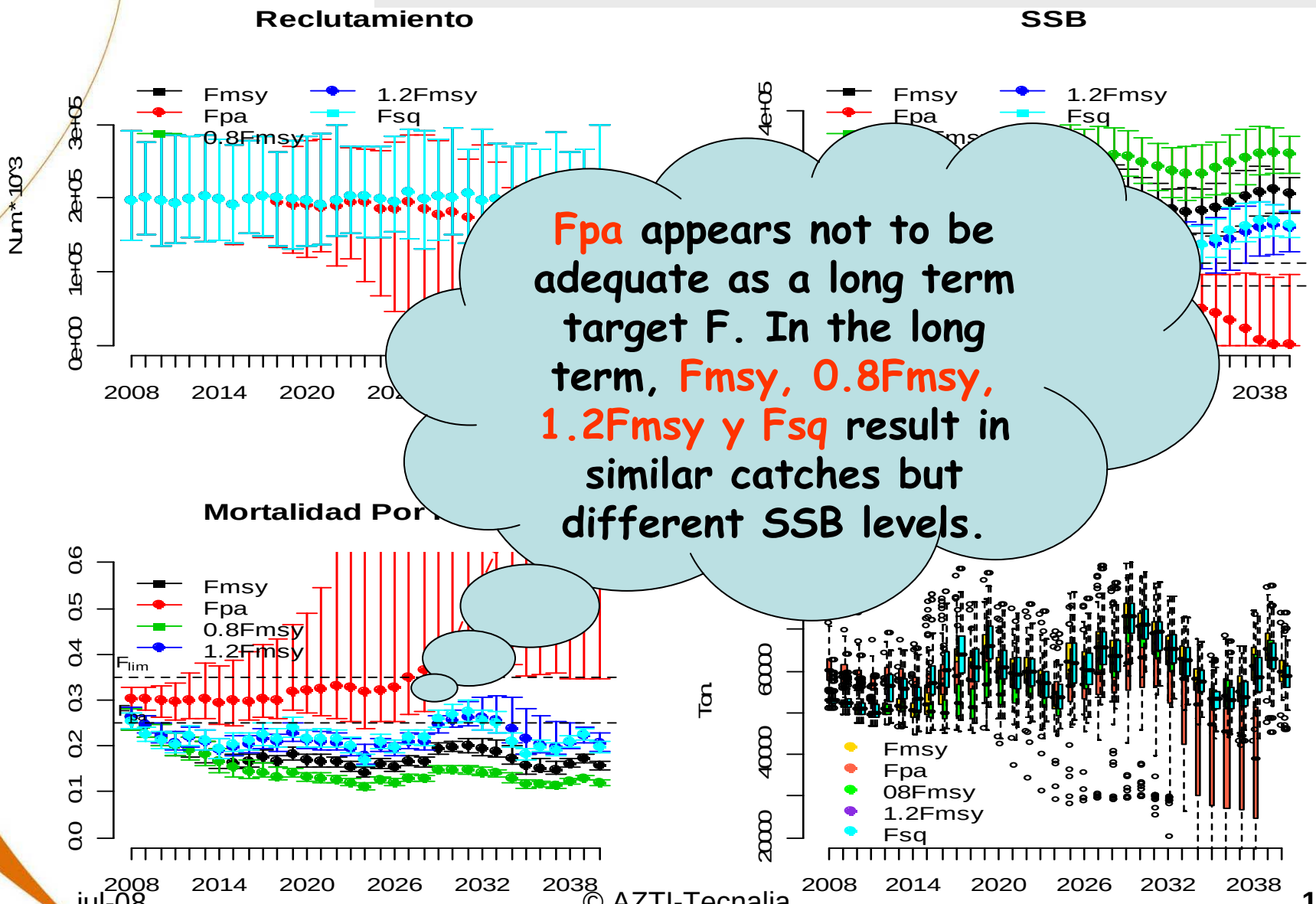
Main differences from economic analysis carried out in December 2007 in STECF group:

- Biological uncertainty (previously seen) are taken into account. The most conservative approach was chosen (Ockham S/R)
- Thus, the stock status (health) is taken into account in this simulations.
- Economic models included are: prices, costs and evolution of fishing capacity. Uncertainty associated to this process are also included.
- Analysis done for a portion of the fishery (Baka and Pair trawl with base port in the Basque country)
- Some of the other species caught by the fleet were included: Anglerfish and Megrim. Squid, Pouts and Mackerel. Others.
- These species were included in the model with uncertainty and in a different way depending on data availability.

4. Results: Comparison between scenarios: Different Stock/recruitment relationships

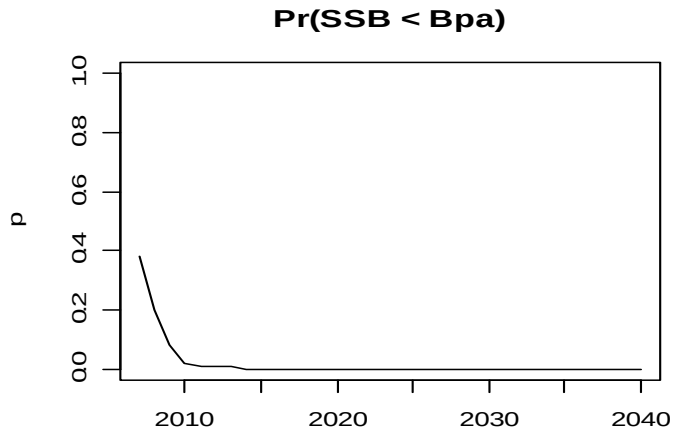


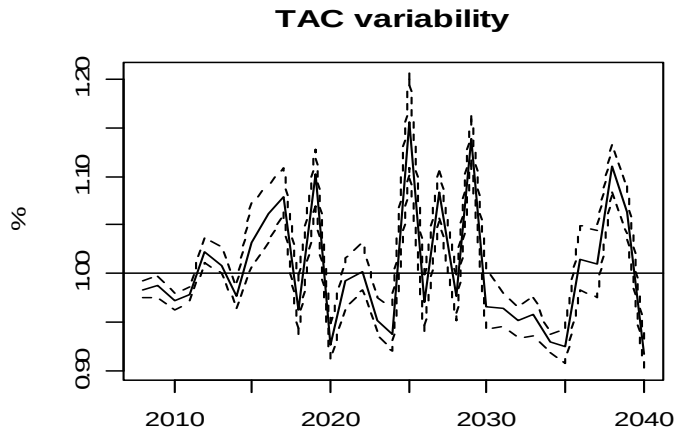
4. Comparision between Management Strategies

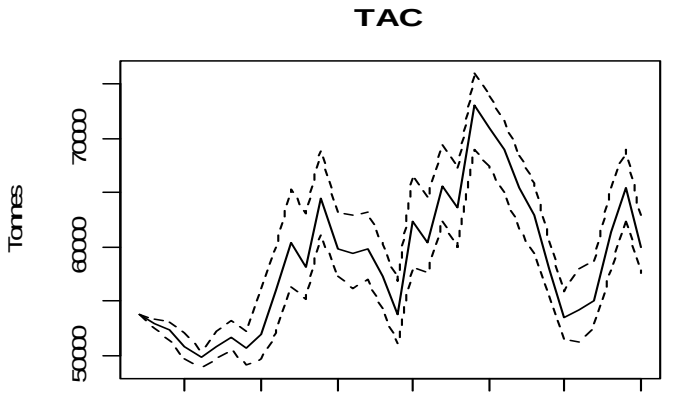


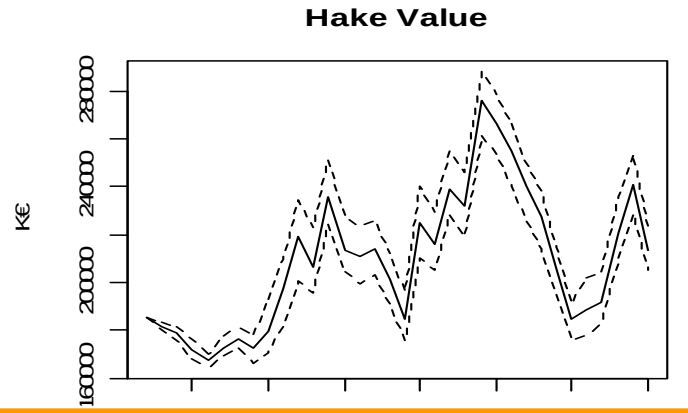
Fpa appears not to be adequate as a long term target F. In the long term, Fmsy, 0.8Fmsy, 1.2Fmsy y Fsq result in similar catches but different SSB levels.

4. Results: bio-economics Fmsy, 10% reduction





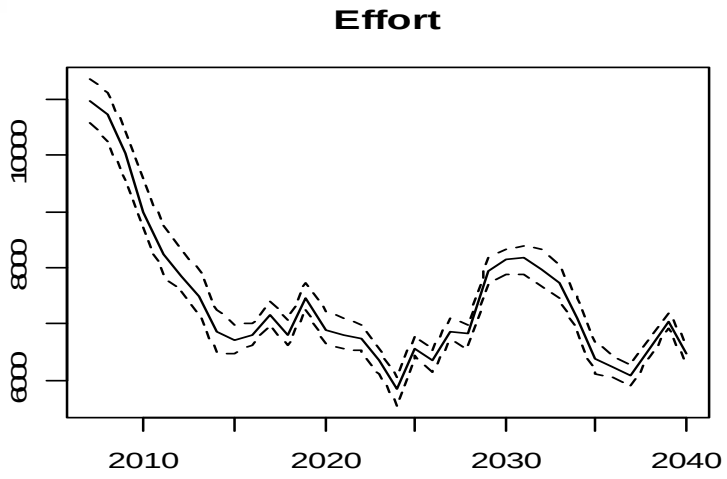


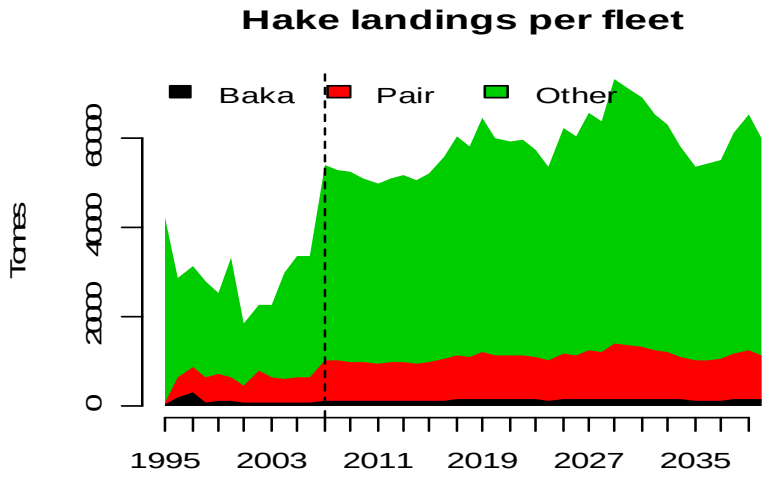


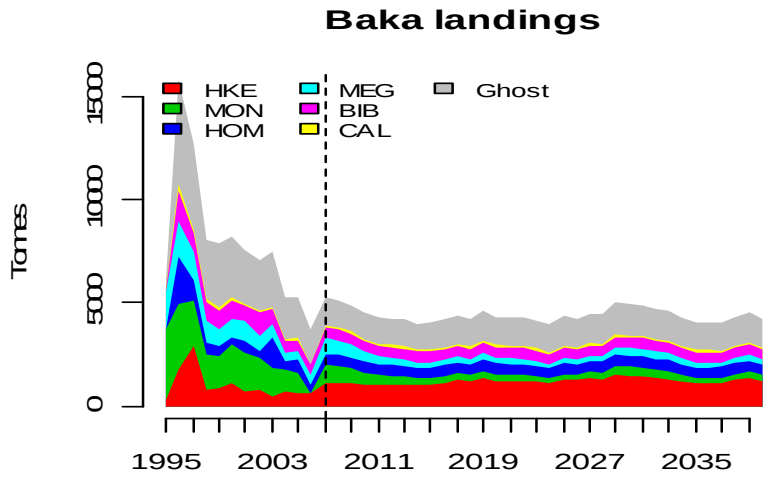
Risk of a biological collapse is low.

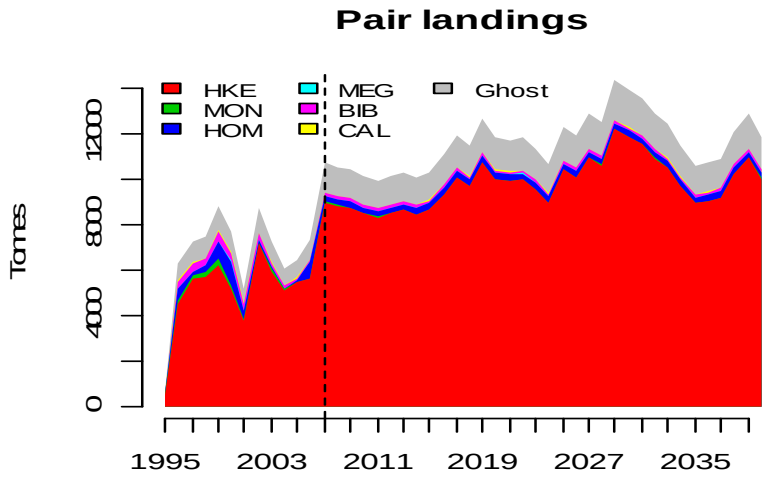
However, variation of the TAC is high.

4 Results Economic analysis: – Fmsy, 10% reduction

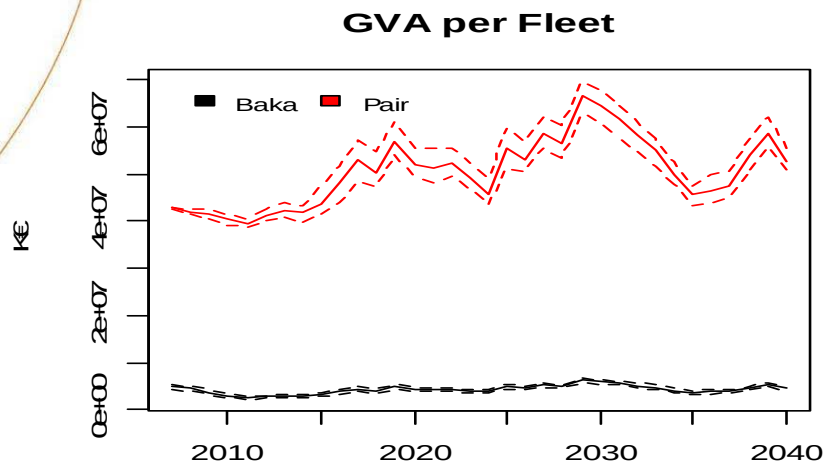


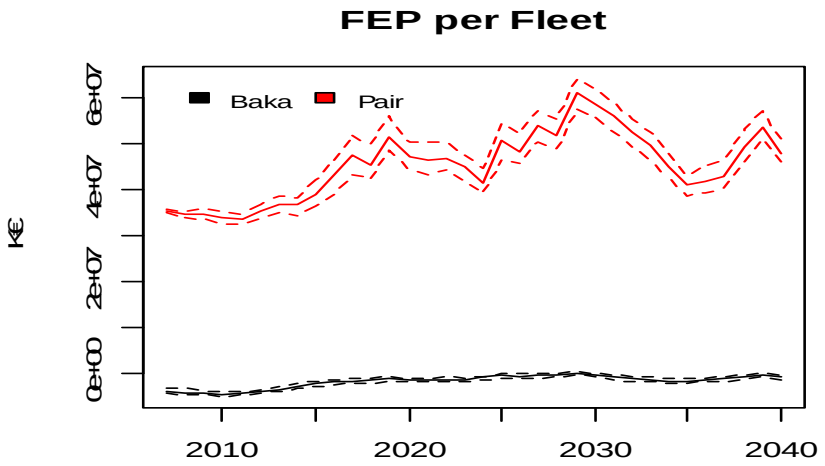


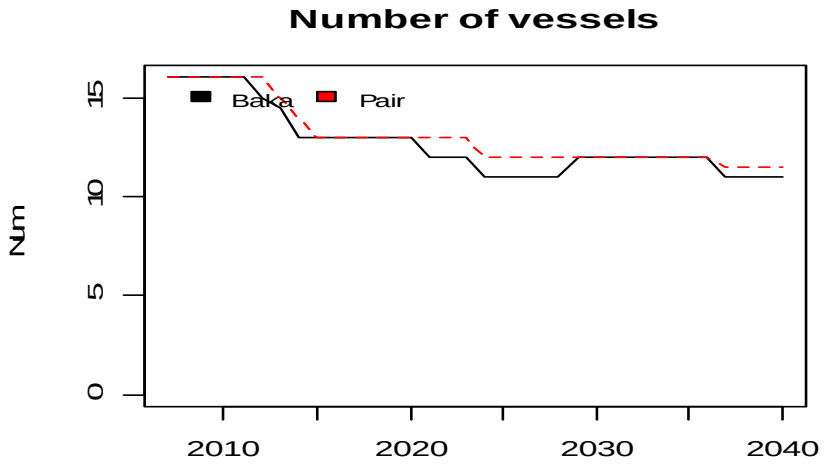


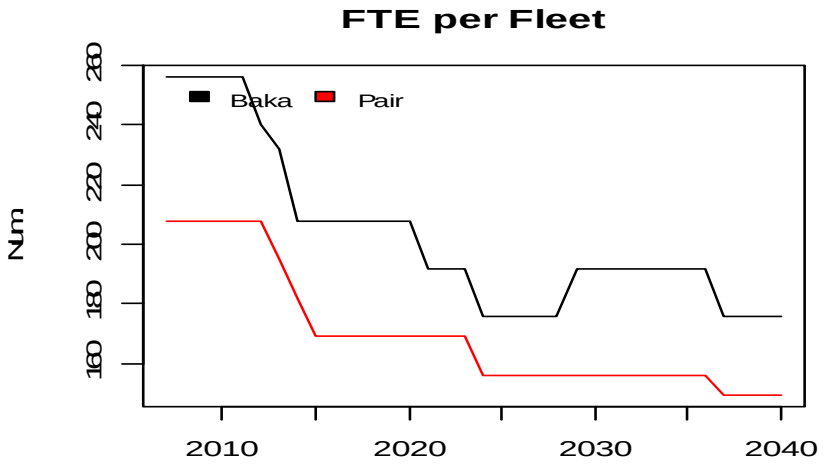


4. Socio-Economic Analysis – Fmsy, 10% reduction









Average values for all indicators considered.

4. Evaluating management strategies: Proposal of indicators

Management Strategy: Fmsy Period: 2008 - 2040 Scenario: Base Case			
Number of years p(SSB<Bpa)>0	7	1% disc. GVA	1561411
Prop. of times that p(SSB<Bpa)	0.02	5% disc. GVA	848507
Average TAC var.	0.06	Final num. vessels	23
Non disc. hake value	7093374	Max. num. vessels	32
1% disc. hake value	5943339	Min. num. vessels	23
5% disc. hake value	3247498	Var. num. vessels	10.46
Non disc. FEP	1477210	Final FTE	326
1% disc. FEP	1230046	Max. FTE	464
5% disc. FEP	653703	Min. FTE	326
Non disc. GVA	1865961	Var. FTE	-0.0079

- **Note: Discount factor gives a lower value to a future catch than to a current one**

4. Results: Evaluating management strategies

Risk of a biological collapse is the highest. It gives high values in term of TACs but low values in terms of fleets.

	Management Strategy	Fpa	Fmax.005	Fmax.010	Fmax.015	12Fmax.005	12Fmax.010	12Fmax.015	08Fmax.005	08Fmax.010	08Fmax.015
Hake	Number of years p(SSB<Bpa)>0	34	7	3	3	17	9	7	7	3	3
	Prop. of times that p(SSB<Bpa)	65%	2%	2%	2%	4%	2%	2%	2%	2%	2%
	Average TAC var.	NA	5.7%	7.7%	8.1%	5.9%	7.8%	8.2%	5.1%	7.2%	8.0%
	Non disc. hake value	5,849,259	7,025,942	7,012,802	7,019,150	7,108,337	7,104,510	7,107,101	6,706,569	6,668,618	6,663,871
	1% disc. hake value	5,047,695	5,887,598	5,873,427	5,877,924	5,971,345	5,965,807	5,968,233	5,616,922	5,576,726	5,569,622
	5% disc. hake value	3,040,150	3,218,813	3,200,120	3,198,492	3,292,210	3,283,712	3,285,680	3,071,651	3,023,746	3,009,244
Fleets (Only Baka and Pairs)	Non disc. FEP	NA	1,420,162	1,448,051	1,456,010	1,326,193	1,346,958	1,350,743	1,449,178	1,485,368	1,497,245
	1% disc. FEP	NA	1,183,190	1,206,666	1,213,689	1,111,478	1,127,554	1,130,495	1,202,992	1,233,549	1,243,994
	5% disc. FEP	NA	630,364	642,482	646,716	605,776	611,861	612,997	632,718	647,907	653,968
	Non disc. GVA	NA	1,808,369	1,818,101	1,822,160	1,797,136	1,801,010	1,801,989	1,776,750	1,785,809	1,789,958
	1% disc. GVA	NA	1,514,100	1,521,613	1,524,928	1,509,501	1,511,841	1,512,458	1,485,285	1,491,460	1,494,620
	5% disc. GVA	NA	824,911	826,496	827,576	831,896	831,085	830,942	805,781	803,967	804,090
	Final num. vessels	NA	23	22	22	30	28	27	18	16	16
	Max. num. vessels	NA	32	32	32	32	32	32	32	32	32
	Min. num. vessels	NA	23	21	21	28	27	26	18	16	16
	Var. num. vessels	NA	10	10	8	2	3	4	29	25	20
	Final FTE	NA	326	319	319	435	400	393	261	232	232
	Max. FTE	NA	464	464	464	464	464	464	464	464	464
	Min. FTE	NA	326	303	303	406	390	377	261	232	232
	Var. FTE	NA	-0.8%	-1.1%	-1.1%	-0.3%	-0.4%	-0.3%	-1.6%	-1.9%	-1.9%

Risk of a biological collapse is the lowest. It gives low values in term of TACs but high values in terms of fleets.

considered except for variation of the TAC which is the highest.

5. Conclusions

- Economic model still being developed…(along 2008)
- Some important points:
- How to establish economic parameters in the long term…is it realist?
- Also, a possible reaction of the fleets to any external driver, is difficult to determine and so to model. (e.g. Changes in abundance of the species, large increases of fuel prices, changes in Regulations…). But it is basic to do it as the fleet is expected to react to these changes.
- We need to take into account that every fleet from different regions, MS and different fishing patterns!!

6. EFIMAS Work Plan

1. Approaching a variety of stakeholders, including several RACs, to find questions that they are facing where our models may be of service. ←DONE

2. The group suggests alternative management strategies. ←DONE

3. We would then use the EFIMAS tool to analyze these strategies and compare their biological and economic implications. ←DONE

4. Then we would meet with the representatives a second time, share these results, and invite them to suggest further modifications of the alterative strategies.← IN PROGRESS

EFIMAS Workshop for stakeholders to share experiences.

Brussels, 11-12 March 2008

It would be desirable that one representative from each SWW RAC and NWWRAC assist and exchange feed back

7. Work plan jointly with the NWW & SWW RACs

- **Today´s meeting:** sharing results from a different strategies and economic analysis for a part of the fleet
- **Next steps:**
- **Identify tasks: e.g. a proposal…**
  - **Scientist** identify data needs, identify uncertainties (still biological and economical), identify process to be included (biological & economical).
  - **RACs**. To assure data availability and give feed-back in process simulations. To suggest strategies committed to be accomplish by the stakeholders: this is, real MSE scenarios
- **A work Plan:**
  - Calendar