

## Reply to comments for Discussion Paper 2012-64

We greatly appreciate the time devoted to reading and commenting our MS from two invited readers and one anonymous reviewer. Here, we present our reply. Page numbers refer to the latest version.

### Reviewer (anonymous):

#### General comments:

1) We tried to link the sections of the text in a coherent way, including the results shown in Table 1, in a conceptual framework as suggested (see below point 3).

2) The discussion on the link between food security and adaptation was deepened in Discussion by adding a new section: "4.2 Adaptation actions and food security". We adapted a conceptual framework as suggested, we broaden our literature review, and improved the information on food security and climate change adaptation in Mexico (pp. 19-22).

3) We have chosen the conceptual framework proposed by Eisenack and Stecker (2012 *Mitigation and Adaptation Strategies for Global Change* 17 (3): 243-260. DOI: 10.1007/s11027-011-9323-9), since it deals with adaptation actions, and has a stronger emphasis on actors, institutions and barriers to adaptation. Furthermore, it is compatible with the concepts and definitions of the Intergovernmental Panel on Climate Change. We reckon that dealing with both economic impacts and food security implications in the Mexican fisheries sector is a suitable subject of analysis under such a framework.

4) The whole text was proof-read by a native English speaker (J. Schoeder), who is listed in the acknowledgements section (p.23).

#### Specific comments:

1) The reasons for choosing shrimp and sardines for our analysis are given in p. 6.

2a) In p. 7 we state that we used yearly data.

2b) We point out the data sources of average rainfall in pp. 7-8. Furthermore, the variable RAINFALL was not statistically significant in our models and therefore, it is not shown in Table 1.

3a) In Table 1 (p. 12) we report the ordinary least squares (OLS), the generalized least squares (GLS) and the generalized moments method (GMM) estimates for comparison purposes. Nevertheless, in econometrics, it is widely known that in the presence of persistence (i.e. lags), the most robust estimator in a dynamic panel is the GMM estimator, since it is unbiased and consistent (Greene, W.H. 2000. *Econometric Analysis*. New Jersey: Prentice Hall).

3b) In Appendix B we show the Variance Inflation Factors (VIF) for the Mexican shrimp and sardine fishery models. The OLS model does not present multicollinearity since the VIF test values were 1.54 for the sardine model and 1.39 for the shrimp model.

3c) A cost or profit function would be difficult to apply due to the lack of time series on variable cost data. We added in our discussion that "... we are aware that a welfare measure (e.g. resource rent), rather than Net Present Value of landings value, is better for analyzing economic impacts of [climate change] in fisheries (Sumaila et al. 2011, *Nature Climate Change* 1: 449-456. DOI: 10.1038/NCLIMATE1301). Nevertheless, Net Present Value of gross profits is an accepted measure for linking [climate change] impacts to fisheries production (e.g. Rocha et al. 2013, *Regional Environmental Change* (in press). DOI 10.1007/s10113-013-0466-y; Lam et al. 2013, *African Journal of Marine Science* 34 (1): 103-117. <http://dx.doi.org/10.2989/1814232X.2012.673294>)..."

Finally, as suggested, we performed a sensitivity analysis in order to include changes in price and in resource availability. Hence, a total of 816 scenarios were run: two species in 17 provinces for an upper and lower bound of temperature change, under 1% and 4% discount rates, assuming constant, upper and lower bounds of price changes, and assuming a constant and ten-year average resource biomass fluctuation. We explain scenario construction in detail in a new section ("3.4. Scenarios analysis") included in Methodology (pp. 10-11).

4a) In order to include an over-exploitation component in our sensitivity analysis, we decided to construct scenarios for stock availability for each province. Hence, we calculated the catch per unit of effort (CPUE) percent change for both shrimp and sardine fisheries in 2000 and 2009 for each province. This percentage (either negative or positive) was used as an indicator of resource biomass fluctuation, as a way to test over-exploitation effects. Changes in capital were not considered because we assumed that fishing fleets, although an input factor of production, respond in the mid and long term to fish stock dynamics. With respect to financing, we assumed that it results from institutional arrangements (i.e. poor-management) which rather respond to fish stock availability. Instead, we reckoned that generating price scenarios would indicate an exogenous source of variation to profits.

5a) Indeed, assuming non-constant prices was necessary for having a more robust analysis. In order to modeling the price scenarios, we computed the price percent change of the last ten years with the deflated 2000 price and the current 2009 price for each province. We used the negative and positive values of this percentage as lower and upper bounds of price changes, respectively.

6a-b) Please see point 2 of general comments above.