



Use of CMSY Tool for the Assessment of West African Stocks

23-27 September 2019 • Dakar, Senegal

■ OBJECTIVES

The main objective of this training workshop is to introduce CSRP scientists involved in fish stock assessment to two new methods, viz.: (i) for the assessment of fish stocks using time series of catch data and estimates of resilience which can be derived from FishBase, here referred to as CMSY; and (ii) for estimating a snap shot of stock status from length-frequency data from commercial catches, here referred to as LBB.

■ MODULE DESCRIPTIONS

CMSY

This module is based on the method for estimating MSY from catch and resilience of Martell and Froese (2013)¹, which was elaborated by Froese et al. (2016)², and applied to 397 stocks in 14 European ecoregions by Froese et al. (2016; see also <https://github.com/SISTA16/cmsy>)³. The biological data used to estimate resilience will be supplied by FishBase (www.fishbase.org)⁴, created by Rainer Froese and Daniel Pauly in the 1990s, and which is the information system of choice on fish by more than half a million users worldwide. The estimation of priors for this CMSY method was recently integrated as a table in FishBase and has data for most exploited species.

Data required:

- Stock is defined according to ecosystem, and not according to fishing zone;
- A minimum of 10 continuous years of catch data expressed in weight units;
- Resilience (quantitative or qualitative) gathered from FishBase/SeaLifeBase;
- If available, abundance indicators expressed as time series (minimum of three years) of catch-per-unit-of-effort (CPUE) or standing stock biomass;
- If available, independent estimates of B/B_{MSY} for specific years (the most recent of the time series is preferred), and which can be estimated using the LBB method (see below);
- Format data sets according to the Stock_Catch.CSV and Stock_ID.CSV templates provided in the workshop Dropbox folder for the CMSY package.

¹ Martell, S. and Froese, R. (2013) A simple method for estimating MSY from catch and resilience. *Fish and Fisheries* 14(4): 504-514. (download article from http://www.fishbase.de/rfroese/Martell_Froese_2012_SimpleMethod.pdf)

² Froese, R., Demirel, N., Coro, G., Kleisner, K.M., and Winker, H. (2016) Estimating fisheries reference points from catch and resilience. *Fish and Fisheries* 18(3): 506-526. (<http://oceanrep.geomar.de/33076/>; see also http://www.fishbase.de/rfroese/Appendix_4.pdf).

³ Froese, R., Garilao, C., Winker, H., Coro, G., Demirel, N., Tsikliras, A., Dimarchopoulou, D., Scarcella, G. and Sampang-Reyes, A. (2016) Exploitation and status of European stocks. World Wide Web electronic publication (<http://oceanrep.geomar.de/34476/>).

⁴ SeaLifeBase (www.sealifebase.org) will be used for invertebrate stocks.

LBB

This module is based on the method described in Froese et al. (2018; see also https://www.fishbase.de/rfroese/LBB_UserGuide_1.zip)⁵ for estimating B/B_{MSY} based on an assumption that fish grow according to the von Bertalanffy growth equation (VBGF) with parameters, viz.: asymptotic length (L_{∞}), length at first capture (L_c), relative natural mortality (M/K) and relative fishing mortality (F/K) obtained from length-frequency data representative of the commercial catch. Estimates of L_{∞} from FishBase can be used to inform this model.

Data required:

- Length-frequency data must be representative of the annual commercial catch, i.e., can be a sample from the catch but raised to the total catch;
- Viable estimates of VBGF parameters, i.e., representative of the population sampled;
- Format data sets according to the ComDat.CSV and Stock_ID.CSV templates provided in the workshop Dropbox folder for the LBB package.

■ WORKSHOP REQUIREMENTS

1. Venue needs to have a strong and consistent/stable WIFI connection that can accommodate 40-50 users at a time and can hold at least one hour of Skype communications with screen sharing. Assure that Skype is not blocked from the firewall. Also make sure that Dropbox can be accessed.
2. Audio-visual equipment that can accommodate Skype communications.
3. LCD projector.
4. Extension cords for at least 40 laptops.
5. USB sticks (1 per group + 1 master USB stick).

⁵ Froese, R., Winker, H., Coro, G., Demirel, N., Tsikliras, A.C., Dimarchopoulou, D., Scarcella, G., Probst, W.N., Dureuil, M. and Pauly, D. (2018) A new approach for estimating stock status from length frequency data. ICES Journal of Marine Science 75(6): 2004-2015. (download article from https://www.fishbase.de/rfroese/LBBcor_fsy078.pdf).

■ **AGENDA**

23 September	Activity	Description	Resource
8:00-9:00	Registration		
9:00-10:00	Opening	CSRP	TBD
10:00-10:15	COFFEE		
10:15-11:00	Plenary	Why we need to manage fisheries?	D Pauly
11:00-12:00	Lecture 1	Basic approaches for fish stock assessments I: LBB	D Pauly
12:00-12:30	Lecture 2	FishBase/SeaLifeBase in support of LBB	MLD Palomares
12:30-13:30	LUNCH		
13:30-15:30	Hands on	Install packages: R, RStudio et JAGS, LBB, CMSY; prepare LBB data	MLD Palomares
15:30-15:45	COFFEE		
15:45-17:00	Hands on	LBB Analyses	Participants with help of <i>Sea Around Us</i>
17:00-18:00	Writing	Prepare reports of LBB analyses	Participants

24 September	Activity	Description	Resource
9:00-10:00	Lecture 3	Basic approaches for fish stock assessments II: CMSY	D Pauly
10:00-10:15	COFFEE		
10:15-11:00	Lecture 4	FishBase/SeaLifeBase in support of CMSY	MLD Palomares
11:00-12:30	Hands on	Prepare CMSY data files	MLD Palomares
12:30-13:30	LUNCH		
13:30-15:30	Hands on	CMSY analyses	Participants with help of <i>Sea Around Us</i>
15:30-15:45	COFFEE		
15:45-17:00	Hands on	CMSY analyses	Participants with help of <i>Sea Around Us</i>
17:00-18:00	Writing	Prepare reports of CMSY analyses	Participants

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25 September	Activity	Description	Resource
9:00-10:00	Forum	Discussion on errors encountered in LBB and CMSY analyses	D Pauly, MLD Palomares
10:00-10:15	COFFEE		
10:15-12:30	Hands on	Continuation of LBB/CMSY analyses	Participants with help of <i>Sea Around Us</i>
12:30-13:30	LUNCH		
13:30-15:30	Hands on	Continuation of LBB/CMSY analyses	Participants with help of <i>Sea Around Us</i>
15:30-15:45	COFFEE		
15:45-18:30	Writing	Prepare work group PowerPoint presentations	Participants

26 September	Activity	Description	Resource
9:00-10:00	Presentations	Work group presentations	Participants
10:00-10:15	COFFEE		
10:15-12:30	Presentations	Work group presentations	Participants
12:30-13:30	LUNCH		
13:30-15:30	Writing	Finalize work group reports	Participants
15:30-15:45	COFFEE		
15:45-18:00	Writing	Finalize work group reports	Participants

27 September	Activité	Description	Resource
9:00-10:00	Writing	Finalize work group reports	Participants
10:00-10:15	COFFEE		
10:15-12:30	Closing	CSRP	TBD
12:30-13:30	LUNCH		
		Afternoon free for discussions if needed	