

Raul Prellezo visit to JRC under the scope of the a4a initiative, Ispra, 14-15/June/2012

June 18, 2012

1 Introduction

The visit of Dr Raul Prellezo had the objective of scoping for the possibility of developing a bioeconomic model that merges the main ideas of Fishrent and Fcube using FLBEIA. FLBEIA is a framework for impact assessments developed in R/FLR. Using it would avoid the development of a new framework, which in the scope of STECF and a4a is not possible to develop in the short term.

2 Agenda

- Day 01
 - Intro to FLBEIA
 - Discussion on feedback mechanisms
 - Limitations of FLBEIA
 - Hands-on
- Day 02
 - Fishrent
 - Discussion on FLBEIA development and implementation of F3/Fishrent alike

3 Discussion

FLBEIA is a toolbox for bioeconomic impact assessment with MSE. It's multi-fleet, multi-stock and seasonal. It's modular and works by coupling separate models as a sum of processes. New methods for different processes can be coded and coupled. The HCR can take into account the economic performance of the fleet. It can also assume various levels of compliance. The time step is flexible.

The main algorithm allocates fishing effort to different mtiers using historical information and TAC. The allocation can be optimize, *e.g.* to obtain maximum profit.

The effort allocation/optimization is carried out every year, *e.g.* if the HCR sets the TAC for 5 years the optimization will not take into account profitability along the 5 years.

The feedback mechanisms implemented include:

- Profit affects the fleet, e.g. the number of vessels - long term capital dynamics
- Profit affects the effort dynamics in terms of effort allocation to mtiers
- Profit affects implementation and compliance depending on enforcement
- Catch as a result of effort acting on the biomass

The limitations found are:

- No length-based methods
- Mostly TAC oriented
- Seems that the Cobb-Douglas function limits to use in mid time steps (to be further explored)
- Management decision must be taken for all stocks at the same time in the year
- Optimization is working both on allocation and level of effort maximizing profit
- No costs are allocated to unused capital or exit costs

Comparing with FishRent, it's not clear how FLBEIA implements an effort strategy and the optimization of rent based on changes on number of vessels is not implemented. It's important to note that FishRent is a management tool that could be simulated within FLBEIA MSE. It could be included on the management loop if the objective variable can be computed from a single function that takes the necessary variables as arguments. `optim()` could be used for optimization and the outcomes implemented as a policy decision. MSE would test the outcome of that decision taking into account all the dynamics and uncertainties of the system.

Comparing with Fcube all the dynamics and policies can be simulated. It is necessary to check that all scenarios included in Fcube can be easily implemented in FLBEIA.

4 Development of a bioeconomic model

The work needed to implement a bioeconomic model that could reply to questions being made by DGMARE, would need the following tasks to be performed in the sequence identified:

- 01 - Examples on how to change specific processes, e.g. fixed prices to elastic prices (AZTI)
- 01 - Example with two species, two fleets and 2/3 mtiers (AZTI)
- 02 - Example on how to change HCR (AZTI)
- 02 - Clear instructions on scenario building (AZTI)
- 03 - Application to North Sea mixed fisheries using Fcube dataset (JRC, DTU-AQUA ??)
- 03 - Preparation meeting for the workshop, 1 week in October with Clara Ulrich and Raul Prellezo or Dorleta Garcia (JRC)
- 03 - Workshop on bioeconomic modelling with FLR, FLBEIA, Fishrent and Fcube, 1 week in November/December (JRC)
 - ToR
 - * Test FLBEIA API
 - * Condition a model based on NS mixed fisheries
 - * Feedback on limitations and further work
 - Attendees: FLR & Economics & JRC experts. Attendees MUST be able to code in R or understand it.