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COVID-19 RESEARCH

Fishing during the "new normality": social and economic changes in Galapagos small-scale fisheries due to the COVID-19 pandemic

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Abstract

The crisis caused by COVID-19 has profoundly affected human activities around the globe, and the Galapagos Islands are no exception. The impacts on this archipelago include the impairment of tourism and the loss of linkages with the Ecuadorian mainland, which has greatly impacted the local economy. The collapse of the local economy jeopardized livelihoods and food security, given that many impacts affected the food supply chain. During the crisis, the artisanal fishers of the Galapagos showed a high capacity to adapt to the diminishing demand for fish caused by the drastic drop in tourism. We observed that fishers developed strategies and initiatives by shifting roles, from being mainly tourism-oriented providers to becoming local-household food suppliers. This new role of fishers has triggered an important shift in the perception of fishers and fisheries in Galapagos by the local community. The community shifted from perceiving fisheries as a sector opposed to conservation and in conflict with the tourism sector to perceiving fisheries as the protagonist sector, which was securing fresh, high-quality protein for the human community. This study explores the socio-economic impacts and adaptations of COVID-19 on Galapagos' artisanal fisheries based on a mixed methods approach, including the analysis of fisheries datasets, interviews, surveys, and participant observation conducted during and after the lockdown. We illustrate the adaptive mechanisms developed by the sector and explore the changes, including societal perceptions regarding small-scale fisheries in the Galapagos. The research proposes strategies to enhance the Galapagos' economic recovery based on behaviors and traits shown by fishers which are considered potential assets to build-up resilience.

Keywords Small-scale fisheries · Value chain · Adaptation mechanisms · Economic recovery · COVID-19 · Galapagos

Introduction

Although pandemics have been recurring phenomena within human societies throughout human history, predicting the immediate and future consequences of novel pandemics, such as the effects of the COVID-19 pandemic, has proven challenging. The COVID-19 pandemic has had significant health and socio-economic impacts all over the world. In Latin America, the short-term socio-economic effects have been severe, and some of them will have long-term consequences for economies, the environment, human well-being, and natural resources (López-Feldman et al., 2020; Jaramillo, 2020). In Ecuador, the first reported case of COVID-19, officially announced by the Government of Ecuador on February 29th 2020, together with a state of emergency declared across Ecuador on March 16th 2020, gave rise to a set of restrictive measures to slow down the virus's spread. These measures included the closure of national borders and the cancelation of all flights to and from the country, the imposition of a curfew, the closure of schools, restaurants, and all public spaces, along with other restrictions. While these measures were necessary to ensure public health, they have impacted the country's economy and lifestyles (e.g., daily routines, working and shopping habits, education habits, and other social interactions.). Official figures estimate that during 2020, Ecuador's Gross Domestic Product (GDP) decreased by 9.6%, which had severe consequences upon poverty levels and associated negative impacts across social and welfare indicators (BCE, 2020).

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The COVID-19 pandemic has resulted in the near total collapse of the tourism sector, which on average represents 65.5% of the Galapagos' GDP (Rosero, 2015). The closure of national borders and the drop in tourists entering the archipelago have altered the linkages between the islands and the Ecuadorian mainland, disrupting the archipelago's food supply system and destabilizing the local fisheries sector in the Galapagos. Some numbers estimate that, before the lockdown, almost 70% of the total demand for fish in the islands came from the tourism sector (Berman et al., 2018). The drop in visitation to zero between March 16th until July 1st profoundly impacted the fisheries sector and many other sectors in the Galapagos. The severity of the impacts is consistent with documented changes on small-scale fisheries worldwide, for example, the collapse of demand and markets for Canadian and American lobsters, Australian crayfish, Vietnamese shrimp, and many other fisheries (Bennett et al., 2020).

The lack of connectivity between the islands and the mainland has also impacted food supply chains, altering the export logistics chain of fish and seafood from Galapagos to the mainland and international markets (mainly the USA). Consequently, the reduction in trade has reduced the artisanal fishing sector's income options, making it exclusively dependent on local market demand. In addition to the fall in demand for fish by the tourism sector, fish prices also dropped as a market response. This decline has been reinforced by diminishing local demand given the reduction in household income, which is closely associated with the impacts on the tourism sector.

The presence of the COVID-19 pandemic in the Galapagos exemplified the heavy dependence of most of the islanders' livelihoods on the tourism sector. Vanishing tourism revenues severely affected most households, forcing them to cut their consumption and triggering self-reinforcing negative feedback between income and aggregate consumption that threatens to further depress the whole economy. Indeed, the severity of the crisis has called into question the viability of the entire Galapagos economic model, including that of the local fisheries sector. For example, reduced revenues from fisheries may not be enough to justify fishing vessel operations. A breakdown of artisanal fisheries would have large-scale impacts on all of Galapagos society since they are a fundamental pillar of the islands' economy, its food system, and nutritional security. The absence of a local supply chain of fish would reduce Galapagos' food security and would increase the dependence on the mainland imported produce and the consumption of ultra-processed food. This could lead to environmental consequences, given that the increased requirement of cargo shipped from the continent to Galapagos increases the likelihood that invasive species are incidentally introduced (Toral-Granda, et al. 2017). Furthermore, an artisanal fisheries' collapse in Galapagos would impact many local families' livelihoods and result in the loss of local fishing knowledge, which is a cultural asset acquired over generations of fishers who live in the Galapagos (Cavole et al., 2020). Finally, the reduced market availability of fish produce would potentially influence local public health by diminishing nutritional diet quality. With obesity and malnourishment in the Islands registering as among the highest in Ecuador (Freire et al. 2018), there are serious implications for youth and adult health.

The fisheries sector's response to this challenging scenario during the COVID-19 crisis has been innovative and flexible, showing signs of resilience that could serve as the foundation for the recovery of the island's economy. Also, it highlights the fisheries sector's resilience and adaptive capacity to respond to multidimensional adverse challenges, such as changes in market demand and supply, effects of novel pandemics, and socio-political issues. Our research on the adaptive capacity shown by fisheries communities in Galapagos contributes to the literature on social ecological systems and resource-dependent communities' social resilience. It highlights how social and ecological resilience could influence each other, as well as the capacity of the system to reconfigure without significant loss of key functions such as social relations, prosperity, functional diversity, and biodiversity (Folke, 2006; Folke et al. 2002; Adger, 2000). We also argue that a full understanding of the response to impacts and changes of the artisanal fisheries sector in Galapagos to the current crisis would provide authorities with evidence-based policy recommendations and initiatives to accelerate the industry's economic recovery. Furthermore, any policy intervention should rely on context-specific adaptive capacity measures, cooperation as well as leadership potential of individuals, and institutions in the face of the crisis.

This study explores the social and economic impacts of COVID-19 on artisanal fisheries in the Galapagos Islands. It analyzes the vulnerability of the Galapagos economy and the response of the fishing sector using the concepts of vulnerability, adaptation, and resilience debated in recent developments of socio-ecological systems (González et al., 2008; Adger, 2006, 2000; Folke, 2006; Adger et al., 2005; Folke et al. 2002). It also documents the adaptive mechanisms developed by the sector, providing insights into the resilience of the fisheries' socio-ecological system. It explores the contingent and temporary changes, including societal perceptions, narratives, and images about small-scale fisheries in the Galapagos as an element of interactive governance. Finally, it proposes strategies to speed up the islands' economic recovery and to search for alternatives given the high dependency of the community and fisheries on the tourism sector. The second section describes in general terms the economy of the Galapagos, its dependency on tourism, the role of small-scale fisheries before the

pandemic, and highlights some of its flaws. The third section presents the theoretical framework used to understand the fishers' response to the crisis and shows the methods used to gather and analyze information on the COVID-19 pandemic's effects. The fourth section presents the main findings of the analysis, a listing of the fisheries sector response to the crisis, an exploration of the effectiveness of the fishers' response, and a summary of the local community's perception about fishers' response and their role within the Galapagos society. Finally, the last section includes some insights, exploring elements that have influenced the fishers' responses to the crisis, including evidence of adapting capacity and resilience, perception, or image of the fishers' role within the community, including the rediscovery of fishers' contribution to food security, limitations to fishers' response, and opportunities to improve the response capacity of the sector and its resilience. This section also includes a set of policy recommendations that could contribute to enhancing the economic recovery of the fisheries sector.

The Galapagos economy before and during the COVID-19 pandemic

Small-scale fisheries and its governance in Galapagos

The archipelago is one of twenty-four Ecuadorian provinces, and since 1998 has been governed under a different legal regime than the rest of the Ecuadorian territory by a special law (the *Ley Orgánica de Régimen Especial para la Conservación y Uso Sustentable para la Provincia de Galápagos*, or LOREG by its Spanish acronym). The LOREG (reformed in 2015) regulates all activities in Galapagos and is based on the principles of conservation, sustainability, and well-being. Various government entities govern the territory, implementing this special regime both in the protected and non-protected areas of the Archipelago, with an aim to guarantee an efficient and integrated management of ecosystems. The two most important entities are the Governing Council of the Special Regime of Galapagos (CGREG, acronym in Spanish), which governs the non-protected territory (human settlements, representing 3% of the surface); and the Galapagos National Park Directorate (DPNG, acronym in Spanish), which governs the protected areas. The protected areas include the Galapagos National Park (97% of the archipelago's territory) and the Galapagos Marine Reserve (GMR). Since the creation of the GMR in 1998, only small-scale fisheries were permitted; consequently, fishing management actions and tools are designed and applied by the DPNG authority, which includes fishing permits, boat licenses, designated fishing zones, fishing seasons, bans, gear and size regulations. Fisheries governance in Galapagos from 1998 up to 2015 consisted of two levels of decision and policy making: the participatory co-management board (PMB) at the local level and the interinstitutional management authority (IMA) at the national level. During that period, the governance model was considered a pioneering and functional participatory co-management forum for marine protected areas co-management within the Latin American region (Barragán-Paladines & Chuenpagdee, 2015). These management forums were collective bodies formed by government entities and users, where decisions were taken by consensus within the JMP and by simple majority voting within the IMA (Ramírez-González et al., 2018). In 2015, the GMR's co-management shifted to a consultative rather than participatory scheme, where government authorities consult with fishers yet independently reserve the right for final decisions (LOREG, 2015).

From a socio-economic perspective, 2014 fisheries production in Galapagos generated an estimated gross annual revenue of $4.35 million (Lynham et al., 2015). Nowadays, official records state that there are 1117 people and 333 boats with fishing permits. However, as of 2019, just over 400 fishers and 147 boats were actively fishing according to the DPNG fishing records (2020b). Fishers in Galapagos are organized in four fishing cooperatives and associations, and most fishers (91%) are men (DPNG, 2020b). Fishing activities are arranged in four major groups or target-species: lobster, finfish, sea cucumber, and minor resources. The lobster fishery is the most consistent fishery in terms of landings and revenues. Year by year estimates indicate it generated a gross revenue of USD$2.03 million in 2014 (Viteri & Moreno, 2015). The finfish fisheries target more than 50 fish species of commercial interest, which are classified into three groups: rocky reef fish, demersal fish, and pelagic fish (Molina et al., 2004). Other commercial fish species landed during 2019 amounted to approximately 371 tons, being equivalent to a gross revenue of USD $2 million (DPNG, 2020b). The sea cucumber fishery was reopened in July 2021, for a 60-day period, after a moratorium of 6 years. Generally, most of these products (except for sea cucumber) were marketed locally for human consumption by both residents and tourists. In general, lobster and tuna are exported to US markets, and the entire landing of sea cucumbers are sold to Asian markets.

Galapagos' tourism-dependent economy and its vulnerability to COVID-19

The Galapagos Archipelago lies on the equator, approximately 1200 km west of continental Ecuador. It comprises 13 islands and over 200 islets, which are globally renowned as the cradle of Charles Darwin's theory of evolution, an endemism hotspot, and priority region for conservation (DPNG, 2014). The human population of the Galapagos

has increased dramatically from 6000 residents in 1982 to approximately 32,000 permanent inhabitants in 2019 (INEC, 2020). This growth is attributed to both tourism and fishing booms that created a "gold rush" toward the islands (Jones, 2012). Currently, the fisheries in Galapagos are regulated by the following governance schemes and instruments: LOREG, the Management Plan of the Protected Areas of Galapagos, the Five-Year Fishing Calendar 2016–2021, the Protected Areas Zoning System of Galapagos, and a set of resolutions issued by CGREG and by the DPNG. Historically, fishing and agriculture were the main drivers of the local economy (Reck 1983, Schiller 2015), until their displacement by tourism in the late 1980s.

The creation of the GMR allowed for a sustained increase of visitors to the archipelago, leading to an expansion of the tourism sector's revenues, establishing it as the most important driver of the archipelago's economy (Pizzitutti et al., 2017). According to the DPNG (2020a), the Galapagos Islands hosted a total of 271,238 tourists in 2019, a sharp increase from the 42,000 tourists received in 1989; the economic activity generated by those visitors represents 65.5% of the islands GDP (Rosero, 2015). In comparison, the contribution of the fisheries sector to the local economy in the same year was about $10.4 million equivalent to about 5% of islands' GDP (Rosero, 2021).

Over the last few decades, the tourism sector itself has undergone various changes, initially catering to international tourists, and placing greater emphasis on tourist packages purchased abroad, orientated toward ocean tour live-aboard tourism, cruise ships, and marine recreational activities, particularly snorkeling and diving (Taylor et al., 2009). This model remained dominant up to 2008–2009. However, since then, land-based tourism (where a visitor stays at a local hotel and travels every day to close visiting sites) has become the dominant type of tourism, with an increased number of visitors interested in "day-tour" and "island-hopping" formats. Land-based tourism has had an annual rate of growth of 8% for the period 2007–2015 and has been increasing ever since, while sea-cruise-based tourism decreased with an annual rate of 2% for the same period (Observatorio de Turismo de Galápagos, 2020). This type of tourism operation is mostly owned and managed by locals, in contrast to sea-based tourism, which is mainly provided by a foreign and mainland Ecuador-owned fleet. One third of this growth is composed of Ecuadorian national visitors, an increase probably fueled by a marked expansion of the Ecuadorian economy, which grew 4.2% per year on average during the period 2007–2015 (BCE, 2021). Increasing numbers of national visitors' and their food consumption patterns have encouraged the rise of alternative sources of income for local service providers including fishers, including promoting the consumption of local fish aboard cruise vessels. The growth of the tourism sector has also resulted in a certain "stagnation" of fisheries, with fishers opting toward less intensive and lucrative tourism-related activities. As a result, these changes have resulted in a shift toward fishers as allies for conservation, who as suppliers to the tourism industry have interests and profits that depend upon and better align with conservation goals (Tanner et al., 2019).

The reliance on tourism for economic growth has meant an increased vulnerability to possible shocks stemming from the sensitivity of international tourism to various crises. The COVID-19 pandemic crisis in the archipelago has painfully revealed the downsides of this overreliance, rapidly affecting the entirety of the archipelago's economy and social dynamics, exacerbated by the strong linkages of the tourism sector with other sectors of the Galapagos economy. When tourism grows, it buys inputs from other economic sectors, propelling simultaneous growth of those sectors. This tendency is called diffusion effect, and according to Utreras et al. (2014), the average diffusion effect in 2010 for the economic sectors in Galapagos was 3.12 (i.e., if one of the sectors grew by $1, then the production of the economy in average grew $ 3.12). For 2010, the restaurant/hotel sector's diffusion effect was 3.16, which is above the average, indicative of the potential of the tourism sector to stimulate the rest of the economy (Utreras et al. 2014). Thus, the collapse of tourism in the archipelago has an expanded knock-on effect that can be dimensioned by this diffusion effect. Furthermore, the overwhelming contribution of tourism to the local economy makes it difficult to find, in the short term, another viable economic activity that can replace the role of tourism as the principle economic driver.

The dependency of Galapagos on tourism, and its collapse during the COVID-19 pandemic, also negatively impacted public sector finances. Notably, 60% of the DPNG's annual budget is funded by the revenues coming from the entrance fees charged to all visitors arriving to the islands. These resources support key conservation processes, such as ecosystem restoration activities, control and patrolling, the fight against invasive species, fisheries monitoring, managing tourism sites, and other vital processes (DPNG, 2018). Other government agencies of Galapagos also depend on the revenues coming from visitors, including the CGREG, the Biosecurity Agency, the Municipalities, and Parishes Boards. In the case of the CGREG, visitor entrance fees and migration card revenues fund 50% of its budget (CGREG, 2019).

The COVID-19 pandemic and its devastating effects have also revealed the vulnerabilities of the fisheries sector, which include the aforementioned dependence upon tourism and the lack of diversified market options for fished produce. Berman et al. (2018) estimate that the total demand for fish in Galapagos was about 871 mt per year. From this amount, about 69% (599 mt) of consumption is from tourists, and the remaining demand is from the local population.

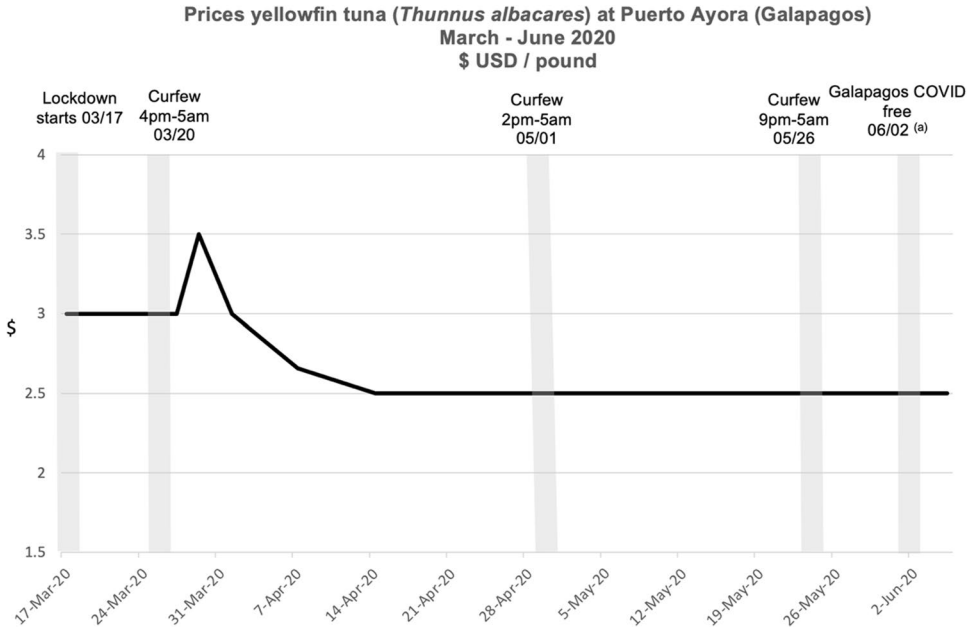

Fig. 1 Prices of yellow fin tuna (*Thunnus albacares*) at Puerto Ayora (Galapagos). [(a)]: The Ministry of Health of Ecuador declared Galapagos a COVID-19' free territory on June 2nd, 2020. Source: Participant observation data from March to June 2020

Furthermore, 13.5% of fish landings are usually exported to the mainland and abroad (117.6 mt). During the lockdown, however, goods transportation outside the archipelago was interrupted due to border closures and disconnection with shipping and airfreight to the mainland. It is worth pointing out that local demand is low compared to global averages with consumption of fish per capita in Galapagos, at just 10.4 kg per year, while the average consumption per capita globally approaches 20.2 kg per year. Monthly fish demand of residents is 22 mt, which constitutes 30% of the average monthly landings (70.9 mt) (Berman et al., 2018). However, this was also reduced due to COVID-19, as residents lost household income due to the collapse of tourism, which probably reduced their ability to purchase fish. The aftermath of this loss in demand resulted in a decrease of fisheries prices between 28.6% and 43.0%. For example, before the pandemic (March, 15th, 2020), yellowfin tuna was sold at $3.50 per pound and decreased to $2.50 per pound (June 5th, 2020) (see Fig. 1). Similarly, while the spiny lobster was sold at $7.00 per pound in 2019, it sold at only USD$4.00 during the pandemic, significantly reducing fishers' income.

Finally, the island's food system was found to be highly susceptible to any international or national crisis due to its dependency on shipping and availability from mainland Ecuador. Most of the food consumed in the Galapagos comes from the continent, including 70% of processed and dry food, and 38% of fresh fruits and vegetables (Viteri, 2017). The islands reliance upon boat and aircraft cargo shipments highlights the islands' food security vulnerabilities to potential disruption by external and unforeseen events.

Methodology

Theoretical framework

In this section, we attempt to understand the fisher's responses to external shocks such as the COVID-19 crisis, which revealed vulnerabilities common in resource/ecosystem-dependent communities such as the Galapagos tourism-based economy. We examine how these responses are evidence of a resilient sector with highly adaptive capacity that could sustain the whole Galapagos socio-ecological system while the tourism industry recovers. The social capital concept and its elements are used to understand fishers' responses in terms of adaptive capacity. We also review the interactive governance approach to have insights about how shifting social perceptions of the fisheries sector by Galapagos society could affect its governance.

We understand Galapagos as a resource/ecosystem-dependent community following Adger's (2000) reasoning, which states that resource dependency of a community is defined as the community's livelihoods reliance on a narrow base of resources that potentially results on social and economic stress within the system due to alterations that could be generated by exogenous factors such as market fluctuations, or natural catastrophes. Adger (2000) also argues that coastal communities may not depend on a single product or resource. Instead, they could have diverse economies that include multiple activities such as tourism, fishing, and transport, but are nonetheless reliant

on a single coastal or marine ecosystem, which could be problematic and evidence of vulnerability. Vulnerability of a community is defined as the propensity to damage due to the exposure to environmental and social alterations accompanied by the inability to adapt (Adger, 2006).

The Galapagos Islands should also be approached as being a complex socio-ecological system, which implies that human action and social structures constitute elements of nature, where the socio-economic and ecological systems are linked by dynamic processes and reciprocal feedback mechanisms (Adger, 2006; González et al., 2008; Watkins, 2008). Here, we understand resilience as the system capacity to transform and reorganize while experiencing adverse conditions (Walker et al. 2004. In: Folke, 2006), acknowledging that interactions and feedbacks between the ecological systems and socio-economic systems can affect the resilience of social-ecological systems when subject to external shocks; interactions or exchanges between systems (social and natural) can build or erode resilience in social and natural systems (Adger & Hodbod, 2014; Van Oudenhoven et al., 2011; Liu et al., 2007). Watkins (2008) points out the linkages between tourism and negative trends that affect native ecosystems, such as invasive species, habitat loss, and urbanization. Such situations may reduce functional aspects of ecosystems, resulting in reduced resilience (González et al., 2008). Adger and Hodbod (2014) assert that social resilience can be achieved through perturbation that imposes the need to cope with change; Adger (2000) argues that coastal communities, which are typically dependent on a single ecosystem, are more socially resilient as a consequence of the marine ecosystems' resilience given its inherent regenerative and absorptive capacity. Such a relationship for social resilience is especially observed with ecosystem-dependent communities in the context of food security and coping with hazards.

We can infer that Galapagos' fisher communities' dependence on coastal and marine ecosystems were affected historically by severe climate events such as El Niño—an event that causes extreme weather disturbance and huge variation in the archipelago's marine ecosystems productivity (Bertrand et al., 2020; Riedinger et al., 2002; Snell and Rea, 1999). Fishers' social resilience may be higher because of the fisher communities' historical response and experience coping with such hazards and food security challenges. We can also hypothesize that fisher communities' adaptive capacity was enhanced due to innovative strategies that emerged to cope with ecosystem variability.

Adaptive capacity in the context of a social-ecological system can be defined as the ability of the system to deal successfully with novel situations without losing options for the future (Smit & Wandel, 2006). This is also influenced by the existence of institutions and networks that learn and store knowledge and experience, providing flexibility for problem solving and balance of power among interest groups (Pittman et al. 2015; Carpenter et al. 2001, Peterson et al. 1998, Bengtsson et al. 2003; Scheffer et al. 2000, Berkes et al. 2002; as cited in Folke et al., 2002). As Pike et al. (2010) mention, resilience and adaptive capacity also need intelligent, efficient, institutional leadership, capable of framing and articulating the nature of the crisis process and constructing a discursive narrative of strategic adaptation or adaptability with the facility to enroll local actors. Given the distress caused by the COVID-19 crisis to the Galapagos socio-ecological system, we might expect fishers, being the interest group most directly dependent on the marine and coastal island ecosystem, to show some evidence of such built-up resilience and adaptive capacity in weathering the negative effects of the crisis.

The methodologies for assessing adaptive capacity or ability to cope with crisis in fisheries are diverse, and there is little consensus on the elements and determinants that influence the ability of communities to deal with crisis (Smit & Wandel, 2006). Fowler and Etchegary (2008) suggest that the ability of communities to cope with crisis can be understood using the concept of social capital, an approach that is robust and consistent with the response of communities facing crisis, and resulting impacts (O'Brien et al., 2004; Hamilton et al., 2003). These authors identify elements of social capital relevant to the ability of fishing communities to adapt to a fishery closure and identify characteristics that compromise their capacity to cope with crisis. They apply Putman's (1993a) social capital definition for the prevailing attributes of social organizations including networks, norms, and social trust that enable collective action; these attributes comprise, for example, the networks that make up a civic community (institutions, associated facilities, and relationships); the civic engagement which involves participation in the process of sustaining and/or using community networks; the civic identity which entails people's sense of belonging to a civic community including a sense of solidarity and equality with other community members; and, the observance of the norms ruling how networks operate, for example reciprocity and trust (Putman 1993a; Putman 1993b; in: Campbell et al., 1999). The approach used by Fowler and Etchegary (2008) for evaluating communities adaptive capacity includes examining social capital dimensions, such as sense of belonging, trust among residents, degree of reliance among residents, help and support, and attitudes toward local politics and the power of ordinary citizens to help in community issues. These authors found that elements of social capital explained the differences in the responses and impacts between two similar communities facing a cod fishery collapse, demonstrating that the community which possess positive social capital traits such as trust and solidarity displayed higher adaptive capacity which resulted in better levels of health and social wellness.

Another line of thinking useful in understanding the responses and effects observed in Galapagos while weathering the COVID-19 crisis is the interactive governance approach. This concept consists of three elements: images, instruments, and actions. Images are the guiding lights as to the how and why of governance, and come in many forms such as visions, facts, judgments, ends, and goals; images are powerful as they contain and describe essential assumptions such as the relationship between society and nature. Instruments link images to action, and action implies putting instruments into effect. Interactive governance states that small-scale fisheries governability is deeply influenced by past and present images of governance (Kooiman et al., 2008). Kooiman (2003) also holds that governance is inconceivable without the formation of images, and that they are necessary for understanding, communication, and action. Despite governance image formation being an integral part of governance, they are not reflected upon or discussed in the governance process, despite having real consequences given that they are acted upon (Jentoft et al. 2010). In their study, Jentoft et al. (2010) posit the intense and permanent exchanges and interaction occurring between images and institutions has the potential to induce institutional and political change, but also shows the ability of images and institution to reinforce each other, and to even demonstrate how institution images justify their existence. Interestingly, this study suggests the usefulness of knowing which image defines a problem for the fisheries governance system, as this image will determine where in the system the problem resides. Recognizing and exploring differences before and during the pandemic in the images associated with the small-scale fisheries sector in Galapagos, hence, present another way to better understand the effects of COVID19 on the local fisheries sector.

Data

This research adopts an interdisciplinary approach to small-scale fisheries research. It focuses on the qualitative tradition and a combination of data gathering methods under the triangulation approach (Clifford & Valentine, 2003). Triangulation is a multimethod approach for data collection and data analysis to ensure study's trustworthiness (Given, 2008). The main research methods involved were participant observation and use of various data collection instruments (i.e., online surveys and interviews) (Newing, 2011; Tarling, 2006). Additionally, a social media channel provided information used by the local authorities during the lockdown to inform the Galapagos community about the local COVID-19 pandemic status. All the data gathering process was performed in Spanish and later translated into English. Data were analyzed by applying the "content analysis" and "narrative analysis" methods (Mohajan, 2018; Riessman, 2008; Wiles et al., 2005). The content analysis has been useful to generate text analysis frequency, while in the narrative analysis some testimonies are explicitly quoted to emphasize their meaning, and others are interpreted for relevant research context.

Data gathering was performed by applying the "*participant observation*" method (Denscombe, 2007). All observers are members of the CDF Fisheries Interdisciplinary Research Project and resident in the Islands. Observers are native Spanish speakers, and they were trained on participant observation by the teams' social scientist. This process was conducted from March 20th to June 7th, 2020, in Puerto Ayora (Santa Cruz Island), which is considered the tourism hub of the Galápagos Islands. The method was applied over 12 weeks, and we were able to collect 42 observations. The participant observations were performed at three main spheres of the fishing value chain in Puerto Ayora: the landing site (Pelican Bay fish market located at Academy Bay), the retail points (*marisquerías*, municipal market and *Feria Miraflores*), and the consumer space (four sites in two neighborhoods). Observers walked around, witnessing the dynamics and interactions among actors of the value chain. During the most restrictive period during COVID-19 lockdown, the observers gathered information from their neighborhoods adopting a consumer role. Note-taking was not conducted at site, but records of observations were gathered in a field notebook within a 30-min interval after the observation period.

Additional data was obtained by conducting open-ended "*interviews*" or "*guided conversations*" (Walmsley et al., 2005). There were 12 interviews completed with directors/managers from fisheries cooperatives and associations and staff from the GNPS. Interviewees were recruited between known participants and stakeholders in the fisheries value chain.

Surveys were also conducted by circulating an online *close-ended questionnaire,* using list-servers and social media groups (e.g., Facebook©, Twitter© and WhatsApp©) among fishers and seafood consumers in Galapagos. The questionnaire included 28 questions and took between 10 and 15 min to complete. A total of 258 valid questionnaires were filled from April 28th to June 2nd, 2020 (SE: ± 6%; CL: 95%). While the survey was used to triangulate other data sources, it is not analyzed extensively in this manuscript.

The dominant communication channel during the COVID-19 crisis was a social media group using WhatsApp©, which was created by the CGREG to ensure an official information channel between the authorities and the Galapagos community. This official channel aired daily interviews with CGREG decision-maker. The "*content analysis*" and "*narrative analyses*" of this channel were conducted between April 9th and June 7th, 2020 during a period of 8 weeks. The chat analyzed was the "*n°12 Infórmate*

Galapagos! COVID19 2." Key messages and narratives were extracted from this information (Bhunnoo & Poppy, 2020) concerning the food chain, food security, food systems, food sovereignty, food networks, food support, fishers, and fisheries.

The COVID-19 health crisis and the response of the Galapagos small-scale fisheries sector

The impacts on the fishing sector described in Section 3 were unprecedented in the Galapagos. The detrimental effect on the community is illustrated by a comment in an interview with a member of the fishers' cooperative leadership who at the beginning of the pandemic (March 15th, 2020) claimed: "nowadays fishing is a subsistence alternative." This statement reflects two facts: revenues generated by a fishing trip barely covered the trip's operational costs, and fishing production declined as fishing trips became less frequent in response to weaker demand. This section presents the main findings of the information gathered during the COVID 19 health crisis. We describe the coping responses of the fishing sector, an analysis of the public sector approach regarding food security and fisheries, and a summary of the local community's perception about fishers' response and their role within Galapagos society.

Fisheries sector adaptation and response strategies

The fisheries sector's response to this daunting scenario has been innovative and flexible, showing signs of resilience that could be the foundation for the recovery of the island's economy. The mindset of their leadership was open to change and to accept the crisis as an opportunity to move toward achieving the sustainability of the islands, as is evident in the following statement: *"If we are talking about a sustainable Galapagos, we are at the time of change, all the things that we have not done well now have to be reformulated" Fishers cooperative vice president in San Cristobal island, 2020.*

Fishers' reactions to the crisis were to reorganize themselves in order to carry out fishing trips in an orderly and homogeneous manner as much as possible to avoid saturating the local market. This was the case for Santa Cruz Island fishers' cooperatives and the boat-owners' associations, which agreed on fishing shifts to avoid a market glut due to the reduction in fish demand.[1] In general, the urgency of the situation led to coordination and cooperation among fishers; they collectively reduced the fishing effort, by establishing who could fish, and when.

Fishing, along with other food providers, was considered an essential activity by the Ecuadorian government and therefore exempted from curfew restrictions. This meant that during the curfew fishers were constantly offering fresh fish. The observed decline in fishing trips can be attributed mainly to a substantial loss in demand arising from the collapse of tourism collapse, and the subsequent adaptation measures introducing rotational fishing effort to address market gluts. Moreover, in the face of these challenges, fishers also sought innovative ways to position their products in the local and export market. One example was the use of new strategies to market their product (i.e., home delivery sales, the use of social networks to offer products, and the shipment of their product using cargo ships instead of air freight).

In the case of Santa Cruz Island, the fishers' cooperative provided a home delivery option, which did not exist before the pandemic. Initially, they distributed products by motorbike, but then they found their storage trucks useful for delivery routes on the island. Some individual fishers started selling door-to-door in Puerto Ayora, while others had to sell their fish to the cooperative. This difference was driven by the bylaws of the cooperative, which establish that fishers who are members of the cooperative must deliver their product to the cooperative. If the fisher is not a member, he/she can decide whether or not to deliver to the cooperative. This highlights an interesting case where group-level restrictions prevented individual level adaptation actions. Although the fishers' market was regularly open, the fish traders' association changed its selling strategy from the fisheries market to organizing shifts for van deliveries. Finally, "*Feria Miraflores*," a popular marketplace where fish were usually sold, was partially functioning, although fish traders were largely absent given that fishers were applying alternative market strategies.

Participant observation and interviews show that the diversity of fish species for local consumption increased. Species such as the bighead tilefish (blanquillo, *Caulolatilus affinis*), the swordfish (espada, *Xiphias gladius*), the sailfish (picudo, *Istiophorus* spp.), the wahoo (*Acanthocybium solandri*), and the snappers (pargo, *Lutjanus* spp.) were rarely seen in the local markets by the community before the COVID-19 emergency. They were considered fish for restaurants and tourism vessels before the COVID-19 pandemic and were not widely accessible to the local community.

Worldwide, research was progressing into necessary safety measures regarding food handling during the COVID-19 pandemic. Locally, however, even the Galapagos Fisheries Under Secretariat officer was not clear about food safety measures, increasing the perception of risk in food consumption. Our results show that, faced with this uncertainty, local

[1] Those agreements were reported to government entities, such as DPNG, Ecuador's Navy and CGREG in compliance with the movement restrictions imposed in the province to prevent further spread of the COVID-19 virus.

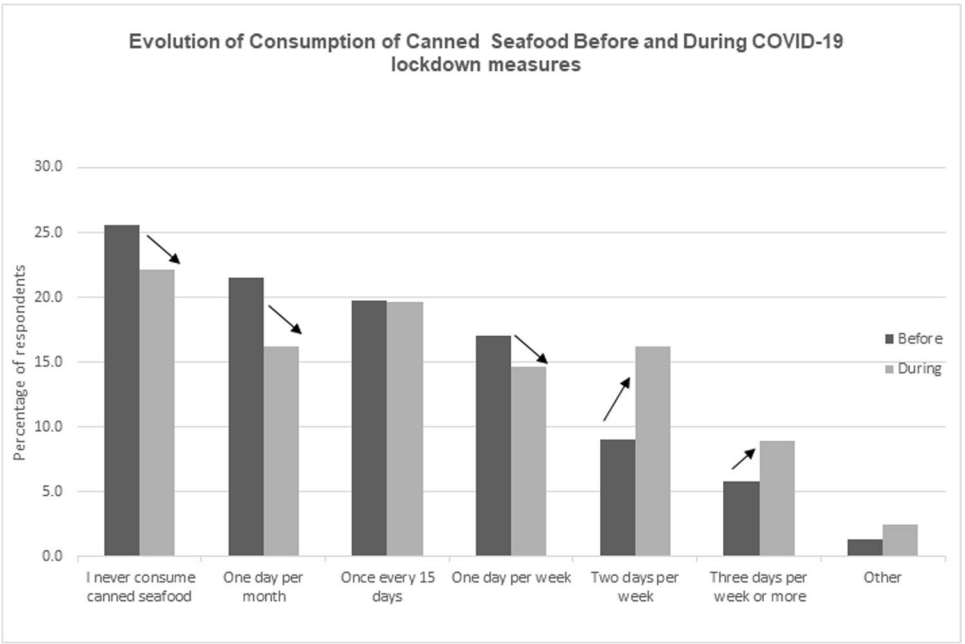

Fig. 2 Consumption of canned seafood before and during COVID-19 lockdown measures in Galapagos. Source: 258 surveys from April 28th to June 2nd, 2020 (SE: ± 6%; CL: 95%)

consumers reacted by relying more on fish-based products, with an increase in consumption in both canned and fresh fish. Figure 2 describes the changes in consumption of canned seafood, with a clear increase in the frequency of consumption of such items during the lockdown measures.

Likewise, an analysis of the consumption of fresh and frozen seafood products before and during COVID-19 lockdown measures allowed us to measure the consumption per capita change in the Galapagos. Before lockdown, an average of 2.36 pounds of fresh and frozen fish was consumed weekly. During lockdown, average consumption increased to 2.45 pounds. Out of the species consumed and fished locally, yellowfin tuna and mullets accounted for the biggest change before and during the lockdown measures (with a 5.9% and 3.1% increase in consumption respectively).

Moreover, we also observed that fishers took measures to avoid infection by COVID 19, including the use of a face mask (87.0%), gloves (54.3%), sanitizing money with alcohol during transactions (36.1%), disinfectant (16.8%), and other measures (7.7%), such as hair net wearing, constant sanitizing of workstations, and installing of physical barriers at selling spots to maintain social distancing from customers. Only 1.9% did not use any protection. These figures were estimated from participant observations.

Government response to food security and fisheries

We observed that the COVID-19 pandemic influenced and triggered specific actions related to decision-making for the spiny lobster fishery by GNPD that were not anticipated and contradicted recommendations from population stock analyses. In fact, according to the biological indicators, the spiny lobster's fishing season should have been reduced (i.e., from 5 months in 2019 to 4 months in 2020). However, in 2020, it was increased to 6 months (i.e., July–December). This decision was agreed upon by fishers and the GNPD, arguing, that it is necessary to reactivate the economy due to the crisis of COVID-19 and that the increase in the fishing season will not negatively impact the spiny lobster's population because the fishing effort will be reduced due to the absence of tourism demand.

During the COVID-19 emergency, the most important topic for the CGREG, after health, was food ("*alimentación*"). In this case, the terminology employed to refer to this aspect was inconsistent, with officials and policy briefs alluding to concepts such as "food security," "food sovereignty," and "food support," interchangeably, despite their different meanings. Despite this conceptual confusion, the "food" dimension became a salient issue for authorities, and within this debate, the fisheries sector was perceived as a key sector for food security along with island agriculture. This was an important inflection point in the approach toward fisheries in the GMR, explicitly making the fishing sector part of the insular food system (Weigel et al. 2014) and highlighting its important role in providing food security.

Monitoring of fisheries landings by the National Park Directorate was also adapted to quarantine circumstances. This activity is usually performed by the park-rangers at the landing dock sites to verify the compliance of fishing regulations and to record biological information of the catch. During March and April 2020, monitoring was conducted from each ranger's home, by receiving monitoring's data through the social network WhatsApp©. Later, these data were submitted into the official National Park system.

Galapagos, as an insular territory and a tourism-based economy, also relies on goods and services shipped from mainland Ecuador. Before the pandemic, food imports comprised 38 to 70% of the total local consumption depending on whether non-perishables are considered (Viteri, 2017). Approximately 80% of the food supply of the islands was dependent on the shipping system from the Ecuador mainland. Thus, once the mobility restrictions started during the curfew, between 50 and 60% of goods, including food, could not be mobilized to the islands. At that moment, the crisis highlighted that local food production (i.e., fruit, vegetables, and seafood) was a provident, cost-efficient, and environment-friendly supply alternative. This realization came as an epiphany to province authorities regarding how priorities for the islands economic system might be reimagined; it can be appreciated in the following statement by the Galapagos' Minister (May 11 2020): "*We move forward in food security: we want to create a proposal to reactivate the capacity for self-sufficiency in local production. We cannot have an economic base that does not consider the production of food, energy and health.*"

Perceptions of society about fisheries and fishing activity

In all the islands fishers donated some of their fish landings to help local families in financial distress due to the health crisis. This is similar to fishers in Mexico, who donated tons of fresh fish to communities (Bennett et al., 2020). This altruistic response has had a positive effect on the community's attitude toward the fishing sector, which, traditionally, has been in conflict with both the conservation and tourism sector in Galapagos (Celata & Sanna, 2010; Shore, 1999). The coordinated response and behavior displayed by fishers has bridged this chasm, allowing for fishers to be perceived as protagonists in securing fresh and high-quality protein for the Galapagos community. Additionally, governmental authorities and institutions played a role in changing local perceptions of fishers. Solidarity food baskets given by the local governments were complemented with a piece of fish donated by fishers or cooperatives. "*Imagine, a bricklayer who lives day by day (economically speaking) what he is going to eat: the people save the people.*" President of the Fishers Cooperative in San Cristobal Island, April 2020, referring to the voluntary fishing trips organized by fishers to donate food for vulnerable households.

For instance, the local authorities' narrative during the first 2 months of the pandemic highlighted both public health and food security as priority issues during the crisis in the islands. Several public statements of the CGREG's Ministry called for securing the food supply systems of the islands, regaining self-sufficiency, building an economic system that prioritizes food production, and praising the role farmers and fishers played in overcoming the emergency. Other important actors, such as tourism and non-governmental organizations, echoed the messages from local authorities regarding the importance of fishers' activity for the food security of the archipelago. All these circumstances brought back a sense of dignity and pride among fishers.

It is uncertain how long fishers will be enjoying this warm glow, but we hypothesize it will fade as the social distancing and lockdown measures start to relax. The local population including the fisheries sector will likely start to demand the adoption of measures to promote an economic recovery, with the risk that measures could roll back on hard-won environmental accomplishments for the archipelago. For instance, fishers were successful in persuading the authorities to disregard technical recommendations for managing the lobster and sea-cucumber fisheries, and to resume the experimental use of long-line within the reserve, using the economic impacts caused by the pandemic as rationale for these exceptions. There is hence the risk and even likelihood that the previous public perception about fishers as conservation antagonists may return.

Post-harvest and livelihood strategies

A set of innovative strategies emerged to cope with the crisis. For example, the increase in competition for food delivery eventually pushed the prices down, which in turn stimulated the emergence of partnerships between chefs and fishers to commercialize value added products such as prepared seafood. Other interesting strategies were triggered by the lack of solvent cash in the islands, which forced the emergence of alternative forms of trade, moving away from a cash economy, and favoring the rise of a barter economy. The exchange of products between fishers and farmers reminded people how communities used to live years ago in the islands. A fishers' leader mentioned, "*we went back 40 years to when barter was used.*"

The pandemic also changed urban–rural dynamics. First, as a coping mechanism for the local population, the visibility, interest, and opportunity for production at rural farms increased. The distribution of residence changed in the island as families who own fields in the rural area migrated temporarily to their farms when affected by all the aforementioned dynamics. On the other hand, the labor force looked to the countryside as an opportunity to cope with reduced employment possibilities. If there was no income, at least they could produce their own food.

Regarding women in fisheries, the participant observation recorded some changes in their involvement in fishing activities. The data gathered suggests a drastic reduction in their participation in local trade, which contrasts with their participation before the pandemic when most used to be very involved in commercialization, as observed by the study of

Almachi, (2020) right before the pandemic. From April 2020 at the Pelikan Bay dock, women gradually returned one by one, and at the Miraflores market a month later in May 2020. Interestingly, women who used to be involved in management and leadership positions within the fisheries sector became more visible and dynamic during the pandemic. They actively expressed their opinions, monitoring emergency activities, as well as leading the formulation of economic reactivation projects.

Insights and policy recommendations

The exchanges between the social and economic dimensions of the Galapagos social-ecological system are central transforming forces in the archipelago, they fuel the archipelago "engine" that propel the transformations taking place. Small-scale fisheries are defined as a complex, diverse, and dynamic sector, taking place at different scales (Kooiman et al., 2005; Bavinck et al., 2005). The analytic focus of this research has provided new/important insights with regard to the conditions and performance of the small-scale fisheries sector in Galapagos during the COVID-19 pandemic. This study contributes to the interdisciplinary literature about fisheries and marine resources governance by clarifying the rather obscure dimensions involved along the entire fish value chain in the islands and how they have been affected by the pandemic and its repercussions. Through the results of this study, we have seen the role fishers played during the full lockdown, which has helped to get a better grasp of the assets and flaws in the fisheries system and fish resource management, as well as its governing practices, shedding light on elements also relevant from before the pandemic.

Our findings resonate with the interactive governance approach which illustrates the divergent images associated with fishing and fisheries, and with their governability, during two key periods within the COVID-19 crisis in Galapagos. These are during the lockdown (i.e., the "recovery of the positive image of fishers") and once the lockdown was removed (i.e., "the going back to the old image of fishers"). We thus argue that these competing fisher/fisheries images, taking place at different moments during and after the pandemic, clearly illustrate the competing values associated to fisher/fisheries. These values have also contributed to the perception that local inhabitants and external actors have regarding the fishing sector in Galapagos, since the early stages of conservation and development of the marine protected area.

In this context, it is thus worth reflecting on the long-term effect of dominant images transmitted by users, decision-makers, and media, about fishers and fisheries in Galapagos, upon the public imagination that as a result influence understanding, communication, and action for this sector. By dissecting the contradictive images of fisher/fisheries that arose during the pandemic; first, the "*helper and ally who feeds my family and I*" and the latter as "*the one to fight back*," we might infer that that the persistence of images is driven by our values about the object and our attitudes toward it, at a specific moment. The extent to which this positive impression of fishers in Galapagos public opinion will persist is uncertain, as is when or whether the previous negative image of fishers will return.

The pandemic also triggered claims by society for economic aid from the government to tackle the financial distress caused by the pandemic. One of the potential solutions provided by fishers and lobbied for by some Galapagos local stakeholders is the use of non-selective fishing gear (i.e., modified long-line) that in the fishers' perspective would solve their economic predicament. This insistence was an attempt, together with similar strategies, to relax current management tools, practices, and measures which are aimed to protect the islands (i.e., the opening of Galapagos to direct international flights) in order to facilitate the recovery of the local economy and improve income of community sectors (although typically at the expense of key environmental and health safeguards). This situation, rather than strengthening the positive image of fishers/fisheries during the pandemic, has increased popular visibility of similar responses/requests from other stakeholders, stimulating a wave of petitions that could cause a roll back on conservation accomplishments for this biologically unique protected area.

Other findings of this study align within the framework of the interactive governance approach by pointing out the intense and permanent exchanges and interactions occurring between fisher/fisheries images and institutions during the pandemic, which deeply influenced the positive perception of the sector. As interactive governance suggests, this interaction also shows the potential of images to trigger institutional and policy change. In that sense, it is interesting to observe how Galapagos' fisheries governance in the public debate is dominated by the image and values of the "conservation-development" dichotomy. This dichotomy places the narrative of fisher "as a predator," which is constantly created and recreated in the social imagery of Galapagos, and which is in conflict with the narrative of a pure, wild, and pristine Galapagos image "without humans," that is promoted by the tourism industry (Rodríguez-Jácome, 2020).

Looking further into the implications of the images encountered in this study, we find that the contradicting images about fisher/fisheries define the nature of the problem, and determine where—as the interactive governance approach suggests—within the governing systems, these negative images about Galapagos' fishers operate. During the pandemic, the "conservation-development" dichotomy was interrupted and replaced by an image of safeguarding public health and food security. This allowed other

institutions such as the CGREG and Municipalities, to temporarily host the fisheries management debate, fueled by the demand for modified longline, as a strategy to tackle the financial crisis. In this context, it is fair to claim that the interactions among these institutions (i.e., fishers, municipalities, GNPS and CGREG with fishers and fisheries), enabled emerging decisions to allow cooperation and to undertake concrete actions to handle the crisis (i.e., food aid for households in distress, credit payments deferral, credit refinance, etc.). These actions showed it was possible to overcome the usual debate paralysis generated by the "conservation-development" dichotomy.

Some lessons learned from our study show that the traumatic episode caused the COVID19 pandemic deeply influenced dominant images about fishers/fisheries in Galapagos. We also learned that environmental authorities that legally are entitled to perform fisheries management and to lead the debates associated with them can balance their debate and agendas to accommodate urgencies demanded by productive sectors, which traditionally have been contrary to the "conservation" principles of the "conservation-development" dichotomy. In those cases, room for discussing other urgent topics has been created, and the opportunity has been given to other stakeholders to demonstrate their values, principles, and interests. These observations align with Jentoft et al. (2010) who observe that allowing a broader participation of stakeholders could bring new images and therefore new opportunities for problem definitions that would challenge those images that dominate the decision-making process.

During 2020, the responses by fishers to confront the crisis caused by the COVID-19 pandemic varied from market strategies, inspired by the need of individuals and of the sector at large, to compensate their loss following the dramatic drop in demand for fish by local consumers (residents and tourists), to pro-social strategies, based on a behavior inspired by social preferences, or other motives (this is a behavior where individuals choose to act considering not only the consequences of their actions for themselves but for others as well; Bowles, 2009); to contribute to alleviate the impact of the crisis on people in distress. Both strategies impacted the Galapagos human community by changing fish consumption and household purchase patterns. They also helped shift public perceptions regarding the artisanal fishing sector. Furthermore, both strategies required leadership, coordination, and reorganization capacities, by individuals and cooperatives, for their implementation while everybody was facing unsettling conditions due to the health crisis. Consistently with the literature on uncertainty and small-scale fisheries (Finkbeiner et al., 2018), the timely adoption of these responses by local fishers also required trust and pro-social behavior among cooperative members as well as a high level of organization to show they can get up on their own feet and even help others. These traits, shown by the organized fishers, suggest they exhibit varied levels of resilience and adaptive capacity that made it possible to react and respond efficiently, and to adapt rapidly to the crisis scenario, allowing them to keep performing their role as seafood suppliers for the human community at large. Thus, we claim that it is very likely that this adapting capacity is rooted in pre-existing features, based on the social cohesion of the fishing community and on the social capital shared by fishers and their families that fueled those initiatives. In fact, their demonstration of reciprocity, altruism, and trust, elements that reflect on the concept of social capital, could have enabled fishers to engage in civic action and behave in a collective fashion, echoing the findings and results reported by Fowler and Etchegary (2008). These collective actions were taken to tackle aspects of the COVID-19 crisis that would have been likely impossible to overcome if fishers had acted individually. It is also possible that the adoption of these collective strategies with humanitarian aims (e.g., donating fish to families in economic distress) could be triggered and enhanced by the pandemic as the literature on natural disasters suggests (Cassar et al., 2017; Adger et al., 2005). Those actions also confirm the presence of a wide and solid social capital among fishers that allow them to respond promptly as a collective body. We claim the behavior and traits, shown by fishers, can become an asset for the Galapagos community at large, between both fishing and non-fishing-related sectors. In this way, authorities, aid agencies, and non-governmental organizations should focus on restoring and strengthening the framework that forms and maintains such social capital while enhancing the resilience of the islands.

The vulnerability evident in the Galapagos economy (as is the case in other nature-based tourism-dependent communities close to protected areas) challenges the logic behind the assertions made by some domains of biodiversity conservation literature which portray tourism as a livelihood strategy compatible with conservation. Moreover, the evidence of co-dependency could contest claims saying that tourism could replace some traditional economic activities that are apparently in conflict with conservation efforts and could even elevate living standards, generate employment, and enhance the regional economy (Pham, 2020; Goodwin & Roe, 2001; Bushell & McCool, 2007; Lopes et al. 2015). Our analyses of the crisis' impact on, and responses of, the Galapagos society give evidence that overdependence of a community on one single economic activity could erode the resilience of the whole system and could limit its response to external shocks (Pham, 2020; Folke et al., 2002; Sisneros-Kidd et al., 2019; Cheer et al., 2019). Following this reasoning, our analysis indicates that the dominating tendency of the tourism industry competes, for resources, with other functional provisioning sectors such as farming and fishing. These vulnerabilities disrupt social structures resulting in a reduced responding capacity for the whole system

when facing a crisis. Aligned with the calls made by the "Galapagos Recovery Plan" and the "Plan of Development 2030" (CGREG, 2020a; CGREG, 2020b), we suggest that the local and national authorities revise the overdependence of the economic model on the tourism industry and search for alternative formats, for instance, to figure out strategies to strengthen or recover traditional economic sectors (fishing and farming), and to foster new economic income generating activities compatible with the conservation and sustainability paradigm of the archipelago (e.g., knowledge-based, education-oriented renewable economies).

Before the COVID-19 crisis, artisanal fisheries in Galapagos were seldom related to food security, and their contribution to food systems was often overlooked. Most of the scientific research endeavor and technical reports, regarding artisanal fisheries in Galapagos, have traditionally focused on their biology, ecology, fish and seafood stocks management, and commercialization. These visions have mainly dealt with "fish" purely as a commodity and with "fishing" as an activity in constant conflict with, and against conservation. The pre-COVID-19 local perception about fisheries is consistent with what we appreciate in most of the scientific literature about fisheries around the world, which, as Loring et al. (2019) mention, mostly disregards fisheries value for food systems and, as Béné (2003) claims, associates small-scale fisheries with poverty. Our results show how this image shifted during the first phase of the COVID-19 crisis, when the lockdown disrupted the food supply, a consequence of the high food supply dependency from the mainland. The results reveal how government agencies, NGOs, business associations, and the public turned their attention to fisheries as the main local source of high-quality protein in the islands. At least for a temporary period, the popular perception of fishers and fisheries in Galapagos was positive.

COVID-19 crisis also had an impact on our way of doing research. Unable to go out to sea to conduct field work, fisheries researchers were obliged to concentrate on the human dimensions to the Galapagos marine food system. This gave us the opportunity to observe and document details of social and economic interactions, dynamics, and changes during the conducted research. This experience allowed us to present an innovative framework looking at small-scale fisheries social-ecological systems from the varied standpoints of fish consumption in Galapagos, and within the value chain perspective, under a crisis scenario. The results show insights from food producers, consumers, traders, researchers, managers, and policymakers. All these standpoints provided a clear understanding of fishers' reaction and adjustment to the fish demand/supply dynamics during the lockdown and after it. Additionally, our outcomes show how the interactions among the varied instances of the social-ecological systems of the fish value chain in Galapagos are closely interlinked: the fish trade with healthy social relations, the alliances, and self-organization capacity to facilitate fish vending with transportation and logistics mechanisms for goods interchange (i.e., *trueque*) with lack of wealth and poverty. These are multidimensional features that confirm the complexity of the fisheries sector, expressed more during a period of stress such as the pandemic, which also enhance the likelihood of sustaining a healthy community.

The policies and practices related to fishing activity in Galapagos could be interpreted as social representations within the entire fish value chain, especially those that were exacerbated by COVID-19's direct and indirect effects (e.g., donating fishing produce to the less wealthy sectors of the local human community). Attitudes and behaviors, willingness and commitment, social bonding, or even social disruptive elements, within fishing communities identified during the COVID-19 crisis, could be reviewed as potential assets, prior to setting, planning, and conducting fisheries management and governance policies and practices. We claim these attributes may shed light on reasons, from the sector itself, to support or oppose certain fisheries management approaches and tools by local authorities (Buijs et al., 2006; Fischer and Van der Wal, 2007).

Hence, understanding and then explicitly defining the complementary, opposed, or dissimilar images created during the crisis and occurring across the social-ecological system associated with the small-scale fisheries value chain in Galapagos, during and after the COVID-19 pandemic, are of critical importance for their sustainability. It does not necessarily imply that the governance and management interactions should and will be free of discrepancies during and after the crisis. Instead, we suggest that those overlapping areas or mismatches between how the small-scale fisheries sector is being "imaged" could serve as clearance mechanisms to innovate, find alternatives, agreements, and commitment, to address the social and economic crisis. This potentially leads to the realization of not only whether broader sector support is advisable toward small-scale fisheries, but also how to better obtain and maintain such support. This, in return would provide improved guarantees for success in sustainable use, market innovation, and entrepreneurship.

We assert that imagery of the small-scale fisheries sector during and after COVID-19 cannot and should not be framed within already established parameters and prejudices. This study could serve as a support for joint longevity of fishing resources tied to welfare of the Galapagos' human community, their sustainable livelihoods, and safeguarding underpinning ecosystem health. In this scenario, a new paradigm of fishers should arise as allies for marine conservation, responsible stewardship and for the improved governance of marine resources.

Further research is required to identify which images illustrated during the COVID-19 crisis need to be

reinforced and which should rather be avoided to build confidence over common shared principles and interests. Initiatives that have been identified as positive and with potential of success not only during, but beyond the COVID-19 crisis, should be reinforced, supported, and facilitated. These would help to enhance fishing resources sustainability, to make fishing community economy and values viable, and to improve the governance of fishing in the Galapagos social-ecological system.

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