Overview of work on MSC key LTL requirements to date

OR How we arrived here

Jo Gascoigne on behalf of the Morocco sardine FIP

https://fisheryprogress.org/fip-profile/morocco-sardine-pelagic-trawl-and-seine-maroc-sardine-chalut-p%C3%A9lagique-et-senne

Morocco sardine FIP - background

- First pre-assessment 2009-10
- FIP prepared 2014, launched 2015
- 6-monthly meetings (last Dec 2018, next July 2019)
- Graded A by FisheryProgress
- Key activities:
  - Support for INRH scientific observers (discards and ETP interactions)
  - Formalising the HCR / decision-making process
  - Key LTL ….

FIP and key LTL requirements - history

- Initial analysis – qualitative, mainly comparison with other Eastern Boundary Current ecosystems. '*insufficiently precautionary*' (MSC)

- Reference points agreed at regional level:
  - Target $F_{0.1}$ and $B_{0.1}$
  - Limit F_{MSY} and B_{MSY}

- MSC key LTL defaults:
  - Target $0.75B_0$, $0.5F_{MSY}$ or $0.5M$
  - PRI (no specified default value but must be $>=0.2B_0$)

Problem with assuming defaults

- High spatial and temporal variability in ecosystem [see forthcoming INRH presentation] $\rightarrow$ stock biomass highly variable (recruitment, migrations, 7 interacting species of small pelagics …)

- Approach to stock assessment is to use as many techniques as possible (several models, annual survey) $\rightarrow$ triangulate advice from range of estimates … [see forthcoming INRH presentation]

$\rightarrow$ parameters such as B_0 and M are very variable

- Livelihoods – more than 3000 vessels (mainly coastal) depend on small pelagics; responsibility to get the most from natural resources (sustainably)
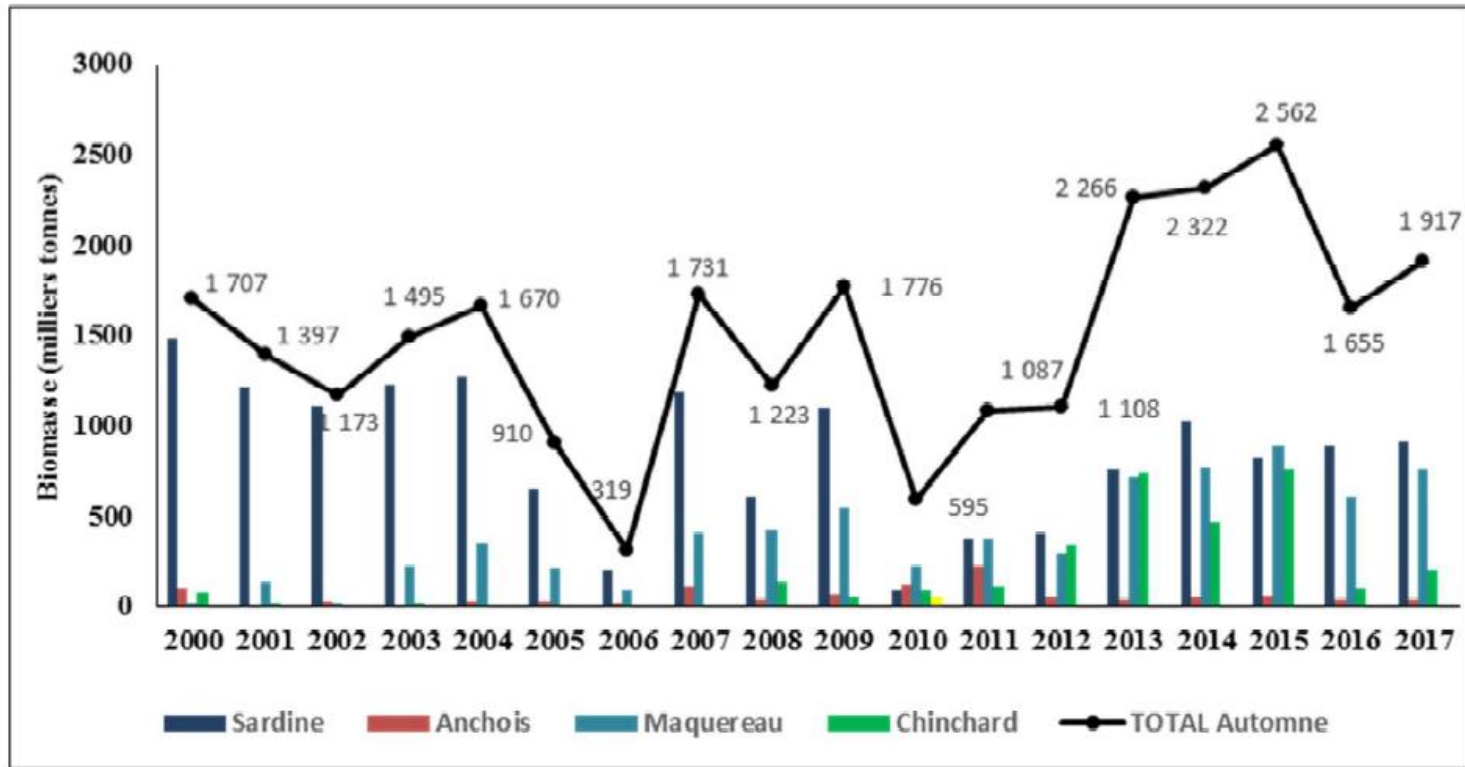
Figure 37 in stock assessment report – biomass of small pelagics in Central zone, 2000-2017

Some estimates of M for sardines from stock assessment report 2017

Stock / model	Estimate of M
Med / LCA	0.6
Nord / range of methods	0.42-0.73
Centre / XSA	0.35
Sud / XSA	0.2

Ecosystem modelling approach

- Grant from Sustainable Fisheries Fund (thanks to them)

- Collaboration Sylvie Guenette / Rochdi Macha-Allah / INRH

- Plan:
  - Phase 1 – evaluate SURF and CBR
  - Phase 2 – evaluate whether existing reference points meet MSC requirements (SA2.2.13) and if not, evaluate how references point might have to change

b. A higher or lower target level, down to a minimum … 40% [B0] … may still achieve an 80 level score if it can be demonstrated, through the use of credible ecosystem models or robust empirical data for the UoA/ecosystem being assessed, that the level adopted: ◙
- i. Does not impact the abundance levels of more than 15% of the other species and trophic groups by more than 40% …; and
- ii. Does not reduce the abundance level of any other species or trophic group by more than 70%.

Results Phase 1

- EcoPath models for South Zone (2010) and Central Zone (2015)
- Details in report from August 2018

Tableau 1. Indices SURF et RBC (Biomasse sardine / Biom. consommateurs) et les valeurs seuils du MSC.

Indice	Zone		Seuils du MSC
	Sud	Centre	
SURF	0.0027	0.0026	0.001 – 0.005
RBC	0.177	0.058	0.05

Phase 2 – not possible …

Moving from EcoPath to EcoSim requires a time series:

- Key driver of productivity is upwelling – indices are SST and chl*a*

- Other time series: catches, effort (missing for some fleets), biomass (from surveys, sometime multiplied up if surveys are partial)

→ Outcome: Even the best model was unable to reproduce both fleet and biomass dynamics, had no predictive power and produced some implausible dynamics for some groups

Problems (summary)

- SST / chl*a* not sufficient to reproduce the complexity of upwelling dynamics and hence changes in productivity in time and space

- Link between upwelling and zooplankton production is complex (advection, dissolved O_2, trophic relationships ...)

- Ecosystem is complex (high diversity of species and trophic groups) – forcing a large amount of ad hoc amalgamation

- Fisheries likewise complex - catch, effort and survey data are not complete for all fleets / target species across a long enough time series

(see report from Feb. 2019)

Utiliser un tel modèle pour explorer les dynamiques entre espèces à des fins académiques est une chose mais en dériver des prédictions de gestion serait malheureusement injustifiable

(To use such a model to explore inter-species dynamics for academic research is one thing, but to use it to make predictions used in management is unjustifiable)

And now ..?

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Key questions for us from this workshop

- Can we present enough 'robust empirical data' from this fishery and ecosystem to draw a conclusion about the impact of the sardine fishery on the ecosystem?

- If so, does the conclusion tell us that the impact is within the bounds set by the MSC standard?

Comparison with other MSC fisheries

- Argentina anchovy (certified 2016) is certified MSC on this same basis (reference points do not meet MSC defaults, no ecosystem modelling is presented)

- Baseline for 'robust empirical data'? (how much and what kind)