



Editorial: Small-Scale and Artisanal Fisheries: Insights and Approaches for Improved Governance and Management in a Globalized Context

Beatrice I. Crona^{1,2*}, Robert S. Pomeroy³ and Steven W. Purcell^{4*}

¹ Global Economic Dynamics and the Biosphere, Royal Swedish Academy of Sciences, Stockholm, Sweden, ² Stockholm Resilience Center, Stockholm University, Stockholm, Sweden, ³ Connecticut Sea Grant, University of Connecticut, Groton, CT, United States, ⁴ National Marine Science Centre, Southern Cross University, Coffs Harbour, NSW, Australia

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Editorial on the Research Topic

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INTRODUCTION

Small-scale fisheries (SSFs) make important but often poorly quantified contributions to national and regional economies, to local food security and nutrition of millions of people. As such they provide an important lever for achieving the UN Sustainable Development Goals, particularly in rural areas. The dynamics that drive SSFs and their observed social, economic and environmental outcomes tend to be a complex mix of endogenous factors, such as over-fishing and conflict over resources, and external pressures such as climate change and international demand for seafood.

As a generalization, small-scale and artisanal fishers suffer from poorly defined rights to marine resources, which can negatively affect conservation incentives. They are often (but not always) among the poorest and most marginalized parts of society and are generally poorly represented in national and international policy fora. However, poorly defined access rights are only part of a complex puzzle of diverse fishing practices and often weak governance structures to regulate them. As shown by Smith and Basurto, many countries display weak political will to engage comprehensively with SSFs. Weak community institutions and sparse data availability often further undermine the capacity for assessment and management. Past failures to address these issues have had significant social consequences and have affected livelihoods, increased vulnerability to poverty, and meant less availability of fish protein per capita. New and improved ways of understanding, analyzing and governing and SSFs are therefore still in demand, in order to allow SSFs to become the lever for sustainable contribution the SDGs it ought to be.

A growing number of studies have shown the importance of broadening policy and academic inquiry to include the entire value chain, as many drivers of exploitation are channeled through and influenced by market structures and market actors (Brewer et al., 2009; Crona et al., 2010, 2016; Cinner et al., 2016; Purcell et al., 2017; Drury O'Neill et al., 2019). Sustaining marine resources and fisheries livelihoods therefore demands consideration of the interactions between ecosystems, small-scale fishing, and the domestic and international seafood markets. Institutional contexts of SSFs also play an important role in resource sustainability, yet successful fisheries governance remains a challenge. In this Research Topic we therefore bring together a broad selection of papers that, in different ways, shed new light on these challenges and how to address them.

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Maria Lourdes D. Palomares,
University of British Columbia, Canada

*Correspondence:

Beatrice I. Crona
beatrice.crona@kva.se
Steven W. Purcell
steven.purcell@scu.edu.au

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RECOGNIZING THAT SSFS ARE EMBEDDED WITHIN GLOBAL MARKETS

One set of papers in this Research Topic heeds the call to explore new approaches, concepts, and methods including the under-examined market connections between small-scale fisheries and global markets, ecosystem-based management and diagnosing and monitoring fisheries. Several of the papers highlight the complexity of SSF value chains—which in fact are better portrayed as networks than chains (Drury O’Neill et al.; Smith and Basurto). These papers point to the importance of describing the relations of fishers and intermediary traders to better understand and predict the behavior of market actors, and thus both social and ecological outcomes.

Stoll et al. show that a similar complexity exists even at the scale of trading nations. Their analysis of lobster trade highlights how the existence of a diverse set of intermediary trading nations for lobster is creating a false sense of trade diversification among lobster producers, which in turn masks increased dependencies on a reduced number of end-markets, particularly in Asia. Using the lobster trade as a case, they outline a method for making explicit the vulnerabilities that face many SSF participating in global markets, and which stem in part from “teleconnectivity” among local SSF created through seafood trade routes.

DIAGNOSIS AND MANAGEMENT OF SMALL-SCALE FISHERIES

A multitude of new approaches and tools are emerging for diagnosing and monitoring SSFs and associated value chains. Some build on existing concepts and ideas, while others are the result of cross-pollination and the introduction and deployment of experimental and modeling approaches from other disciplines, for the benefit of improved SSF governance.

Lindkvist et al. review agent-based modeling (ABM) in fisheries and show how it has been used as a research tool for understanding cooperation and over-harvesting, as a decision-support tool, or as a participatory tool. While ABM is a resource-intensive endeavor, the simple structural design of agent-based models allows stakeholders, experts, and scientists across disciplines and sectors to reconcile different knowledge bases, assumptions, and goals. As such, ABM can aid the development and testing of new policies and management strategies.

Drury O’Neill et al. show how behavioral economic experiments can be used to test hypotheses about causality within fisheries markets that are hard to examine from purely empirical enquiry. Behavioral economic experiments have not been widely used to understand SSFs. Such tools might uncover gaps in our understanding of human behavior in fisheries, and can be used to test whether “conventional truths” of fishers’ responses might need to be challenged in order to achieve truly sustainable governance strategies.

Just like agent-based models and economic experiments, behavioral science is a field not extensively linked to fisheries research. Yet behavioral science can contribute to improved understanding and management of SSFs. In this regard,

Battista et al. trace the drivers of illegal fishing and review how behavioral science can inform interventions to combat this prevalent phenomenon. Once the norms and beliefs of fishers are understood, actions can be taken to correct beliefs (e.g., perceived illegitimacy of regulations) and address drivers of illegal fishing.

The multi-species, multi-gear, and data-poor nature of SSF makes implementation of traditional single-species management approaches (e.g., catch quotas) challenging and insufficient. Herrón et al. therefore propose indicators (taxonomic, sized-based, functional, conservation) to be used in evaluations of multi-gear and multi-species SSFs in tropical coastal areas. These can help to understand ecological impacts of different fishing gears and contribute to ecosystem-based fisheries management. The multispecies and multi-gear nature of SSFs also make their diagnoses and management difficult. Purcell et al. assess geographic and gendered variation in catches and gear use in a tropical multispecies SSF. Their novel graphical techniques for visualizing such trends across a fishery can inform the planning of regulatory measures and fishery development initiatives.

Local ecological knowledge (LEK) is broadly considered the body of knowledge built up by a group of people through generations of living in close contact with nature. Berkström et al. assess fishers’ LEK on connectivity between multiple habitats within a tropical seascape, differences in LEK among fisher groups, and the coherence between LEK and conventional scientific knowledge (CSK). The study highlights benefits of LEK as complementary information in the management of SSFs.

Finally, trophic models of the Ecopath with Ecosim (EwE) type and Local Ecological Knowledge (LEK), have been widely applied for fisheries assessment and management. However, no specific methodologies describe how (LEK) from local fishers can be incorporated in the models. Sánchez-Jiménez et al. aims to do this and present a systematic integration of LEK with EwE modeled output. They demonstrate how integrating knowledge systems can enhance understanding of the state and changes in ecosystems, helping to improve fisheries management. EwE models can also contribute in communication between managers and fishers, promoting discussion and engagement.

NEW APPROACHES AND PARADIGMS FOR SSF GOVERNANCE

A couple of papers in this special issue also explore key challenges and new approaches in the governance of SSFs. Co-management has long been advocated, yet is still not a dominant paradigm within SSF governance. As such, it is still finding new places of adoption and new ways of being used. Tilley et al. examine the adoption of community-based resource management (CBRM) in Timor-Leste and show the effectiveness of co-management in engaging communities in resource management. However, their analysis also shows the risk of a monolithic, narrow interpretation of CBRM (in fact, no-take zones) becoming the norm. They highlight a need for guiding principles to ensure a diverse contextualized implementation of management strategies, as well as legitimate community engagement.

de la Torre-Castro highlights that inclusion of both genders in the management process is needed and better inclusion of women in fisheries management can foster new solutions. Achieving the SDGs goals of gender equality while also ensuring conservation of life below water requires management approaches that consciously and explicitly consider gender and diversity of actors (de la Torre-Castro; Biswas, 2017). In a similar vein Cohen et al. elaborate on the importance of conceptualizing a just space for SSFs in the blue economy. Their proposed “just space” explicitly accounts for the voices, interests, and human rights of both women and men who service, fish and trade from SSFs. Accordingly, a balance must be struck between artisanal livelihoods, industrial-scale fishing and conservation of fishery

resources through the consideration of both ecological and social objectives.

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REFERENCES

- Biswas, N. (2017). *Towards Gender-Equitable Small-Scale Fisheries Governance and Development: A Handbook*. Rome: FAO. doi: 10.18356/e999fb85-en
- Brewer, T. D., Cinner, J. E., Green, A., and Pandolfi, J. M. (2009). Thresholds and multiple scale interaction of environment, resource use, and market proximity on reef fishery resources in the Solomon Islands. *Biol. Conserv.* 142, 1797–1807. doi: 10.1016/j.biocon.2009.03.021
- Cinner, J. E., Huchery, C., MacNeil, M. A., Graham, N. A., McClanahan, T. R., Maina, J., et al. (2016). Bright spots among the world's coral reefs. *Nature* 535, 416–419. doi: 10.1038/nature18607
- Crona, B., Nyström, M., Folke, C., and Jiddawi, N. (2010). Middlemen, a critical social-ecological link in coastal communities of Kenya and Zanzibar. *Mar. Policy* 34, 761–771. doi: 10.1016/j.marpol.2010.01.023
- Crona, B. I., Basurto, X., Squires, D., Gelcich, S., Daw, T. M., Khan, A., et al. (2016). Towards a typology of interactions between small-scale fisheries and global seafood trade. *Mar. Policy* 65, 1–10. doi: 10.1016/j.marpol.2015.11.016
- Drury O'Neill, E., Crona, B., Ferrer, A. J. G., and Pomeroy, R. (2019). From typhoons to traders: the role of patron-client relations in mediating fishery responses to natural disasters. *Environ. Res. Lett.* 14:045015. doi: 10.1088/1748-9326/ab0b57
- Purcell, S. W., Crona, B. I., Lalavanua, W., and Eriksson, H. (2017). Distribution of economic returns in small-scale fisheries for international markets: a value-chain analysis. *Mar. Policy* 86, 9–16. doi: 10.1016/j.marpol.2017.09.001

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