

**Methods for social-ecological systems analysis:
small-scale fisheries and climate change
Syllabus**

ESM 296-4F

Instructor: Erendira Aceves-Bueno

Sept 28 – Dec 7, 2017

TH: 12:30-1:45

Bren Hall 1424, UC Santa Barbara

Course Description

The appropriate design of resources management institutions requires a holistic perspective that considers the synergies between ecological and social dynamics. Thus, in recent years, the concept of “social-ecological systems” has gained interest, facilitating decision making with this integrative approach. This course will introduce students to the theory behind social-ecological systems science and the tools most commonly used in their analysis. Through a class project, the students will be able to analyze real case studies and expand their analytical skillset. The final goal of the class is the creation joint peer reviewed publication.

The class will provide a brief introduction to the theory behind the existent social-ecological system frameworks, co-management and cooperatives through lectures and discussions. Through examining current theories around resilience and adaptation of social-ecological systems to climate change, students will also become familiar with key literature in the topic and insight from case studies.

Class Project

Using existing climate change vulnerability indices (Mcclanahan et al. 2008, Cinner et al. 2012) we will analyze the capacity of artisanal fishing cooperatives to adapt to climate change. The data to be used in this analysis was collected by Ovando et al. 2013.

Class Schedule

Session 1: 09/28

- a) Presentation of the class and project
- b) The tragedy of the commons

Required readings:

- Hardin, G. 1968. The Tragedy of the Commons. Science, New Series, Vol. 162, No. 3859 (Dec. 13, 1968), pp. 1243-1248 (<http://www.jstor.org/stable/1724745>)

Session 2: 10/5

- c) Governing the commons
- d) The social-ecological systems framework

Required readings

- Basurto X, Gelcich S, Ostrom E (2013) The social-ecological system framework as a knowledge classificatory system for benthic small-scale fisheries. *Glob Environ Chang* 23:1366–1380
- Ostrom E (2009) A general framework for analyzing sustainability of social-ecological systems. *Science* (80-) 325:419–422

Suggested readings

- Ostrom E (2000) Collective Action and the Evolution of Social Norms. *J Econ Perspect* 14:137–158
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge [England] ; New York: Cambridge University Press

Session 3: 10/12

- e) Co-management
- f) Local traditional management systems
- g) TURFs and Cooperatives

Required readings

- Berkes, Fikret. Evolution of co-management: role of knowledge generation, bridging organizations and social learning. *Journal of environmental management* 90.5 (2009): 1692-1702.
- Carlsson, Lars, and Fikret Berkes. Co-management: concepts and methodological implications. *Journal of environmental management* 75.1 (2005): 65-76.
- Wilen JE, Cancino J, Uchida H (2012) The economics of territorial use rights fisheries, or turfs. *Rev Environ Econ Policy* 6:237–257

Suggested readings

- Ovando D, Deacon RT, Lester SE, Costello C, Leuvan T Van, McIlwain K, Kent Strauss C, Arbuckle M, Fujita R, Gelcich S, Uchida H (2013) Conservation incentives and collective choices in cooperative fisheries. *Mar Policy* 37:132–140
- Deacon RT (2012) Fishery Management by Harvester Cooperatives. *Rev Environ Econ Policy* 6:258–277

Session 4: 10/19

- h) Climate change and fisheries.
- i) Climate change and artisanal fisheries: Challenges and opportunities

Required readings

- Allison, E. H., Perry, A. L., Badjeck, M. C., Neil Adger, W., Brown, K., Conway, D., & Dulvy, N. K. (2009). Vulnerability of national economies to the impacts of climate change on fisheries. *Fish and fisheries*, 10(2), 173-196.

Suggested readings

- Cheung, W. W., Lam, V. W., Sarmiento, J. L., Kearney, K., Watson, R. E. G., Zeller, D., & Pauly, D. (2010). Large-scale redistribution of maximum fisheries catch potential in the global ocean under climate change. *Global Change Biology*, 16(1), 24-35.
- Sumaila, U. R., Cheung, W. W., Lam, V. W., Pauly, D., & Herrick, S. (2011). Climate change impacts on the biophysics and economics of world fisheries. *Nature climate change*, 1(9), 449.

Session 5: 10/26

- j) Resilience, adaptation and adaptive capacity

Required readings

- Adger WN (2009) Social Capital, Collective Action, and Adaptation to Climate Change. *Econ Geogr* 79:387–404

Suggested readings:

- Cinner JE, McClanahan TR, Graham NAJ, Daw TM, Maina J, Stead SM, Wamukota A, Brown K, Bodin O (2012) Vulnerability of coastal communities to key impacts of climate change on coral reef fisheries. *Glob Environ Chang* 22:12–20
- McClanahan TR, Cinner JE, Maina J, Graham NAJ, Daw TM, Stead SM, Wamukota A (2008) Conservation action in a changing climate. *Conserv Lett*

Session 5: 11/2

- a) Case studies of cooperatives in Latin America
- b) Discussion of the final projects. Tasks will be assigned for the peer reviewed publication

Required readings:

- Defeo O, Castrejón M, Pérez-Castañeda R, Castilla JC, Gutiérrez NL, Essington TE, Folke C (2016) Co-management in Latin American small-scale shellfisheries: Assessment from long-term case studies. *Fish Fish* 17:176–192

Suggested readings:

- McCay BJ, Micheli F, Ponce-díaz G, Murray G, Shester G, Ramirez-sanchez S, Weisman W (2014) Cooperatives, concessions, and co-management on the Pacific coast of Mexico. *Mar Policy*
- Gelcich S, Hughes TP, Olsson P, Folke C, Defeo O, Fernández M, Foale S, Gunderson LH, Rodríguez-Sickert C, Scheffer M, Steneck RS, Castilla JC (2010) Navigating transformations in governance of Chilean marine coastal resources. *Proc Natl Acad Sci U S A* 107:16794–9
- Castilla J., Defeo O (2001) Latin American benthic shellfishes: emphasis on co-management and experimental practices. *Rev Fish Biol Fish* 11:1–30

Sessions 7,8,9: 11/3,16 and 30

- a) Development of the class project

Sessions 10: 12/07

- a) Class conclusion and next steps