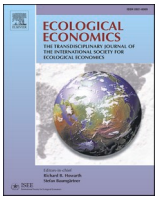
Ecological Economics 226 (2024) 108350

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecolecon



Who pays for sustainability in the small-scale fisheries in the global south?

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ARTICLE INFO

Keywords:
Financial sustainability
Latin America and Caribbean
Fishery improvement projects
Marine reserves
Implementing costs
Non-financial contributions

ABSTRACT

Marine conservation and sustainable fisheries require diversified funding sources to align with Sustainable Development Goals. This study examined seven Fisheries Improvement Projects (FIPs) and seven community marine reserves in Mexico, spanning 60 months. FIPs averaged $60,296 USD annually, with variations based on FIP type and accessibility. Marine reserves required $2343.16 USD per square kilometer over 17 months, varying based on size and location. Private funding covered 91.5 % of costs, primarily from philanthropic donations (69.5 %) and fishing organizations (21 %), with a minor contribution from markets (1 %, only in FIPs). Public funding constituted 8.5 %, split between academia (4.5 %, only in reserves) and governmental sources (4 %). Despite efforts to engage other stakeholders, philanthropy remained the dominant funding source, most FIPs couldn't access a price premium and markets didn't support marine reserves. Community reserves heavily relied on philanthropy, raising concerns about long-term sustainability. Incorporating in-kind contributions, mainly from fishing organizations and communities, is crucial, particularly in small-scale fisheries in the Global South. Strengthening community agreements and public-private coordination is essential to attract new investments for small-scale fisheries' sustainability, addressing institutional challenges in the Global South.

1. Introduction

Increasing levels of resources are being invested every year to sustain healthy oceans and their impact on the livelihoods of the three billion people who depend on marine and coastal biodiversity for their livelihoods (United Nations (UN), 2015). This need led the United Nations (UN) to proclaim 2021–2030 as the Decade of Ocean Science for Sustainable Development (UN, 2015). However, there is a 50 trillion USD funding gap between the current levels of funding available, and those required to meet the SDG (Burgess et al., 2018), with a gap of $175 billion for SDG 14 specifically (World Economic Forum (WEF), 2022).

Market demand for sustainable seafood, as well as the commitments made by States to the SDG, have contributed to increased efforts to produce sustainable seafood. To meet this growing demand, international certifications and standards have been developed over the last two decades for fisheries sustainability, such as Marine Stewardship Council (MSC), Fishery Improvement Projects (FIP), Fair Trade, and the Seafood Watch Program of Monterey Bay Aquarium (SFW MBA). For example, FIPs, which were launched in 2006, increased to 83 in 2014 (California Environmental Associates (CEA), 2020) and to 246 by 2023 (Fisheryprogress, 2023 at https://fisheryprogress.org/), with Latin America-Caribbean and Asia hosting the most projects and an increasing number of international buyers committing to sourcing their seafood from FIPs or eco-certified products. FIPs have recently included (2021) the social impact on fisheries through a social responsibility and human and labor rights that is just beginning to be implemented.

Marine reserves - clearly defined areas in which fishing activity [as well as other extractive and non-extractive activities] is regulated - are another essential spatial management tool (Hilborn et al., 2004; Sala and Giakoumi, 2017; Villaseñor-Derbez et al., 2022) to reverse ocean degradation and restore fisheries. The case studies presented here occur whether in partially (like those fisheries that develop inside MPAs) or fully protected areas (totally protected fish refuge areas). There are numerous types of marine reserves, focused on biodiversity conservation (e.g., Marine Protected Areas [MPAs]), or preservation and restoration of fishing resources (e.g., fish refuges [FR]), community reserves, locally managed marine areas). The number and size of marine reserves has continued to increase yet only 2.7 % of the global ocean is highly protected (Sala et al., 2021), and new commitments (including 30 × 30) continue to drive implementation.

To meet these targets, significant steps forward must be made in the Global South. According to the definition of Global South established by

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https://doi.org/10.1016/j.ecolecon.2024.108350
Received 7 November 2023; Received in revised form 27 July 2024; Accepted 10 August 2024
Available online 24 August 2024

UNDP (2004) and production data from FAO (2022), from the 25 countries that most contribute to fisheries production worldwide (80 % of production), the Global South's fisheries (16 countries, out of 25) contribute with 43.92 millions of tons, which represent 70 % of the production coming from the 25 top producer countries. Yet, fisheries in the Global South are complex and a well-documented wicked problem (Jentoft and Chuenpagdee, 2009; Khan and Neis, 2010). Small-scale fisheries play a critical role in supporting the livelihoods of millions of people, particularly in developing countries. These fisheries encompass a diverse range of fishing activities, often operated by individual fishers or small groups, catching a wide range of species. Despite their relatively small-scale operations, they collectively contribute significantly to global fish production and food security (FAO, 2022). Small-scale fisheries are characterized by their dependence on local resources and their close connection to coastal communities, and while they are essential for local economies and food supply, they face numerous challenges and threats. Unsustainable fishing practices, overexploitation, and habitat degradation are significant concerns, leading to declining fish stocks and threats to marine biodiversity (Rosenberg, 2003). Furthermore, these fisheries often lack adequate governance, access to adequate financial and technical resources, impeding their capacity to improve sustainability and value-chain efficiency (Bennett et al., 2015).

Efforts to promote the sustainability and resilience of small-scale fisheries have gained momentum globally. In the Global South, underfunded governments have often depended on external funding to help cover the implementation costs of conservation and sustainability projects (Oliveira Leis et al., 2018; Gruby et al., 2021). The focus on increasing the number of sustainable fisheries and the marine reserve coverage has led many conservation funders (often from the Global North) to invest heavily in these initiatives, funding Civil Society Organizations (CSOs) and governments to work on the ground. Market incentives have been proposed for sustainable fisheries, as demand for sustainable products grows. Price premiums for some eco-certified seafood are documented in the literature (Roheim et al., 2011; Fernández Sánchez et al., 2020) and have been used as an incentive to include fishers in such schemes globally, yet whether any retail-level price premium reaches the fishers at the source is not clear (Roheim et al., 2018). Community-based marine reserves, however, lack any market incentives and differ from traditional (top-down) MPAs in their financing models. In traditional MPAs, federal or local taxes or access fees cover operating costs, and benefits are distributed among society at large. However, in community reserves, opportunity costs are absorbed by the fishers who create them, through increasing restrictions on fishing grounds and operational costs over time are also absorbed, while benefits can be accrued local and, ideally, by society at large (Villaseñor-Derbez et al., 2023).

Despite the proliferation of the number of eco-certifications and marine reserves globally, there is very little information about how much they cost to implement on the ground. A global MPA network covering 20–30 % of the ocean has been estimated to cost $5–19 billion per year to operate (Balmford et al., 2004), yet there is no literature available as to how much individual community initiatives cost, and who pays them. This article collects five years of costing data from seven FIPs, and one and a half years of costing data from seven networks of bottom-up marine reserves, providing information on who pays for sustainability efforts. We explore how much each initiative costs, who contributes (and who *should* contribute), and we address the importance of documenting financial and non-financial contributions to create transparent and scalable actions, especially in the context of small-scale fisheries in the Global South.

2. Methods

2.1. Characterization by fisheries and marine reserves

The information presented in this analysis comprises a financial and non-financial contributions profile of seven FIPs in Mexico: (1) multispecies finfish and (2) ocean whitefish, both in the Pacific; (3) jumbo squid, (4) penshell, and (5) multispecies finfish in the Gulf of California; and (6) red snapper, and (7) octopus in the Gulf of Mexico. Information is also presented for seven networks of bottom-up marine reserves in the Pacific, Gulf of California, and Mesoamerican Reef System (Fig. 1), summarized in Table 1. Eligibility of these FIPs and reserves was based on the existence of costing data for a period longer than 12 months.

The fisheries were characterized according to several variables that were chosen due to its relevance for the FIP objectives (as described in FisheryProgress.org), and include the type of FIP as well as other relevant eco-certification standards (e.g., MBA SFW, MSC, Fair Trade; Table 1). FIPs are characterized as basic (those that work on some of the 25 indicators of the MSC standard V3.0, MSC, 2023) and comprehensive (those that address all indicators). The species included in each FIP are listed in Table 1. In the case of marine reserves, the name, modality (community reserves, core zones of Marine Protected Areas - MPAs, and Fish Refuge - FR), and the extension of the no-take zone are included. Some of these conservation modalities are legally recognized (MPAs, FR), while in other cases they are voluntary community efforts (community reserves). It is also indicated whether or not the fisheries operate in exclusive user rights schemes, through a concession or other TURF (Territorial Use Rights for Fisheries), and the origin of the initiative (top-down or bottom-up). Bottom-up FIPs or marine reserves refer to those that are community-driven. Top-down FIPs are market-driven, whereas top-down marine reserves are government-driven.

Several authors have proven the relevance of surveys as a method for collecting quality data in financing in conservation (Balmford et al., 2004; Baralon et al., 2021; Wardropper et al., 2021; Fundación Interamericana, 2022), fisheries (California Environmental Associates, 2020), as well as in impact investment (Rodewald et al., 2020), including multiple sectors and a diverse range of interests. For the purpose of this study, and guided by the methodologies exposed for data-poor studies with coastal communities (Lucas et al., 2012, Comunidad y Biodiversidad A.C, 2014, Fernández-Rivera Melo et al., 2019, Fulton et al., 2019), direct consultations were carried out with stakeholders involved in the implementation of fisheries improvement projects and marine reserves during this period. We documented the cost of designing and implementing marine sustainability efforts during quarterly online or in-person meetings with all participants. Data categories were selected according to those commonly considered in conservation and fisheries projects: salaries, consultants, travel expenses, equipment and materials, workshops and meetings, other direct costs, indirect costs, and financial contributions from the market-private sector if applicable. Data sets were cleaned and curated, and presented back to the stakeholders during assembly meetings, once a year. These meetings were held in person or online during COVID-19 pandemic (2020 and 2021), during which, stakeholders provided feedback and validated the data.

Some of the studied communities had complementary efforts (either ongoing or concluded) that also influenced the financial or technical capacity of stakeholders to contribute to FIP and marine reserve implementation, and are described further below:

Isla Natividad and La Bocana, Baja California Sur. The Pacific spiny lobster fishery, caught by cooperatives of these and other communities, was certified by the MSC in 2004 and remains active. This was the first small-scale fishery certified as MSC, globally, and one of the first 10 fisheries in the world to obtain certification. The marine reserves (FR or community-based) are focused on abalone replenishment, although other species of commercial interest (e.g., turban snail octopus, lobster, sea urchin) benefit from protection.

Jumbo squid, Gulf of California. This fishery has not operated since 2020 due to significant variations in squid population dynamics that affect its distribution and phenology (Urías-Sotomayor et al., 2018;

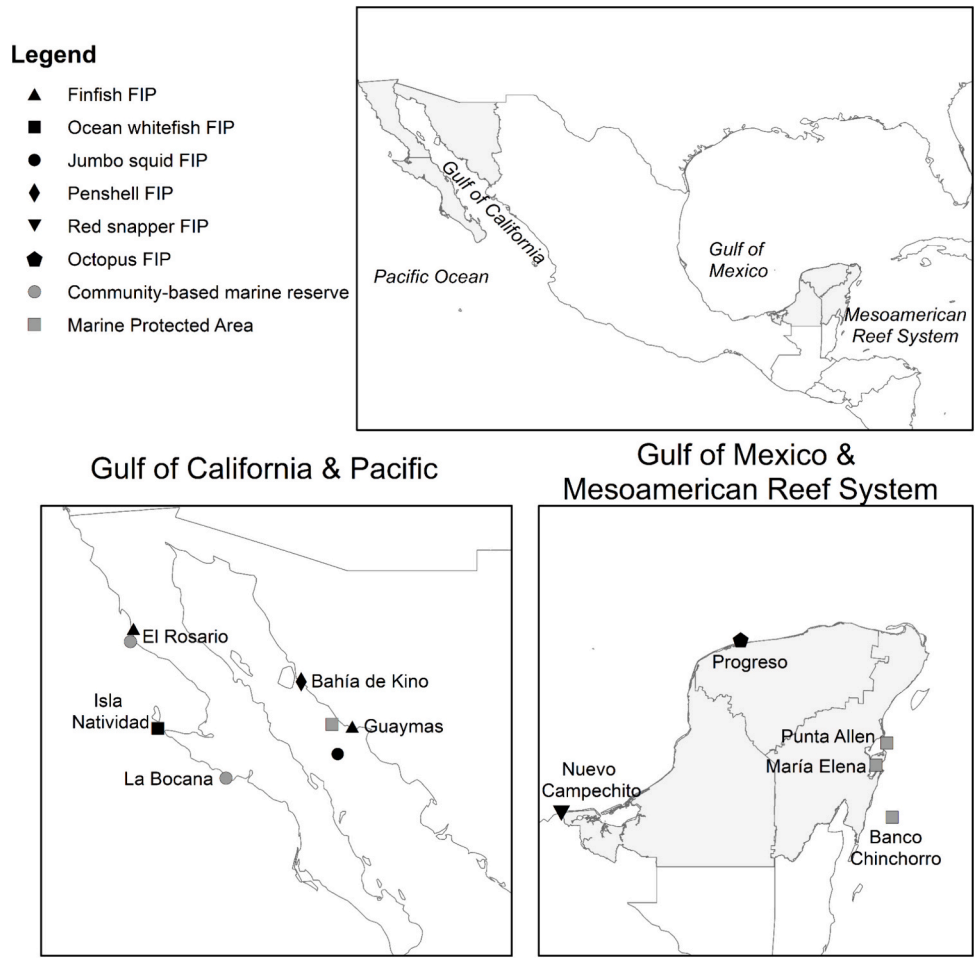

Fig. 1. Location of the fisheries under FIP scheme and marine reserves represented in this study.

Wen et al., 2020). This is a periodic phenomenon related to El Niño oscillations.

Penshell, Bahia de Kino. This FIP was inactive between 2020 and 2022, while it transitioned to a FIP with an enhanced fishery approach due to a change in their permits to aquaculture in the wild. Hence, the enhanced fishery approach was more suitable for this project, as it seeks to reduce its impact on the ecosystem and wild populations of penshell. It is an area with an integrated management of the habitat's components and the broader ecosystem.

Punta Allen, María Elena, and Banco Chinchorro (Mesoamerican Reef System). The Caribbean lobster fishery in Mexico, obtained the MSC certification in 2012, but withdrew from the standard five years later due mainly to a lack of price premium that made it very difficult for the fishers to pay to sustain the certification requirements (audits, research, improvements, and recertification; Pérez-Ramírez et al., 2016).

2.2. Documenting costs and data analysis

From January 2018 to December 2022 (60 months), Comunidad y Biodiversidad (COBI), a CSO that has worked in the FIPs implementation. With the support of the FIPs' participants (see Table 2 in supplementary materials), COBI documented the financial and in-kind contributions made by producers, managers, academics, researchers, philanthropist, and the markets to implement the improvements associated to the FIPs Action Plans (developed after the assessment of each fishery against the MSC standard, and expanded recently to include social improvements). After the first learning phase with this experience, from May 2021 to October 2022 (17 months), COBI applied the same process to marine reserves. This process imperatively required to: i) monitor financial and/or non-financial contributions by each stakeholder involved within the FIPs and marine reserves on a quarterly basis, and ii) present and validate costs with each multi-stakeholder group, through internal workshops and/or separate virtual meetings in order to receive and incorporate feedback.

Both in-kind and financial contributions were documented in the local currency (Mexican pesos), but for the purpose of this analysis we present the information in US dollars based on the five-year average official exchange rate of 1USD = $20.08 Mexican pesos published in the Diario Oficial de la Federación, *2024* (the Federal Register). Philanthropic contributions refer to grants and donations applied through CSO.

To calculate the total cost of the FIP improvements and marine reserve operations, as well as their respective investment percentages for each stakeholder involved, the costs were classified into three phases: i) design costs (e.g., stakeholder identification, socialization), ii) implementation costs (e.g., research consultancies, monitoring, participation cost, enforcement, communication campaigns, etc.), and iii) follow-up costs (e.g., presentation of results, compliance and progress audits, validation of data collected by fishers).

The following aspects were considered when developing and implementing the costing template:

1. Data categorization adequate to the activity (as described in section 2.1).

Table 1
Characterization of seven FIPs and seven marine reserve networks, in the Pacific, Gulf of California, Gulf of Mexico, and the Mesoamerican Reef System.

Community	Conservation / fisheries goal	Sustainable fisheries management (FIP, SFW, MSC, FT)	FIP type (Basic, Comprehensive)	Fisheries of focus	Marine reserve	Type of marine reserve (community-based, FR, MPA)	No-fishing area (km^2)	TURF	Origin of the scheme (Bottom-up/ Top-down)
El Rosario & Isla Cedros, Baja California	By 2024, the FIP is comprehensive with rating A. The marine reserves contribute to abalone and lobster replenishment.	FIP / Fair Trade (2017 to date) / (2019–2021)	Comprehensive	Ocean Whitefish (*Caulolatilus prínceps*) Barred Sand Bass (*Paralabrax nebulifer*) California Sheephead (*Semicossyphus pulcher*) Red Rockfish (*Sebastes constellatus*) Vermillion Rockfish (*Sebastes miniatus*) Green abalone (*Haliotis fulgens*) Pink abalone (*Haliotis corrugata*) White abalone (*Haliotis sorenseni*) Black abalone (*Haliotis cracherodii*)	Islas del Pacífico de la Península de Baja California Biosphere Reserve Punta Baja La caracolera Sport fish China town	MPA Community-based marine reserve	 7.15 5.64 1.6 1.04	Yes	Bottom-up
Isla Natividad, Baja California Sur	By 2025, the FIP is basic with rating B. The lobster fishery maintains the MSC certification. The marine reserves contribute to abalone and lobster replenishment.	MSC (2004 to date) FIP (2018 to date)	NA Basic	Pacific spiny lobster (*Panulirus interruptus*) Ocean whitefish (*Caulolatilus princeps*) Green abalone (*Haliotis fulgens*) Pink abalone (*Haliotis corrugata*)	El Vizcaíno Biosphere Reserve Punta Prieta La Plana/ Cuevas	MPA Temporary FR	 0.7 1.3	Yes	Bottom-up
La Bocana, Baja California Sur	The lobster fishery maintains the MSC certification. The marine reserves contribute to abalone and lobster replenishment.	MSC (2004 to date)	NA	Pacific spiny lobster (*Panulirus interruptus*) Green Abalone (*Haliotis fulgens*) Pink Abalone (*Haliotis corrugata*)	 La Bocanita El Estero El Rincón	 Community-based marine reserve	 0.20 0.12 0.27	Yes	Bottom-up
Jumbo squid, Gulf of California	By 2020, the FIP is comprehensive with rating A.	FIP / SFW (MBA) - Good Alternative (2017–2022)	Comprehensive – INACTIVE since 2022	Jumbo squid (*Dosidicus gigas*)	NA	NA	NA	NA	Bottom-up
Bahía de Kino, Sonora	By 2026, the FIP is comprehensive with rating A.	FIP (2017 to date)	Comprehensive	Penshell (*Atrina tuberculosa*)	NA	NA	NA	NA	Bottom-up
Guaymas, Sonora	By 2024, the FIP is comprehensive with rating A.	FIP (2017 to date)	Comprehensive	Ocean Whitefish (*Caulolatilus prínceps*), Yellowtail Amberjack (*Seriola lalandi*), Gulf Grouper (*Hyporthodus acanthistius*) Goldspotted Sand Bass	El Resumidero Punta Chivato Roca partida	Temporary FR	0.43 0.30 0.65	No	Bottom-up

(*continued on next page*)

Table 1 (*continued*)

Community	Conservation / fisheries goal	Sustainable fisheries management (FIP, SFW, MSC, FT)	FIP type (Basic, Comprehensive)	Fisheries of focus	Marine reserve	Type of marine reserve (community-based, FR, MPA)	No-fishing area (km^2)	TURF	Origin of the scheme (Bottom-up/ Top-down)
				(*Paralabrax auroguttatus*) Red Snapper (*Lutjanus peru*)					
Nuevo Campechito, Campeche	By 2024, the FIP is comprehensive with rating A.	FIP (2019 to date)	Comprehensive	Red snapper (*Lutjanus campechanus*)	NA	NA	NA	NA	Initially Top-down, after Bottom-up
Yucatán	By 2025, the FIP is comprehensive with rating A, and enters MSC Full-Assessment.	FIP/ SFW (MBA) - Avoid /Fair Trade/ In transition to MSC (2019 to date)	Comprehensive	Red octopus (*Octopus maya*) Common octopus (*O. americanus*)	NA	NA	NA	NA	Top-down
Punta Allen, Quintana Roo	The marine reserves contribute to groupers' replenishment and their spawning sites are preserved.	MSC 2012–2017/ SFW (MBA) - Good Alternative/ FIP 2017–2022	Comprehensive – INACTIVE since 2022	Caribbean spiny lobster (*Panulirus argus*) Nassau grouper (*Epinephelus striatus*)	Arrecifes de Sian Ka'an Biosphere Reserve Punta San Juan Niche Habin	MPA Temporary FR	 16.28 15:83	Yes	Bottom-up
María Elena, Quintana Roo	The marine reserves contribute to lobsters' replenishment.	MSC 2012–2017 / SFW (MBA) - Good Alternative/ FIP 2017–2022	Comprehensive – INACTIVE since 2022	Caribbean spiny lobster (*Panulirus argus*)	Arrecifes de Sian Ka'an Biosphere Reserve Punta Loria San Román Norte San Román Sur La Poza Gallineros Cabezo Mimis Punta Niluc	MPA Temporary FR	 0.07 0.03 0.01 0.04 0.08 0.09 9.98 0.15	Yes	Bottom-up
Banco Chinchorro, Quintana Roo	The marine reserves contribute to lobsters' replenishment.	MSC 2012–2017 / SFW (MBA) - Good Alternative/ FIP 2017–2022	Comprehensive – INACTIVE since 2022	Caribbean spiny lobster (*Panulirus argus*)	Banco Chinchorro Biosphere Reserve 40 Cañones	MPA Temporary FR	 122.57	Yes	Bottom-up

Table 2
Costs per FIP and contribution percentages of actors involved in each project during 2018–2022. Philanthropic contributions refer to those provided by COBI (96 % of philanthropy contributions on average) and other CSOs (4 % average).

FIP (community)	Pacific Finfish Multispecific (El Rosario, Isla Cedros)	Ocean Whitefish (Isla Natividad)	Jumbo squid (Gulf of California)	Penshell (Bahia de Kino)	Gulf of California Finfish Multispecific (Guaymas)	Gulf of Mexico red snapper (Campeche)	Yucatan Octopus (Gulf of Mexico)	Average
Cost-documenting period	5 years	2 years	5 years	5 years	5 years	4 years	2 years	NA
Total cost (USD)	$281,265.76	$65,533.15	$240,803.11	$271,831.32	$303,442.29	$201,886.85	$300,097.69	$237,837.17
Average annual cost (USD)	$58,270.20	$32,766.57	$48,160.62	$54,366.26	$60,688.46	$50,471.71	$150,048.84	$64,967.52
Philanthropic contributions (through CSOs)	76 %	63 %	59 %	72 %	63 %	55 %	81 %	67 %
Fishing organizations contributions	14 %	33 %	23 %	17 %	33 %	30 %	8 %	23 %
Public institution contributions	10 %	4 %	18 %	11 %	4 %	2 %	6 %	8 %
Market contributions	0 %	0 %	0 %	0 %	0 %	13 %	5 %	2 %

2. Data template needs to be easily completed. This can be done either by community stakeholders directly, or by COBI with the information provided by the group. The template should facilitate data curation before the analysis.
3. Integrate both financial and in-kind contributions. For example, opportunity costs represent what fishers stop earning or would have earned if they had carried out another economic activity (not including time spent on harvest or post-harvest activities). Effective time includes participation in training courses, workshops, meetings, fishery monitoring, biophysical and oceanographic monitoring, participation in interviews, and data collection and reporting. Financial contributions include financial resources allocated to cover for example research, equipment or traveling.
4. Participation costs from other sectors were provided accurately by the participants themselves (community partners, other CSOs). Government stakeholders were more reluctant to share this information, and costs were provided by the government staff through personal communication. For the government sector, the staff time spent on the FIP/reserve was considered (e.g., hours in meetings, days monitoring, and time spent in developing stock assessments).
5. The costing of marine reserves included follow-up meetings on the status-renewal of fish refuge zones, biological monitoring, oceanographic monitoring, collection of acoustic data on fish aggregations, and environmental and genetic connectivity studies, among others.

3. Results

3.1. Who bears the costs?

During the implementation of FIPs and marine reserves along the aforementioned period, several sources of financial and in-kind contributions were identified, clustered in private (91.5 %) and public funding (8.5 %). Private sources of funding include philanthropy via CSOs (69.5 %), fishing organizations (21 %), and private sector companies (1 %), such as markets (e.g., processing plants, seafood buyers). Public sources include funding provided by research centers (4.5 %), and different levels of government (national, state or municipal, 4 %).

3.1.1. Fishery improvement projects

The average annual cost of the FIPs in our study is $60,296 (ranging from $47,473 to $72,317 USD) (Fig. 2). Costs vary based on FIP type (basic or comprehensive), origin (bottom-up or top-down), pre-assessment results, action plan, certification/international recognition pursuit, and fishery size and context. Notably, integrating social responsibility and labor rights, essential for sustainability, introduced additional costs from 2021 onward, with investments now reflecting these changes.

During the five years of FIP cost monitoring, the greatest contributions were made by philanthropy, channeled through grants and donations to CSO (including COBI, SmartFish, Impact Blue) providing an average of 66 % of the necessary funding. The productive sector (fishing organizations and community groups) invested an average of 23 % mainly thanks to their non-financial contributions (in-kind), while government agencies (the National Fisheries and Aquaculture Institute, focused on fisheries research -INAPESCA-, the National Commission for Aquaculture and Fisheries, focused on fisheries management -CONAPESCA-, state government) contributed to 7 % of the total costs. Markets (referred to industry or corporate investment) contributed with 4 % of the necessary funding towards FIP improvements, and it is worth noting that their participation was exclusively in the top-down FIPs. Academia did not conduct research as a contribution to FIP improvements. They conducted studies but only as consultants for the FIPs; hence this is included in the contributions from philanthropy through CSO as they provided funding for the studies.

The costs, as well as the contribution percentages, evolved according to different variables, such as the growing demand for sustainable products, the progress of the FIPs in complying with the action plan, the adoption of a gradual exit strategy from philanthropy support with respect to financial contributions, and the involvement and contributions of the market as an active investor in the FIPs. Table 3 presents a breakdown of the total cost per FIP, the average annual cost, and the percentage of contribution by each stakeholder for the period mentioned in each project.

The largest financial contributions (Fig. 3) were in the first and second year for projects that started out as basics, with a deficiency of information on the stock status fishing effort, reference points, and agreements between stakeholders. This implies a greater investment in the first three years. In addition, there are activities that must be maintained on an annual basis (e.g., fishing logbooks and their respective analyses, research, follow-up meetings), and others that become sporadic (e.g., determining the effect of fishing on the ecosystem) and do not require an annual investment.

The annual production by fishery from 2017 to 2022, including the percentage variation from one year to the next, as well as the results of monitoring costs per kilogram or piece of a product when implementing good fishing practices, and price variations through time, are shown in Table 4. The records indicate a variation in the number of metric tons produced, as well as in the prices documented by the fishing

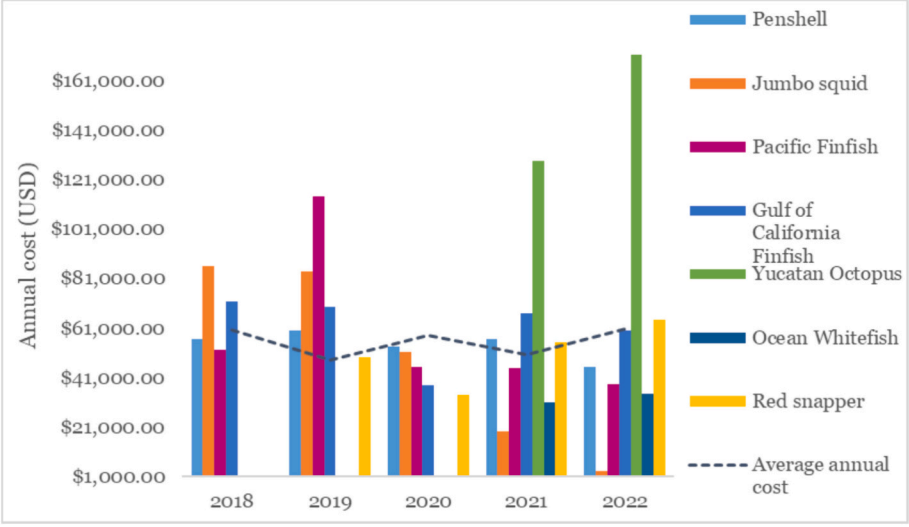

Fig. 2. Annual costs per FIP and annual cost average in each project.

Table 3
Information of the analyzed fisheries, and the difference in prices due to sustainable management from 2017 to 2022.; I = % of indicators above 80; P = Progress rating (A, B, C, D, E); T- 2017 = total of tons in 2017; T- 2018 = total of tons in 2018; T- 2019 = total of tons in 2019; T- 2020 = total of tons in 2020; T- 2021 = total of tons in 2021; T- 2022 = total of tons in 2022; P - B = Price at the beginning in 2017 (US dollars) / Kg or pz; P - 2020 = Price in 2020 (US dollars) / Kg or pz; P - 2021 = Price in 2021 (US dollars) / Kg or pz; and P - 2022 = Price in 2022 (US dollars) / Kg or pz. NA = not available, NR = not registered.

Fishery	Species	I	P	Total tons per year						Price per year			
				T-2017	T-2018	T-2019	T-2020	T-2021	T-2022	P - B	P-2020	P-2021	P-2022
Multispecific finfish – El Rosario and Isla Cedros	*Caulolatilus princeps* *Paralabrax nebulifer* *Semicossyphus pulcher* *Sebastes constellatus* *Sebastes miniatus*	54	A	0	0	42	61	79	159	NR	$1.36 USD/Kg	$1.73 USD/Kg $0.69 USD/Kg $1.03 USD/Kg $2.12 USD/Kg $2.12 USD/Kg	$1.73 USD/Kg $1.28 USD/Kg $1.7 USD/Kg $2.32 USD/Kg $2.32 USD/Kg
Ocean whitefish – Isla Natividad	*Caulolatilus princeps*	68	D	NA	NR	NR	57	49	21	NR	$1.37 USD/Kg	$7.75 USD/Kg	$9.60 USD/Kg
Jumbo squid – Gulf of California (INACTIVE)	*Dosidicus gigas*	86	A	100	0	0	0	0	0	NR	NA	NA	NA
Penshell - Sonora (enhanced fishery)	*Atrina tuberculosa*	57	E	2	4	2	0.06	0	0	NR	$4 USD/pz	$ 4 USD/pz	$ 4 USD/pz
Multispecific finfish – Guaymas	*Caulolatilus princeps* *Seriola lalandi* *Hyporthodus acanthistius* *Paralabrax auroguttatus* *Lutjanus peru*	61	A	42	42	14	26	26	22	NR	$5.15 USD/Kg	$2.36 USD/Kg $4.18 USD/Kg $6.27 USD/Kg $2.87 USD/Kg $6.27 USD/Kg	$2.36 USD/Kg $4.18 USD/Kg $6.27 USD/Kg $2.87 USD/Kg $6.27 USD/Kg
Red Snapper – Gulf of Mexico	*Lutjanus campechanus*	46	A	NA	50	6	16	19	6	$6 USD/Kg	$7.5 USD/Kg	$6.25 USD/Kg	$7.24 USD/Kg
Mexico Yucatan octopus - drift rod and line	*Octopus maya* *Octopus americanus*	61	A	NA	NA	NA	534	1241	986	$5 USD/Kg	$5 USD/Kg	$7.5 USD/Kg	$6.3 USD/Kg $6.0 USD/Kg

organizations. These fluctuations may be due to various factors such as the demand for the product, the increasing diversity of markets, a supply from other latitudes, and also from that which comes from illegal fishing, environmental and social shocks such as the COVID-19 pandemic, climate change, red tide, among others.

3.1.2. Marine reserves

Over a 17-month period from May 2021 to October 2022, the stakeholders involved in marine reserves in Mexico shared their financial contributions towards monitoring and operating seven networks of marine reserves, encompassing fish refuges and community reserves, across three distinct regions of the country:

- Pacific Network: El Rosario (four community marine reserve sites), Isla Natividad (two FR sites), La Bocana (two community marine reserve sites).
- Gulf of California Network: San Pedro Nolasco Island (ISPN, three FR sites).
- Mesoamerican Reef System Network: Maria Elena (eight FR sites), Punta Allen (two FR sites), and Banco Chinchorro (one FR site).

The average annual cost was US$2343.26/km^2 (Min $1614.54 USD, Max $7857.00 USD) (Fig. 4). The cost variations depend on a variety of variables, such as distance of the reserve to shore, size, research needs (some equipment for oceanographic research may be very costly), and time since it was declared. The funded activities encompass a diverse range of tasks, including salaries, equipment (e.g., hydrophones, temperature, oxygen and currents' sensors, and environmental DNA sample kits), workshops and meetings (capacity building, socializing with communities before, during and after), field work and traveling (biological -benthic cover, invertebrates, and fish- and oceanographic monitoring). Meetings serve to disseminate underwater monitoring results and present findings from interviews conducted to understand the socioeconomic conditions of users, such as small-scale fishers, sport fishers, and tourism service providers, where applicable.

The findings show that financing of marine reserves primarily relies on philanthropic contributions through CSO, accounting for 65 % of the total funding. Academia contributes 18 %, while fishing organizations contribute 17 %. The private sector, which often directly benefits from ecosystem services and tourism opportunities created within the marine reserves, does not contribute in the case studies in the Pacific nor the Gulf of California. In the Mesoamerican Reef region, a private company supported monitoring and research in marine reserves, providing funds to the CSO via grant making (2019–2022). A breakdown of the total cost per community reserve or fish refuge, the average monthly cost, and the percentage of contribution for the period mentioned in each community can be consulted in Table 5.

Based on the records documented during the marked period, considering the number of sites and the amount of km^2 protected, philanthropy through CSOs is the actor that contributes the most in the seven communities, with an average of 65 %. Although there are several activities that are implemented by fishing organizations with support and/or advice from academia and CSOs, philanthropy absorbs most of the costs to maintain these conservation and restoration schemes (Fig. 5).

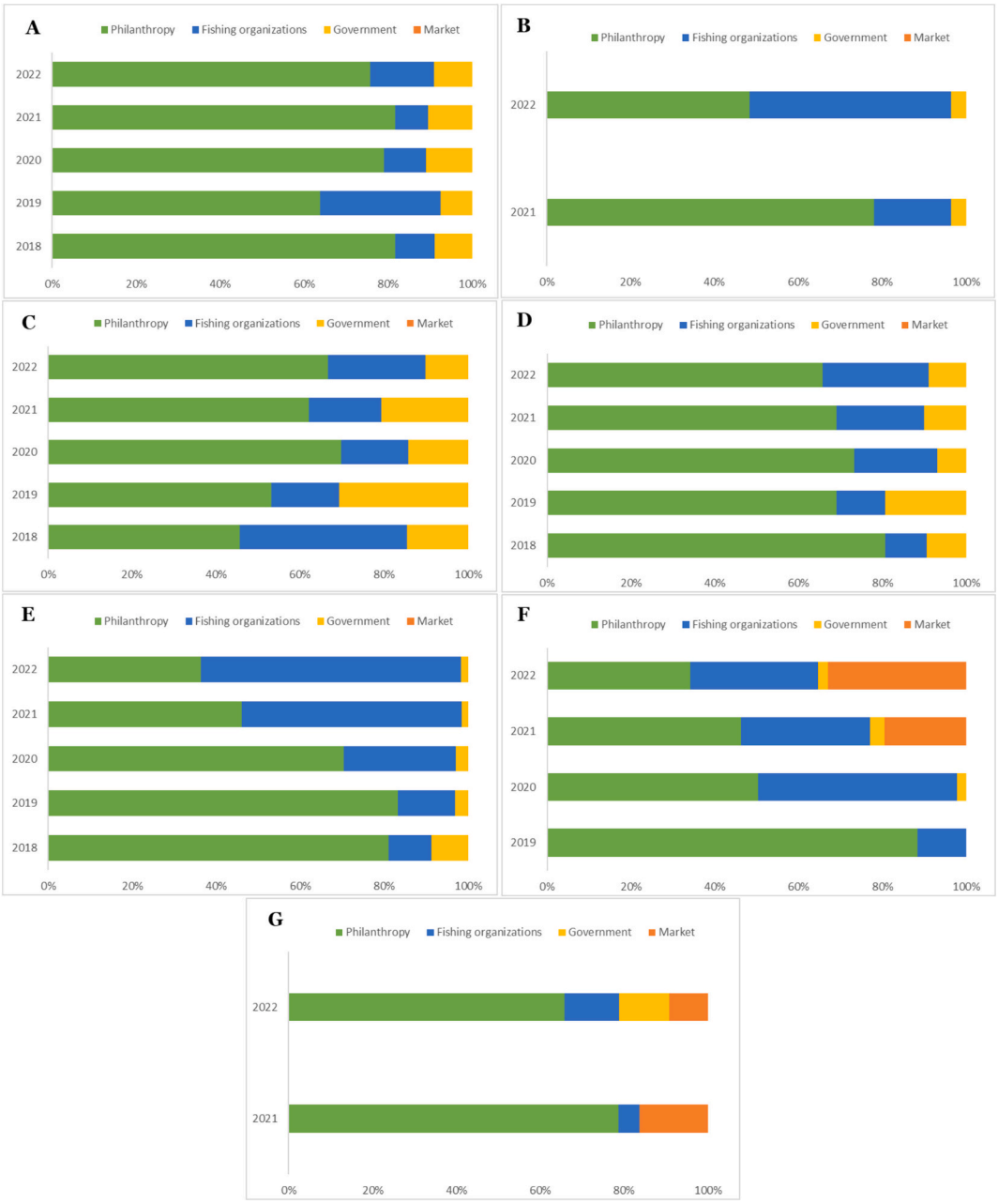

Fig. 3. Annual cost from stakeholders involved in the following FIPs: Pacific multispecies finfish (A), ocean whitefish from Isla Natividad, (B) jumbo squid (C), penshell (D), Gulf of California multispecies finfish (E), red snapper (F) and Yucatan octopus (G), from 2018 to 2022. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Table 4
Costs per community reserve or FR, and contribution percentages of stakeholders involved in each community during May 2021 to October 2022.

Networks of Marine Reserves	Pacific Network			Gulf of California Network	Mesoamerican Reef System Network			Average
	El Rosario	Isla Natividad	La Bocana	ISPN	Punta Allen	Maria Elena	Banco Chinchorro	
No. sites	4 sites	2 sites	2 sites	3 sites	2 sites	7 sites	1 site	NA
km^2	15.43	2	0.59	1.38	32.11	10.45	122.57	NA
Total cost (USD)	$26,717.53	$31,427.98	$6458.16	$9939.42	$38,710.19	$21,601.28	$20,364.10	$22,174.09
Average annual cost (USD)	$13,358.76	$15,713.99	$3229.08	$4969.71	$19,355.09	$10,800.64	$10,182.05	$11,087.05
Average annual cost per km^2	$990.27	$7857.00	$1614.54	$3601.24	$1223.46	$1032.57	$83.07	$2343.16
Contributions from fishing organizations	24 %	3 %	4 %	8 %	21 %	31 %	25 %	17 %
Contributions from philanthropy	65 %	48 %	27 %	92 %	79 %	69 %	75 %	65 %
Contributions from academia	11 %	49 %	69 %	0 %	0 %	0 %	0 %	18 %

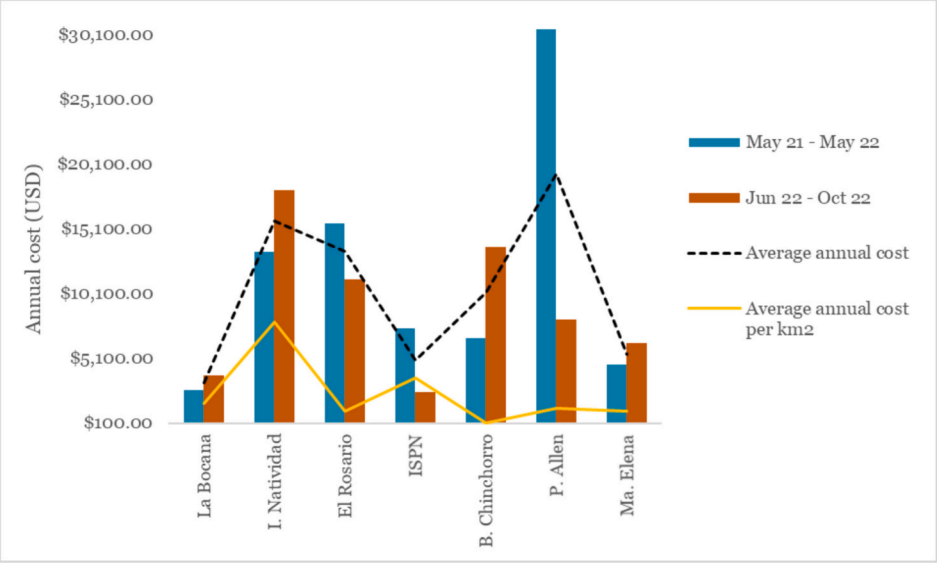

Fig. 4. Annual costs per marine reserve, average annual cost and average annual cost per km^2 in each project.

4. Discussion

4.1. Who pays for fisheries sustainability?

Efforts to scale the number of sustainable fisheries and the coverage of marine reserves continues unabated, yet the challenge of securing sustainable financing persists has been clearly identified (Robert et al., 2019). The findings of this study show that, in 10 communities and after five years, sustainability continues to rely heavily on philanthropic support (66 % average funding for FIPs, 65 % average funding for marine reserves). This emphasizes the critical role philanthropic funding plays in driving conservation and sustainability efforts, particularly in small-scale fisheries within the Global South. Funding transparency on FIPs is limited (CEA, 2020), yet this study stands out from the only other published data on FIP costs which reported that philanthropy provided funding for approximately one-third of Resource Legacy Fund (RLF) supported FIPs (CEA, 2020).

The average annual costs of FIP operation in our study fall within the range previously reported ($50,000 - $100,000.00 USD, CEA, 2020). There are few references on community marine reserve costs available. Balmford et al. (2004) report national-level MPA costs of $0 - $2.8 m per km^2 (median 775 per km^2) which is so broad as to be uninformative. Pascal (2011) provides community marine reserve data for Vanuatu, where the average annual investment ranged from $3330 to $19,444 per km^2 per year, with variations due to limited monitoring programs. The same author also notes that external agencies covered 95 % of the costs, a figure that is likely common across similar initiatives in the Global South. Recognizing and monetizing non-financial contributions and time-based opportunity costs adds complexity and has been less explored in existing studies. However, not doing so risks overlooking important socioeconomic and environmental factors that contribute to the success or failure of these efforts. This partial view of contributions and distribution of costs and benefits neglects the need for transformation in social relations and power dynamics (Chausson et al., 2023). Several authors have echoed on this need, centering equity in ocean governance and the need to decolonize science (Bennett et al., 2015; Spalding et al., 2023). This research adds to that pledge, the need to decolonize financing, and consider non-financial contributions, costs and benefits, in the global conversations as a key asset to engage communities, particularly in the Global South. To help calculate these contributions, this study developed a free budgeting tool (https://innovacionazul.shinyapps.io/AppCosteo/) that can be used to project design, implementation and follow-up costs over the lifetime of a FIP or marine reserve, divided by stakeholder.

Recently, a growing number of studies focused on investments and financial contributions, from business cases of conservation such as tourism mainly and, to a lesser extent, fisheries (Blomquist et al., 2015; Sala et al., 2016; Clark et al., 2018; CEA, 2020; Fernández Sánchez et al., 2020; Lara-Pulido et al., 2021). The financialization of nature and sustainable development plans have led to an increased number of initiatives that promote market-driven approaches to sustainability, often driven by funders from the Global North, as pathways to increase natural capital and achieve conservation goals on the ground. Most sustainable fishery initiatives look towards a price premium (Fernández Sánchez et al., 2020) as the financial motivation for sustaining activities over time, however this price premium is often elusive, especially at the bottom of the value network where the benefit does not necessarily trickle down to fishers (Roheim et al., 2018). Over the five years of the FIP dataset reported here, a price premium market was not consistently reached. Product price value changed little over the five years despite the FIP schemes and market participation. Price variations regarding the baseline are minor and can be explained by changes in demand, opening of new markets, impact of the pandemic (Lopez-Ercilla et al., 2021), inflation rate and exchange rate. The only products with a significant change in price were cabrilla (*Paralabrax nebulifer*) which increased 85 % and ocean whitefish (*Caulolatilus princeps*) which increased by 465 %, both of which are commercialized by a hybrid social enterprise (CSO-fish buyer) in Mexico. This hybrid enterprise (Comercializadora HealthyFish SAPI [a social enterprise]- SmartFish) worked with three of the FIPs in this study (Multispecies finfish - El Rosario and Isla Cedros, Ocean whitefish – Isla Natividad, Multispecific finfish - Guaymas), offering price premiums in two. Since a differentiated market was found for these species, the price did go up, and the costs and processes of good practices were reduced due to market demand (fisher, pers. comm.). Although it must be noted that any marketing or similar work to achieve a price premium is not recorded in this study, nor is it considered how the purchase of the product by the market contributes to the FIP (Table 2) if the actions did not contribute to the 25 FIP indicators (V3.0 from MSC fisheries standard).

4.2. Who should pay for sustainability?

Philanthropy makes important contributions in FIPs worldwide. Only 11 % (28 out of 244 total FIPs) and 3 % of the FIPs analyzed by CEA

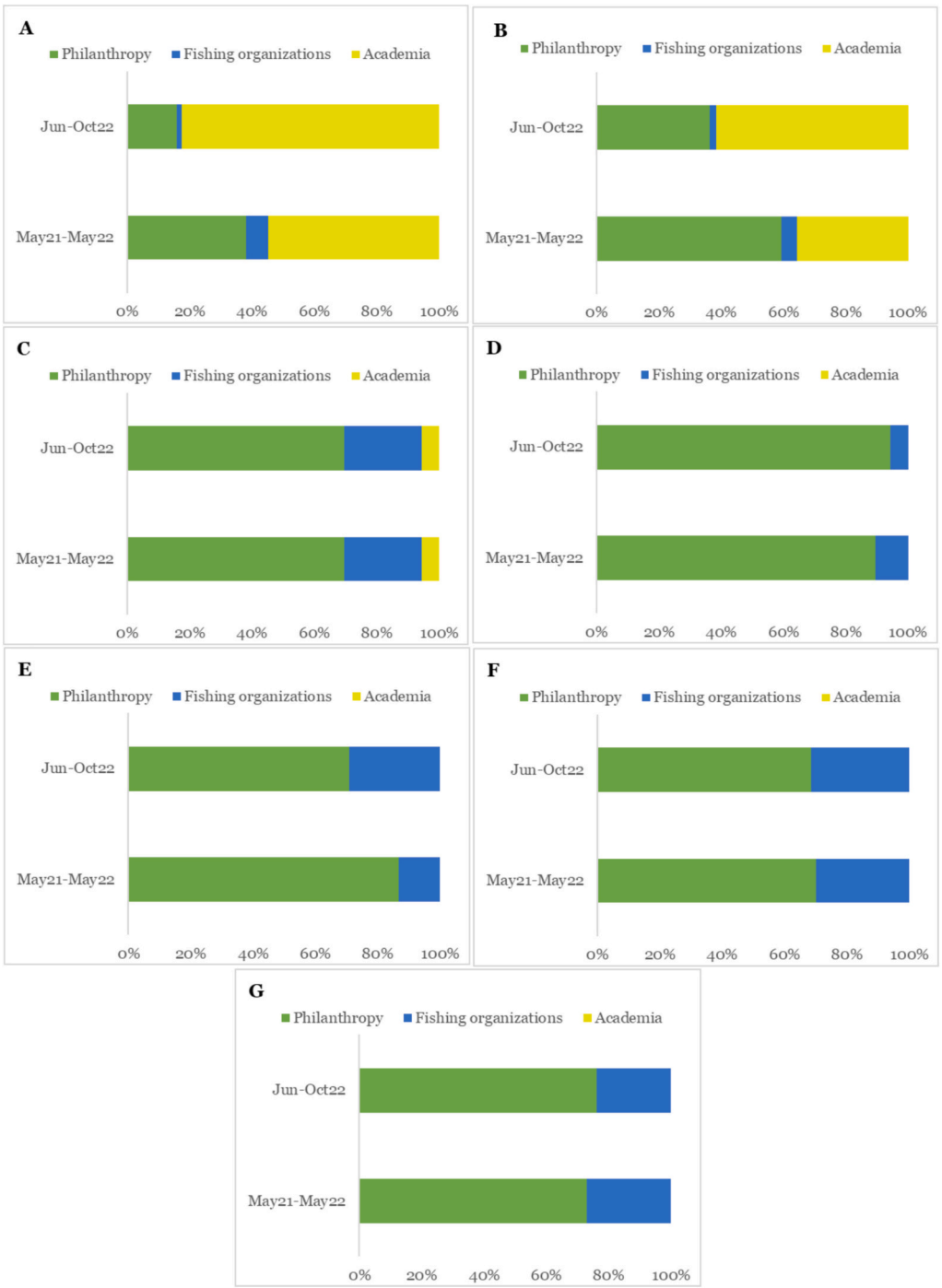

Fig. 5. Investment by the stakeholders involved in marine reserves: La Bocana (A), Isla Natividad (B), El Rosario (C), ISPN (D), Banco Chinchorro (E), Punta Allen (F), and María Elena (G), during the period May 2021 to October 2022.

(2020) received funding and in-kind contributions from philanthropy, respectively, as reported by RLF. It is unclear who provides the remaining budget. For the purposes of this study, philanthropy is viewed as all contributions made by CSOs through grants and donations. On the other hand, CEA (2020) differentiates and separates both CSO and foundation funding, and it is not clear where the CSO funding originated from initially (i.e., *if it was not philanthropic funding, what was it?*). The same analysis indicates, according to anonymous sources, that "counterpart" funding (from industry, government, and other donors) can contribute with the double amount of the percentage indicated by RLF, both in cash and in kind. There is no clarity as to who provides the rest of the contributions or in what proportion the other stakeholders participate by providing the remaining necessary resources. This indicates that information on contributions is not being systematically observed or collected, making it difficult to analyze. The contributions noted in the CEA report (CEA, 2020) do not correspond to what is reflected in the present study, which could indicate that these CEA cases are isolated, in contexts linked to very specific conditions and elements (Sala et al., 2016); making their scalability difficult.

Overall, there is no significant market participation to any of the FIP improvements presented in this analysis. While the market may benefit from the fishery being in a FIP, the market has only meaningfully contributed to two FIPs (Campeche snapper, Yucatan octopus), probably not coincidentally, being both originated as top-down FIPs (promoted by

the market). In both of these cases, there was significant interest from the market to undertake a FIP process, but also a strong interest from foundations for CSOs to become involve as the market did not have the technical capacity to track and implement the necessary actions to achieve the improvements. This would suggest that in market-driven FIPs, CSO are most likely to transfer the costs currently absorbed by philanthropy to the market, even though the market still makes relatively low contributions to funding the improvements directly. Zelasney et al. (2020) mention that this is a precarious situation, where fish workers in the Global South are almost entirely dependent on philanthropy for fishery improvements, which could vanish if funding sources dry up. Additionally, as Spalding et al. (2023) addressed, the funding -as well as governance agenda and scientific knowledge- largely comes from high-income countries, mostly within the Global North, undermining equity and effectiveness. Until FIPs turn into investible structures, the costs of FIP improvements stop being subsidized by philanthropy and are shifted to the private entities of the market, the real costs of sustainability will not be known.

There was no market participation in the bottom-up FIPs, despite the claimed increase in market interest in sustainability schemes in commodity fisheries, i.e., those with high market value. The reasons for this lack of interest by the market are not immediately clear. The market may be unaware of the FIPs (although that seems unlikely as FisheryProgress.org has positioned itself as the go-to hub for all FIPs), or that the Global North's markets do not see the incentives to participate. It should be noted that Comercializadora HealthyFish SAPI purchases from three of the five bottom-up FIPs (and achieved a price premium in two species) and commercializes to high-end markets in Mexico, showing that there is a market for the product. The volumes landed in the bottom-up finfish FIPs are not significantly different to those in the top-down finfish FIP within this study. This suggests that during the five years of the FIPs in this case study, markets will not seek out and join existing FIPs, but would rather initiate their own processes, that others can then join. Determining the return on investment for time and funding invested in to each FIP is difficult to calculate during the timeframe of the study. Upfront costs can be high, but the improvements in the fishery can have a long tail and economic benefits may occur in a longer timeframe than reported here. With the high contributions of philanthropy, environmental and social benefits are also a key motive for funding the FIPs, and once sustainability improvements have been made in a fishery, the improvements tend to remain in place even if preferential markets are not found. In that sense, FIPs and marine reserves may act as pathways towards sustainability, especially if people in the communities are the agents of those changes.

In the case of marine reserves, where market incentives are considerably lower due to a lack of return on investment, market does not participate in any way. This is true even in long-life reserves existing for 10–15 years. There is a significant contribution by academics through research centers in certain communities where joint research efforts are implemented. While academics do make contributions (installing and providing oceanographic sensors, conducting surveys, providing expertise) that improve knowledge and management, it would also be fair to say that the reserves could exist without this contribution. Many marine reserve studies focus on the potential benefits of spillover (which may or may not benefit the community that actually established the reserve, Cinner et al., 2014, Spalding et al., 2023) while many foci on tourism potential (Sala et al., 2013; Lara-Pulido et al., 2021; Viana et al., 2017). Mexico currently has plans to create 100,000 additional hectares of fish refuges (Gobierno de México, 2021) and many philanthropic organizations are funding complementary initiatives. Unfortunately, Mexico's government financial support to fish refuge operation (as part of CONAPESCA's federal subsidy budget) was eliminated in 2019 and there are no new mechanisms in place to fund the operation and enforcement of these marine reserves over time. This can lead to frustration and rejection by the fishing communities as the hope for increased enforcement or increased biomass does not materialize. In addition to the opportunity costs of the closed fishing grounds, they are burdened with operational costs too.

4.3. Challenges and opportunities to decolonize sustainable financing

Several barriers hinder the fulfillment of financing needs for sustainable development. These obstacles include a reliance on voluntary or informal commitments, market failures (Freiss et al., 2022), short-term thinking, and inconsistent policies that discourage large-scale private investments in sustainability (Clark et al., 2018). Additionally, harmful subsidies negatively impact the economic viability of small-scale fisheries (Schuhbauer et al., 2017). These challenges are closely linked to the worldviews and power dynamics responsible for climate change, resource overexploitation, and biodiversity loss (Chausson et al., 2023), emphasizing the need to recognize how financial mechanisms for preserving natural resources are interconnected with these issues. To address these challenges, financial solutions must integrate values that acknowledge the interdependence of ecosystem health and human well-being.

Funders have been pointed out as a main driver in promoting ocean governance (Spalding et al., 2023) and influencing conservation agendas (Gruby et al., 2021; Enrici et al., 2023). In small-scale fisheries that aim to improve their practices towards sustainability, they continue to be the main providers of seed funding during the early-mid stages. This is particularly important for FIPs in Latin America and the Caribbean, as these projects cover a wide variety of socio-economic contexts reflecting upon the regions' diversity, richness and complexity (Gomez-Gomez et al., 2024).

The lack of effective, innovative, scalable financial mechanisms in place to support fisheries sustainability, nourishes this dependent relationship, which deepens the difficulties of accomplishing self-governance (Spalding et al., 2023). An effective approach to cope with this context and ensures the authenticity of these efforts, aligning them with local aspirations, is to acknowledge philanthropists as influential stakeholders. This recognition has to come along with the inclusion of fishing and community-based organizations, as well as local entities with established trust-based relationships within the community groups. This focus on local engagement and sustainability, should include generating opportunities to adopt human-rights centered governance solutions.

Community-based initiatives have been documented to bring numerous economic and non-economic benefits. These initiatives empower communities in decision-making processes (Mansuri and Rao, 2004) and give them ownership over projects aimed at the common good and sustainable management of natural resources (Fenton et al., 2014). In fisheries, non-financial benefits encompass various aspects, notably environmental benefits like increased biomass of commercially exploited species, enhanced generation and overflow of larvae and juveniles to surrounding areas (Comunidad y Biodiversidad A.C, 2018, Villaseñor-Derbez et al., 2022), healthier fishery populations, higher biodiversity indices within marine reserves, fishing refuge zones, and increased trophic levels. Furthermore, community-based financing initiatives strengthen technical and soft capacities, leading to improved community resilience in the face of environmental impacts and shocks, such as climate change and pandemics (Fenton et al., 2014; Lopez-Ercilla et al., 2021). These initiatives also promote better governance and community participation in resource management (Espinosa-Romero et al., 2014), while enhancing narratives to foster alliances and gain public recognition for their efforts, ultimately strengthening their financial capacities (Tirumala and Tiwari, 2020). As a result, the livelihoods and well-being of communities can improve.

Despite global efforts to develop business cases for conservation and the growing appeal of green and blue finance (Shiiba et al., 2021), the private sector has primarily engaged in projects with strong business cases that promise clear returns on investment or cater to a market segment willing to pay premium prices. However, demonstrating the

effectiveness of conservation and fisheries-aligned projects in terms of measurable performance and value for money has been less promising (Clark et al., 2018). Investing in such projects could improve efficiency, reduce costs, and provide financial stability to the value network and conservation efforts (Shames et al., 2014; Clark et al., 2018). This, in turn, can sustain efficient research and management, as well as enable continuous improvements. The focus on short-term financial profitability often diminishes incentives for companies to invest in sustainability strategies and undertake the necessary long-term investments required for sustainable development projects with high upfront capital costs and long-term returns (Clark et al., 2018).

At the same time, it remains unclear how FIPs and marine reserves can be effectively scaled to make a real impact on sustainable resource use. If the main incentive of a FIP is a price premium across the value network, then it is by definition an exclusivity scheme that, if scaled to the level needed to create real ocean impact, loses its potency as the market competes with itself to drive costs down. Similarly, there is little business case for community marine reserves, and fundraising for creating marine reserves is much easier than acquiring funding for operating marine reserves in the long term. Options such as limited biomass extraction and partially protected reserves to pay for operating costs (Villaseñor-Derbez et al., 2023) can raise issues with ocean conservation purists. However, with limited government and long-term philanthropic funding for operation, additional strategies are needed to help support communities who implement bottom-up processes, often at their own cost once philanthropic funding dries up (or the project collapses, but this is rarely recorded). This study suggests that a greater focus on community-based financial solutions may unveil equity-based opportunities to ensure financial sustainability.

4.4. Lessons learned

Our study reveals a crucial funding gap in the early stages of marine conservation and sustainable fisheries projects (Future of Fish, 2021). Industry funding alone falls short of supporting project initiation, creating a heavy reliance on philanthropic contributions to kick-start initiatives, especially in regions like the Global South with limited government support, lack of organizational capacity, and high informality. However, market involvement must evolve to cover the costs of continued improvements. Our data support the idea that FIPs initiated by the market are more likely to include greater market contributions to fishery improvements. While markets are becoming more engaged, their contributions still often fall short (Inamdar et al., 2016), leaving philanthropy to effectively subsidize them.

Importantly, contributions should be constantly monitored. Data and information needs to be systematized. Having standardized metrics to monitor financial and in-kind contributions can greatly improve the understanding of bringing long-term funding (Rodewald et al., 2020). This serves as a foundation for diversifying strategies and exploring potential improvement solutions across sectors. Such initiatives are particularly pertinent to the financial frameworks operating within regions like the Global South, fostering greater adaptability and effectiveness in addressing evolving challenges.

Government funding, when available, is often misdirected through subsidies that boost production without promoting sustainability (World Bank, 2017; Fulton et al., 2019). This can exacerbate overexploitation of marine resources and hinder conservation efforts like marine reserves.

Philanthropic funding, though valuable, won't sustain these projects in the mid to long term, an ideal scenario for marine reserves. Recurring annual costs may be manageable for various stakeholders (mean $11,087), but they're often unaffordable for most fishing communities. Additionally, philanthropic funds vary in focus and distribution, responding to emerging situations rather than fostering long-term impact.

It's essential to shift the focus from attracting short-term funding to attracting long-term commercial investments that can sustain the transition. It is suggested that the focus should not be on how to attract funding, but on attracting long-term commercial investments that will sustain the transition (Holmes et al., 2014; Inamdar et al., 2016). Encouraging the private sector, such as markets and enterprises, to significantly increase their contributions in the short to medium term is critical (Encourage capital, 2016; Sala et al., 2016; Fernández Sánchez et al., 2020). Only then could we be talking about the expected return on investment that would challenge the current paradigm on sustainable financing, extending the responsible sourcing approach (product focus) to the fishery value network emphasizing inclusivity and diversity.

In the early stages of marine reserves and fishery improvement projects, community-driven organizations and fishing communities set the pace for investment, often without immediate returns. Clear communication, defined timeframes, and shared expectations with these communities are vital to transfer leadership, avoid dependence and paternalism (Torre and Fernandez, 2018). Failing to observe this, may lead to unorthodox scenarios in which the community is not prepared technically, financially and with the necessary social cohesion to sustain the project in the long term. Mismatched objectives and perceived timeframes between communities and external advisors can lead to discrepancies and a lack of meaning in project outcomes (Montero, 2009; Rojas-Andrade, 2013). This underscores the importance of aligning stakeholder expectations, costs, and benefits to ensure sustainability.

This is a reflexive-active process, where it is also necessary to share the expectations, costs, gains and benefits of implementing marine reserves, FIPs, or any other sustainability tool to be implemented, as well as the required financial and in-kind contributions. Otherwise, Fernández Sánchez et al. (2020) point out, based on economic theory, that the productive sector could refrain from applying sustainability schemes that are costly (e.g., eco-certifications) because of all the changes in production methods, organization, capacities, and governance that they entail, or, failing that, abandon the effort. The establishment of their own financial sustainability mechanisms and their finance work plans will also depend on how strong their technical, and administrative capabilities, soft skills, self-determination, and sense of agency they have developed. This is a window of opportunity for early-stage leadership and will determine whether improvements in the ecosystem and community will be permanent or not.

4.5. Policy implications

The findings from this study provide insights that could significantly influence policy decisions and shape recommendations for future funding models in marine conservation and sustainable fisheries projects by:

1. *Redirecting government funding towards sustainability*. The study highlights that government funding, when available, is often misdirected through subsidies that boost production without promoting sustainability. This creates a need to redirect government funds towards initiatives that support sustainability, thereby aligning public resources with long-term environmental goals.
2. *Reducing Reliance on Philanthropy*. This study shows that philanthropic contributions can be key to kick-start initiatives especially in regions with limited government support. Policy decisions could focus on creating frameworks that reduce this reliance by encouraging private sector involvement and incentivizing long-term commercial investments in marine conservation and sustainable fisheries. Private funding could be encouraged by tax incentives, or regulatory mechanisms that promote long-term responsible sourcing and commercial investment in marine conservation and sustainable fisheries.
3. *Aligning stakeholder expectations to nourish meaningful collaborations*: Typically, community partners are not included in the design phase, generating models that are not sensitive to their socio-economic and

environmental conditions, exacerbating inequalities. Projects need to be sure to "invite everyone to the party" when designing financial models and mechanisms. Policy recommendations include strategies for facilitating clear communication, defined timeframes and work plans (and enforce them), capacity-building, and shared expectations between community-driven organizations, fishing communities, funders, markets, and governments.

Overall, the findings suggest the need for a comprehensive approach to funding marine conservation and sustainable fisheries projects, one that involves redirecting government funding, reducing reliance on philanthropy, encouraging private sector engagement, aligning stakeholder expectations, and promoting long-term financial sustainability. By incorporating these insights into policy decisions and future funding models, policymakers can better support the transition towards sustainable practices in marine environments.

5. Concluding remarks

- Promoting marine conservation and sustainable fisheries demands diversified funding sources to mitigate reliance on a single channel. Long-term investments, spanning at least five to ten years, are crucial for generating environmental and social impacts. This necessitates strengthening financial capacities, fostering opportunities among stakeholders, and developing inclusive financial mechanisms.
- Despite efforts to diversify funding, marine conservation and fisheries sustainability heavily depend on philanthropic contributions, with market involvement remaining minimal, even after five years for certain Fisheries Improvement Projects (FIPs).
- Initially, philanthropy and support from Civil Society Organizations (CSOs) are essential for project initiation, but sustainability falters when funding wanes, often leading to project discontinuation.
- Market-driven FIPs benefit from market willingness to invest in fishery improvements, but when market stakeholders aren't involved from the outset, soliciting financial contributions becomes challenging, even when they purchase FIP products.
- Community marine reserves face financial precariousness due to the absence of market support, relying almost entirely on philanthropic funding. Documenting participation costs enhances transparency, enabling better understanding of investments and future requirements.
- To ensure project longevity, collaboration between governments, markets, and fishers is imperative to secure long-term investments aligning with their interests. Coordinated strategies can attract impact investments, especially in the Global South, where institutional weaknesses pose unique challenges.
- Aligning these strategies with the Sustainable Development Goals (SDGs) helps address disparities and propose effective solutions, recognizing that no single actor can overcome these challenges in isolation.

CRediT authorship contribution statement

I. López-Ercilla: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Project administration, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **L. Rocha-Tejeda:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **S. Fulton:** Writing – review & editing. **M.J. Espinosa-Romero:** Writing – review & editing, Funding acquisition, Conceptualization. **J. Torre:** Writing – review & editing, Funding acquisition, Conceptualization. **F.J. Fernández Rivera-Melo:** Methodology, Data curation, Conceptualization.

Declaration of competing interest

This work was supported by The Walton Family Foundation [grants number 2017-1469, 00101951, 00104754]; the David and Lucile Packard Foundation [grants number 2017-66237, 2019-69961, 2021-73213]; the Sandler Supporting Family Foundation [grants number 20180273, 20190282, 20200404, 20210356, 20220429], the Marisla Foundation [grants number 20170062, 20190231, 20200304, 20220131, 20230106], Summit Foundation [grants number 20180011, 20190091, 20200165, 20210149, 20220233], SacTun [no grant number], the Waterloo Foundation [grants number 1017-2853, 1017-4215], and MSC-OSF [no grant number].

Data availability

Data will be made available on request.

Acknowledgements

We are especially thankful to all the stakeholders working in FIPs and marine reserves, for sharing their costing data throughout the years, to allow for this analysis. We are also thankful to the support provided by Alesa Flores, Alfonso Romero, Jacobo Caamal, Laura Ibarra, Marco Polo Barajas, and Raziel Hernández, who were involved in documenting the costing data.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ecolecon.2024.108350.

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