



Multi-site fishery models with price variation depending on demand and supply

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Reçu le 09/12/2014; publié le 15/05/2015

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Abstract

We present multi-site stock-fishing effort models. Different sites can correspond to fishing areas, fish aggregating devices (FAD) or still marine protected areas (MPA). We study effects of price variation, due to demand and supply, on the global dynamics of the fishery. In a first case, we consider a linear decreasing demand function of price. We show that in the linear case, we can have multi-stability, i.e. existence of two strictly positive and stable equilibria associated with different markets and prices. In a second case, we consider a non-linear demand function of price. A non-linear demand function allows us to maintain a small demand even when the resource price is high. We show that, in the non-linear case, a stable equilibrium can be found for which the resource goes extinct at a constant fishing effort with booming price. To end, we apply our model to the case of a commercial species, the “thiof” in Senegal, for which it is observed that the catch is drastically decreasing with a booming market price. We show that the obtained results using our model are in qualitative agreement with observed data.



Commission Sous-Régionale des Pêches
Sub-Regional Fisheries Commission



Book of Abstract International Conference ICAWA 2014

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Ecosystem Approach
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Trilateral German-French-African research initiative

ISBN :978-2-9553602-0-1

Edited by:

Patrice Brehmer (IRD) & Hamady Diop (SRFC/CSRP)

With the collaboration of:

Marie Madeleine Gomez, Ndague Diogoul, Viviane Koutob, Peter Brandt, Bamol Ali Sow, Alban Lazar, Xavier Capet, Heino Fock, Carlos F. Santos, Eric Machu, Hamet Diadihou, Didier Jouffre, Ibrahima Diallo, Joern Schmidt, Amadou Gaye, Mahfoudhould Taleb Sidi, Yves Gouriou, Rafael Almar, Moussa Sall, Dominique Duval Diop, Modou Thiow, Ross Wanless, Jacob Gonzales-Solis Bou, Ibrahima Ly, Dienaba Beye Traoré, Marie Bonnin, Werner Ekau.

ISBN: 978-2-9553602-0-0

SRFC/CSRP – IRD ©2015

Cover design: AWA (BMBF – IRD) project

Logo and flyers: Laurent Corsini (IRD)

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