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Economics of Marine Resources in the Global South—Meeting the Challenge of Agenda 2030

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ABSTRACT
In this introduction to the special issue, "Economics of Marine Resources in the Global South," we address the current challenges for sustainable management of aquaculture and capture fisheries in developing and transitional countries. We note that the collective action problem remains a major challenge for capture fisheries in the Global South. While aquaculture has been a fast-moving food sector for half a century and provides disadvantaged people in the Global South with low-cost, high-quality protein, negative externalities remain an industry-wide challenge. We provide a background to aquaculture and fisheries economics relevant for the Global South, using the six articles contained in this issue as a point of departure to discuss six of the ten targets that are formulated in connection with the United Nation's Sustainable Development Goal 14 (SDG14): *Conserve and sustainably use the oceans, seas and marine resources.* Bringing together the challenges of meeting SDG14 and the contributions of this special issue, we discuss an agenda for future research for those interested in the economics analysis of fisheries and aquaculture relevant to the Global South context.

Key words: Agenda 2030, aquaculture, capture fisheries, Global South, sustainable development goals.

JEL codes: Q01, Q22, Q57.

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INTRODUCTION

About 60 million people around the globe are engaged in the primary sector of fisheries and aquaculture; almost two thirds in fisheries and more than a third in aquaculture (FAO, 2020). Less than one percent of them are found in Europe, and a vast majority consists of small-scale artisanal fishers and aquaculture workers in the Global South.[1] Seafood contributed to 17 percent of the global population's intake of animal protein during 2017 (FAO, 2020). Seafood exports from developing countries amounted to USD 88 billion in 2018, and their net fish export revenues (exports minus imports) reached USD 38 billion, which is higher than the combined value of other agricultural commodities like meat, tobacco, rice, and sugar. Trade in seafood and seafood products constitutes an important source of export revenue and is an important contributor to economic growth in developing countries (FAO, 2020). Considering their importance, it is natural to give specific attention to sustainable fisheries and aquaculture in the Global South.

Many of the challenges facing the sustainable management of capture fisheries and aquaculture in the Global South are unique to those encountered in the Global North. For example, several countries of the Global South have failed to solve the collective action fisheries problem; in turn, they have made little to no investment in fisheries management, lack scientifically assessed fish stocks, and are primarily governed by open-access institutions. As a result, opposite to the situation in the Global North, numerous fish stocks in the Global South are overfished and/or severely depleted (Hilborn et al., 2020). To make matters worse, many coastal populations in the Global South have low income and rely on these fish stocks for food security, income, and employment. Moving away from open-access fisheries is thus the most needed reform for many developing countries. Notably, recent work indicates that moving away from open-access fisheries not only improves economic outcomes, but also ecological and social outcomes of fisheries (Asche et al., 2018). However, given that a lot of countries in

the Global South lack conditions that promote long-term solutions to the collective action problem, including weak traditions of property rights and/or inability to defend resource access against encroachment from outsiders, the challenge of reforming open-access institutions and rebuilding fish stocks in the Global South is daunting (Ostrom, 2000; Wilen, 2013; Chávez et al., 2018).

Aquaculture, with an average growth rate of 8 percent, has been the fastest-growing food sector in the last five decades. In 2018, aquaculture accounted for 46 percent of seafood production and 52 percent of fish for human consumption globally (FAO, 2020). The largest aquaculture producing nations: China, Indonesia, India, Vietnam, Philippines, and Bangladesh, are all low- or medium-income Asian countries. Initially, the rapid growth of aquaculture generated concern that capture fishery stocks used as feed would be depleted, that negative ecological externalities (e.g., deteriorated water quality, disease spillovers, wild/domesticated genetic interactions, and overuse of antibiotics) would escalate, and that aquaculture would reduce supply for poor people in low-income countries (Naylor et al. 2000; Naylor et al., 2009; Naylor et al., 2021). More recent work, however, shows that the so-called fish meal trap does not exist (Smith et al., forthcoming), that aquaculture has had less negative impact on the environment than previously projected (Naylor et al., 2021), and that aquaculture often helps the very poorest in developing countries by supplying protein at low cost (Belton et al., 2018). Still, various externality problems persist in aquaculture development, particularly in the Global South. For example, handling various diseases is still an industry-wide sustainability task, as is restoration of depleted mangroves following shrimp aquaculture expansion. The effects of climate change on aquaculture remain uncertain and difficult to validate, but the negative effects may be most severe in the tropics. As often with resource management, low-income countries and poorly developed institutions make those challenges harder to handle.

This special issue of *Marine Resource Economics* is devoted to articles pertaining to the Economics of Marine Resources in the Global South. The articles contained herein address current challenges for sustainable management of aquaculture and capture fisheries in the Global South, and points to important directions for future research. The issue is an initiative by the Environment for Development (EfD) Global Hub at University of Gothenburg. EfD is a global network, supported by the Swedish International Development Cooperation Agency (Sida), of environmental economics research centers aiming at effective management of the environment in the Global South. Many of the contributing researchers have already collaborated within EfD, and it is our hope that this issue will further spur interaction between researchers in the North and the South on marine research projects with a particular focus on problems and challenges in the South.

This introduction to the special issue provides background and motivation for research on the economics of marine resources in the Global South, and links some of the challenges for sustainable management of aquaculture and capture fisheries to the United Nation's Sustainable Development Goal 14 (SDG 14). The rest of this article is organized in the following manner. We first highlight the SDG 14 targets and link them to the articles presented herein. We then provide an overview of the six articles that comprise this issue. Lastly, we discuss potential future research directions and offer some concluding remarks.

SUSTAINABLE DEVELOPMENT GOALS AND AGENDA 2030

The Brundtland Report (Brundtland et al., 1987) generated considerable interest in sustainable development and brought about various initiatives, including the World Bank's triple bottom line, which focused on the three pillars of sustainability: economic, social, and environment. To further strengthen previous ambitions, all UN Member States in 2015 adopted 17 Sustainable Development Goals (SDGs) as part of the 2030 Agenda for Sustainable

Development, which set out a 15-year plan to achieve the Goals (UN, 2021b). SDG 14 is of particular interest to countries of the Global South and aims to *Conserve and sustainably use the oceans, seas and marine resources*. Linked to SDG 14 are ten different targets. We note that while three of the targets are completely focused on capture fisheries, aquaculture is mentioned only once.[2] Hence, even though future increases in seafood production will almost solely be delivered from aquaculture, it is not accurately reflected by the targets. Overall, there are six targets that are highly relevant for the articles in this issue. Below we list the six targets, link them to the articles in this issue, and discuss research areas connected to the targets.

SUSTAINABLE FISHING

The conservation and sustainable use of the oceans, seas, and marine resources for sustainable development is a critical target of the UN SDGs. A critical component of sustainable fishing is the ability to limit and enforce resource access to control exploitation, which requires the establishment of some form of property right—either private or common property (Ostrom, 1990, 2000). However, as previously discussed, fisheries in the Global South are most often characterized by open access, stock assessments are almost nonexistent, and many fish stocks are overfished and/or severely depleted (Costello and Ovando, 2019; FAO, 2020; Hilborn et al., 2020). Indeed, 77 percent of the estimated USD 83 billion (2012) in global economic losses from overfishing are attributable to fish stocks in the regions of African and Asia (World Bank, 2017). Overfishing is further exacerbated by illegal, unreported, and unregulated (IUU) fishing, which remains widespread in several regions of the Global South (Agnew et al., 2009; Sumaila et al., 2020). In this issue, Vélez et al. (2021) address overfishing due to non-compliance using a novel lab-in-the-field experiment,[3] and demonstrate that unconventional tools have the potential to improve compliance, even in the presence of weak institutions and imperfect enforcement.

CONSERVE COASTAL AND MARINE AREAS

The conservation of coastal and marine areas is another target of SDG 14, with the goal of conserving at least 10 percent of coastal and marine areas. Current estimates hold that 2.7 percent of global ocean area is fully protected and another 3.7 percent is in implemented but less protected zones (Marine Protected Atlas, 2020) Marine protected areas (MPAs), which place limits on human activity in a defined geographic area of the ocean, are among the primary tools for conserving coastal and marine areas. The potential long-term benefits of MPAs, such as the protection of habitat and vulnerable species, in addition to the spillover effects of rebuilt stocks, are well known (e.g., Gaines et al., 2010). However, MPAs also have the potential to be costly in the short-run by displacing fishers from productive fishing grounds (Reimer and Haynie, 2018), making their creation controversial (Smith et al., 2010). This is especially true in low- and middle-income countries of the Global South, where any such displacement can be particularly harmful to coastal populations that rely on small-scale and nearshore fisheries as their primary source of income, employment, and nutrition (World Bank, 2012). Despite this, MPAs are increasingly being used for conservation purposes in historically important fishing areas for small-scale and nearshore fisheries (Di Franco et al., 2016). The potential tradeoff between conservation and socioeconomic objectives thus makes the implementation of MPAs in such areas a contentious matter. In this issue, Albers et al. (2021b) demonstrate the potential for implementing MPAs alongside other aspatial policies, such as license restrictions and onshore wage policies, in ways that avoid conflict between conservation and socioeconomic objectives.

END SUBSIDIES CONTRIBUTING TO OVERFISHING

Fishery subsidies are widely recognized to contribute to overcapacity and overfishing. Despite this, it is estimated that USD 35 billion (2018) in subsidies were granted to fisheries worldwide, 22 billion of which were deemed as capacity enhancing (Sumaila et al., 2019). This is particularly concerning given their potential to incentivize distant-water fishing fleets (Cao et al., 2017), which are known to contribute to IUU fishing (Belhabib et al., 2015). Despite these concerns, governments in the Global South continue to use fisheries subsidies as a means to increase catches and revenues in the short run by facilitating the exploitation of fisheries that are relatively underdeveloped. Indeed, Asia is the primary contributor of fisheries subsidies globally, with China being the country with both the most fishery subsidies and the largest distant-water fishing fleet in the world (Sala et al., 2018; Sumaila et al., 2019). In this issue, Pham et al. (2021) investigate the impacts of fisheries subsidies on fishing capacity through an empirical evaluation of a Vietnamese subsidy scheme, finding evidence of a growing fleet of larger vessels fishing offshore in disputed territories.

INCREASE THE ECONOMIC BENEFITS FROM SUSTAINABLE USE OF MARINE RESOURCES

Another target of the UN's SDG 14 is to increase economic benefits from the sustainable use of marine resources. Traditionally, economic benefits to coastal populations in developing countries were primarily derived from nearshore capture fisheries. However, given the need for improved management in a lot of regions in the Global South, in addition to the general trend of stagnating catches from capture fisheries worldwide in recent decades, the prospects for future expansion of economic benefits from capture fisheries are low.[4] The recent expansion in aquaculture, which now represents 46 percent of global fish production (FAO, 2020), has highlighted the potential for increasing economic benefits derived from marine resources, and to address food security challenges more broadly, through the creation/expansion of

aquaculture opportunities (Smith et al., forthcoming). In particular, small-scale aquaculture development offers the possibility for the conversion of fishers into aquaculture workers. An important question is thus whether fishers are willing to substitute aquaculture activities for fishing. To date, this question has received very little attention in the literature. In this issue, Albers et al. (2021a) conduct an empirical investigation of income-generating activity choices of coastal populations in southern Chile and evaluate hypothetical policies aimed at increasing income through small-scale aquaculture. They find that such policies present challenges for inducing fishers to undertake aquaculture opportunities. Identifying requisites and restrictions for successful expansion of sustainable aquaculture as a base for economic activities and wellbeing of coastal communities is thus needed.

SUPPORT SMALL-SCALE FISHERS

Of the estimated 39 million people engaged in the primary sector of capture fisheries in 2018, most are small-scale and artisanal fishers in developing countries, many of whom rely on marine resources for food security, income, and employment (FAO, 2020). Providing continued access to marine resources for small-scale artisanal fishers is thus another target of the UN's SDG 14. Small-scale fishers face several challenges, including declining and/or migrating fish stocks (Oremus et al., 2020), competition from other fishing (e.g., foreign industrial fleets), and non-fishing (e.g., offshore energy, tourism) sectors, and few alternative income and employment opportunities (FAO, 2015). In this issue, Marco et al. (2021) study the iconic Queen conch fishery, which plays a cultural role in several Caribbean countries, has gone through boom-and-bust periods, and supports an important small-scale fishery. They identify a harvest strategy that would significantly improve economic and ecological outcomes for the fishery but would require management reforms that address the current poorly defined property rights.

IMPLEMENT AND ENFORCE INTERNATIONAL SEA LAW

The United Nations Convention on the Law of the Sea (UNCLOS) was accepted in 1982 and fully came into force in 1994 (Hilborn et al., 2020). UNCLOS meant that developing countries could be sovereign managers over all of their continental shelf, which in most cases lies inside the 200 nautical mile Extended Economic Zone (EEZ). It also provides for over 90 percent of global catches (Clark 1990). However, many developing countries do not have a capital-intensive fishing fleet to exploit fish resources available offshore. Instead, they often grant offshore fishing area access to foreign fleets with owners in, for example, the European Union and various Asian countries.[5] Such access fees may generate substantial income to governments in coastal countries, and in some cases provide 30–50 percent of the total government budget (Blomqvist et al., 2016). While government revenues are desirable, they may come at the expense of foreign fleet overfishing. Belhabib et al. (2015) claim that EU (1.6 million t/year) and China (2.3 million t/year) reported only 29 and 8 percent, respectively, of their estimated total catches from West African countries between 2000 and 2010. The practice of IUU fishing can have important implications for the domestic nearshore fisheries. For example, destructive fishing practices that cause habitat damage, the incidental catch of forage fish, and/or the harvesting of fish species that are targeted in the domestic nearshore fisheries, can have negative external impacts on the domestic nearshore fleet. In this issue, Akpalu (2021) uses a bioeconomic model to investigate the optimal management of a small-pelagic species that is targeted by both a domestic artisanal nearshore fleet and a foreign capital-intensive offshore fleet.

CONTRIBUTIONS IN THIS ISSUE

Motivated by the problem of overfishing due to non-compliance, Vélez et al. (2021) designed a lab-in-field common pool resource economic experiment to study individual behavior under different mechanisms intended to reduce over-exploitation of marine resources. Considering the results from a pilot study, Vélez et al. (2021) explore the effects of regrouping fishers to induce compliance. The purpose of regrouping is to signal more sustainable behavior and cooperation through targeting social expectations to change current accepted practices as violation of fishing regulations. Four new treatments were run in the field with Mexican fishers. The treatments include regrouping fishers based on: (1) ranking of extractors according the disclosure of information regarding harvesting levels in previous periods, (2) ranking of extractors based on the disclosure of information with noise, (3) ranking of extractors considering only fishers with a low level of extraction, and (4) ranking considering only fishers with a low level of extraction along with a high level of monitoring in that group as compared to other groups. The results of Vélez et al. (2021) suggest that regrouping reduces the aggregate level of harvest as compared with the baseline situation. Although regrouping did not eliminate illegal fishing, it increased quota compliance. Among the drivers of the observed changes on behavior, the authors discuss the role of group identity, conditional cooperation, and the establishment of social norms through changes in social expectations related to desired behavior. The result of this work suggests the possibility of using non-conventional tools to improve compliance in the presence of imperfect enforcement, weak institutions, and social norms that accept illegal behavior.

Albers et al. (2021b) investigate the role of MPAs and aspatial policies, such as taxes and gear restrictions, in achieving ecological and economic objectives for nearshore fisheries in low- and middle-income countries (LMICs). Governments can employ a suite of policies to manage nearshore fisheries and achieve development goals, such as subsidies, gear restrictions, and to a growing extent, MPAs (Di Franco et al., 2016). The effectiveness of MPAs in achieving

ecological and economic objectives has largely been assessed without consideration of how MPAs interact with other aspatial policies. Albers et al. (2021b) investigate settings in which aspatial policies can enhance the effectiveness of MPAs for improving both community income and fish stock levels. Using a spatially explicit bioeconomic framework, Albers et al. (2021b) model the labor allocations of local residents between onshore wage labor and fishing, and in turn, the fishing location choices of residents that choose to fish. Albers et al. (2021b) also model a manager's optimal site choice and enforcement level for an MPA, conditional on an enforcement budget. Their model produces steady-state predictions of labor allocations; fishing and MPA site choices; and community income, MPA enforcement, and fish stock levels, under a variety of different aspatial policies. Overall, model predictions suggest that combining MPAs with aspatial policies can improve both ecological and economic outcomes relative to what each policy or MPA can achieve on its own. These results have several important implications for addressing overfishing, rebuilding depleted fish stocks, and achieving community development goals. Most notably, Albers et al. (2021b) demonstrate that combining aspatial and MPA policies can lead to win-win outcomes, in contrast to tradeoffs between ecological and economic outcomes. The work by Albers et al. (2021b) thus supports the general findings of Asche et al. (2018) that ecological and economic goals are not necessarily in conflict, while also providing a mechanistic understanding of how spatial and aspatial policies can be designed to avoid such conflicts.

The work of Pham et al. (2021) empirically studies the effects of a subsidy scheme that reduces the fishers' cost of credit to build larger and more efficient vessels. The study considers a unique data set on the use of a subsidy intervention covering different fisheries and several fishery grounds in Vietnam. The analysis considers the potential impacts of subsidies on economic, social, and environmental conditions of fisheries. In particular, this contribution investigates the beneficiaries of the subsidy scheme, the causal impact of the subsidy on

vessels' profitability, and the possibility of overinvestment in capital in the subsidized vessels with potential long-run effects on sustainability of fishing activities. The results indicate that fishers who obtain the subsidies have been able to build larger vessels to fish offshore, increasing the presence of Vietnamese fishers in disputed territories and consequently helping to demonstrate sovereignty. The subsidy has increased the profitability of vessels, with distributional consequences as the greater positive impact observed for owners of larger vessels. Finally, the study also finds evidence of overinvestment in vessels, which may affect the sustainability of Vietnamese fisheries in the long run.

To investigate policies aimed at increasing incomes through small-scale aquaculture, Albers et al. (2021a) conduct an empirical study to determine the drivers of people's choice of income-generating activities and income levels in southern Chile. Considering a low propensity to relocate spatially to take advantage of income-improving opportunities, Albers et al. (2021a) estimate the probability that a household head chooses a particular set of activities and the determinants of household income as a function of the characteristics of the household, their main economic activity, and their location or biogeographic zone. The results indicate that the sets of productive activities chosen by households are diverse and vary across space. Many households undertake combinations of income-generating activities, leading to diversification of income sources. Biogeographic zones define the possible local activities and productivity, while user rights define the household's ability to be productive with particular activities. The analysis sheds light on some general issues facing the development of small-scale aquaculture as a coastal development tool or alternative source of income-generating activities in developing and transitional countries. For example, policies to promote small scale aquaculture may need to discriminate across space given both the role of biogeographic zones in determining activities and possible variation in social conditions. Moreover, the transition to new small-scale aquaculture activities may require creation and allocation of new marine

user rights, which should take in to consideration possible variation in marine resources productivity by location.

Marco et al. (2021) use a bioeconomic modeling approach to study the iconic Queen conch fishery in the Colombian part of the Caribbean Sea. Queen conch fisheries have a cultural role in several Caribbean countries. The meat is part of traditional cuisine, the characteristic shell is a standard tourist souvenir, and the pearls that rarely, but sometimes, develop from a grain of sand have been a boost to fisher income. Even though pearls are rare, they earn a high price, so that about 65 percent of the average income for a conch fisher comes from pearls. Fishing is still done by free diving fishers on shallow banks from canoes, which nowadays are equipped with an outboard motor. The Colombian conch fishery has gone through boom-and-bust periods. During the 1980s landings gradually increased and reached a peak around 800 metric tons by the late 1980s; they then drastically shrunk to almost zero in 2005 followed by a closure in 2006. The closure was in place for some years, but likely there were problems with unreported fishing. A reopening period followed, but low stock levels led to a second closure in 2013. This pattern is common for open-access fisheries where capital costs and opportunity costs of labor are low; any stock recovery will attract increased fishing effort. Currently only one area is open to fishing, while all other areas are closed. Marco et al. (2021) compare two fishing strategies. One is what they call status quo (SQ), which implies a conservation rule restricting harvesting to 8 percent of the total exploitable biomass. The other strategy is labelled as rotation management (RM) and means that harvesting is following a rotational harvesting scheme consisting of four-year closures and then 30 percent removal of the exploitable biomass in the fifth year. This would significantly improve economic as well as ecological results for the fishery. Such a scheme would require management reforms addressing the poorly defined property rights, and the authors suggest a TURF program along the lines of Christy (1982) and Wilen et al. (2012).

Akpalu (2021) looks at the optimization problem when a foreign capital-intensive fleet is fishing offshore, in this case for tuna, while the domestic coastal artisanal fleet is fishing in-shore for small pelagic species, in this case primarily anchovy. In this study, the link between the two fleets is direct as the tuna fleet is using anchovy as bait and there is fishing for anchovy more or less inshore in order to get bait for the tuna fishery; implying direct competition with the artisanal fleet. In addition, industrial fishing for anchovy may have negative external impacts on the ecosystem and the carrying capacity of the anchovy stock. In order to study the problem, Akpalu (2021) develops a bio-economic model and derives expressions for a Pigovian tax (a Warming landing tax[6]) to mitigate the congestion externality and ecosystem destruction, under some possible scenarios. He also links the model to a simulation using empirical data from Ghana fisheries. His results show that if tuna vessels are locally owned, and if bait fishing does not damage the ecosystem, the tax on baitfish catch should decrease in the social discount rate, all else equal. In case the tuna fleet is foreign owned, then an ad valorem tax can be employed to ensure that the tuna fisher does not run at a loss. The tax should be higher if the vessels employ destructive fishing techniques, but lower if the price of tuna or the cost of catching the baitfish or tuna increases, given that everything else is equal.

CONCLUDING REMARKS—FUTURE RESEARCH

There are several areas of future research on the economics of marine resources that are particularly relevant to the Global South in the context of the targets linked to the SDG14. The contributions to this special issue highlight some of them. The most significant and urgent policy reform for capture fisheries is still to move away from open access (Eggert and Sterner, 2020). Hence, exploring alternative instruments to manage fisheries in the context of weak institutions, lack of market development, and limited alternatives for employment and income-generating opportunities continue to be areas of future research worth pursuing. This could

perhaps include extending the conceptual, empirical, and experimental analysis of managing open-access fisheries using aspatial and spatial instruments. Are there new unconventional instruments available that are suitable for managing marine resources in the Global South? If so, how would one implement such instruments in this context? What are the distributional impacts of different policy options, and how would the presence of inequality affect the proper design and implementation of such policies?

Considering the expected expansion of aquaculture in the Global South, more analysis regarding people's potential responses to policies intended to incentivize development of this sector may shed light on the challenges and opportunities for sustainable development of aquaculture that improve the wellbeing of coastal communities. The potential impacts of externalities due to future expansion and pressure on coastal areas should also be addressed. How can policies be designed to generate new income opportunities that can also be adopted by residents in coastal areas? How would user rights and natural resource endowments affect the possibility of expanding aquaculture and the potential labor transition from fishers to aquaculture workers? How can current and future aquaculture expansion be governed to internalize potential environmental impacts? What type of social and economic support policies should be in place to facilitate labor transitions?

There is growing competition between various activities in coastal areas. These include capture fisheries and aquaculture, but also shipping, tourism, windmills and wind turbines, and other energy production systems, as well as traditional extractive activities, like mining. Hence, there is a need for more research including an economic perspective on marine spatial planning and how to operationalize a concept like Blue Growth. From the old fisheries problem of "Race to Catch," we now face the challenge of "Race for Space" (Smith el al., forthcoming).

Climate change, perhaps the largest market failure the world has seen (Stern, 2008), will have growing effects on marine resources. Increasing temperatures will likely have a negative effect

on tropical fisheries and marine protected areas' ability to preserve threatened habitats and species (Bruno et al., 2018). Ocean acidification following from carbon dioxide dissolving into oceans is another threat of particular concern to coral reefs and species with reefs as their habitat, although a recent article predicts less harmful effects than previous studies (Clark et al., 2020). Changes in environmental conditions, including water temperature, salinity, and dissolved oxygen, along with other threats, such as opportunities for invasive species movement, harmful algal blooms, and the spread of aquatic species diseases driven by climate change and climate variability, will likely affect the vulnerability of aquaculture activities in the Global South (see for example Soto et al. 2019). The economic analysis regarding the impacts of climate change and the exploration of policy options for adaptation in the Global South context are also part of the relevant ongoing and future research agenda.

Exploring the role of scientific assessment and development of monitoring technology that uses ecological and economic information is an area of valuable research for designing and implementing more efficient, sustainable management strategies for fisheries and aquaculture. Low-cost monitoring technology and scientific assessments are critical components for effective co-management of marine resources and aquatic environments under situations of incomplete enforcement of regulations and weak institutions. Moreover, the exploration of new methods for empirical analysis to improve inferences in order to support management and policy decisions in fisheries and aquaculture appears to also be an important area of future research.

The UN (2021a) projects that there will be almost 10 billion people on the planet by 2050, with a vast majority living in the Global South. Feeding the world is a Herculean task that creates great challenges in handling trade-offs, designing policies, and providing the right incentives. Aquaculture and capture fisheries will have a crucial function and resource economists have an essential role in analyzing and providing policy guidance in order to succeed.

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[1] The Global South refers to countries in Latin America, Africa and Asia, except for Russia, while the Global North includes North America, Europe, Israel, Australia, and New Zealand. The term now commonly replaces older terms like the "Third World" and "developing countries". Many of the countries within the Global South currently have relatively high income and are industrialized to a large extent, but we apply this rather broad definition, which includes both low- and medium-income countries. As many sources refer to "developing" for low-income countries, and "transitional" for medium income countries, we also use those terms interchangeably.
[2] Aquaculture is mentioned together with fisheries and tourism as a potential source of income for small island developing states and least developed countries.
[3] Lab-in-the-field is a commonly used label for framed field experiments, which refers to a conventional lab experiment conducted with subjects recruited in the field and field context that the subjects can use (Harrison and List, 2004).
[4] Capture fisheries have plateaued since the late 1980s at approximately 95 million tons (FAO, 2020).
[5] UNCLOS imposes an obligation on coastal states to promote the optimum utilization of the living resources and to determine the allowable catch of living resources within their EEZ. If the allowable catch exceeds their own capacity to catch, they are obliged to give other states access to any surplus. Still, the coastal state has a very broad discretion to decide on which states get access to any surplus (Beckman and Davenport, 2012).
[6] Jens Warming suggested an optimal tax to solve the overfishing problem in 1911 (Eggert, 2010).