Global Journal of human-social science: b
Geography, Geo-Sciences, Environmental Science & Disaster Management
Volume 24 Issue 4 Version 1.0 Year 2024
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-460x & Print ISSN: 0975-587X

Reflections on the Environment and the Way of Life of Brazilian Artisanal Fishermen

By Gustavo de Macedo Veras, Vivianny K. Galvão & Janaína A. Junkes
Centro Universitário de Maceió - UNIMA

Abstract- Extractive Reserves are territorial spaces in Brazil created by Law No. 9,985/2000 with the objective of protecting the livelihoods and culture of traditional Brazilian extractivist populations, as well as ensuring the sustainable use of natural resources in these areas. The recipients of this protection are artisanal fishermen, who inhabit the Brazilian coast and depend on fishing resources to survive. It so happens that this protection is questioned, given the problems that threaten these populations, such as disorderly fishing, pollution, tourism, in addition to the absence of public policies for them. In order to analyze the Jequiá Lagoon Marine Extractive Reserve as a form of protection for artisanal fishermen, a descriptive and exploratory study was developed, of a qualitative nature, with the artisanal fishermen of this conservation unit.

Keywords: jequiá lagoon marine; extractive reserve; artisanal fishermen; law protection; public policies.

GJHSS-B Classification: LCC: SH221, GE320.B6

Strictly as per the compliance and regulations of:

Reflections on the Environment and the Way of Life of Brazilian Artisanal Fishermen

Gustavo de Macedo Veras [α], Vivianny K. Galvão [σ] & Janaína A. Junkes [ρ]

Abstract- **Extractive Reserves are territorial spaces in Brazil created by Law No. 9,985/2000 with the objective of protecting the livelihoods and culture of traditional Brazilian extractivist populations, as well as ensuring the sustainable use of natural resources in these areas. The recipients of this protection are artisanal fishermen, who inhabit the Brazilian coast and depend on fishing resources to survive. It so happens that this protection is questioned, given the problems that threaten these populations, such as disorderly fishing, pollution, tourism, in addition to the absence of public policies for them. In order to analyze the Jequiá Lagoon Marine Extractive Reserve as a form of protection for artisanal fishermen, a descriptive and exploratory study was developed, of a qualitative nature, with the artisanal fishermen of this conservation unit.**

Keywords: jequiá lagoon marine; extractive reserve; artisanal fishermen; law protection; public policies.

I. Introduction

It can be seen that Brazilian artisanal fishing has numerous and complex specificities and considers social, political, institutional, economic and environmental factors intrinsic to each region of Brazil, and its users use various means of production such as petrels, boats and strategies to capture resources that are generally not very abundant, in a constantly changing environment (DIEGUES, 1983) and with conflicting social relations.

Although Brazilian artisanal fishermen have their own characteristics that differentiate them depending on the region of the country in which they live, it is possible to identify common characteristics that are not limited to the capture of fish, such as the existence of social cooperation, the sustainable management of the environment, the traditional way in which knowledge of fishing activity is passed from generation to generation (DIEGUES; ARRUDA, 2001).

In addition, they have in common, difficulties resulting from impacts caused by anthropic elements that constantly threaten their way of life, coming mainly from the conflicts generated in the environment in which they live and that comprise aspects related to nature, economy, social relations and politics, hence why the study of a given fishing community can reveal common difficulties experienced by it and by artisanal fishermen from other fishing communities, and contribute to the elimination or alleviation of such difficulties.

Artisanal fishing is also considered an indicator of environmental quality, being an important strategy for the conservation of fishery resources (CATELLA et al., 2012), which demonstrates its importance for the preservation of the natural environment in which they are located.

The data related to artisanal fishing are estimated and may not reflect the current fishing situation, because the programs for collecting and systematizing statistical data have been paralyzed since 2009, and the last two Statistical Bulletins of national fisheries were published in 2010 and 2011 from data inferred through statistical imputation models to circumvent the existing gaps. The last estimate was made in 2012, so that, to date, Brazil has not presented any more fish production bulletins, and the national fisheries statistics have since then been based on estimates derived from historical averages that have been more than a decade behind (ZAMBONI; DAYS; IWANICKI, 2020; ISHIZAKI, 2021).

Despite the lack of recent official data on fishing, there are data contained in studies developed by researchers and made available by the General Fisheries Registry (RGP), as well as reports developed by non-governmental organizations, which allow us to assess its social, economic and environmental importance.

Vasconcellos, Diegues and Kalikoski (2011) present data from the late 2000s indicating the existence of approximately 800,000 fishermen, stating that in 2011 this number would have increased to 993,000, of which 99.2% would come from artisanal fishing. This information corroborates the data from the RGP in 2015, which indicated the existence of approximately one million fishermen in Brazil, mostly concentrated in the states of Pará, Bahia and Santa Catarina.

As for the number of vessels, the 2017 RGP indicates a fleet of more than 24,000 vessels distributed along the coast, of which 21,000 are classified as artisanal, operating in areas close to the coast, mainly in the capture of shrimp, lobsters and demersal fish, with the states of Santa Catarina, Rio de Janeiro and Ceará concentrating most of the artisanal fleet. which demonstrates the great relevance of artisanal fishing in

Author α: Ph.D in Society, Technologies and Public Policies from SOTEPP-UNIMA/AL. e-mail: gugaveras@hotmail.com
Author σ: Ph.D in Legal Sciences and professor of the Graduate Program in Society, Technologies and Public Policies at SOTEPP-UNIMA/AL. e-mail: vivianny.galvao@unima.edu.br
Author ρ: Ph.D in Materials Science and Engineering and professor of the Graduate Program in Society, Technologies and Public Policies at SOTEPP-UNIT/AL. e-mail: janaina.junkes@unima.edu.br

the national socioeconomic context (ZAMBONI; DAYS; IWANICKI, 2020).

In a recently published study, it was found that artisanal fishermen in the Brazilian coastal zone, who have artisanal fishing as their main livelihood, or part of it, are involved in environmental conflicts that are mainly related to tourism, industrial fishing and shrimp farming activities in the north and northeast regions, and to the oil and gas chemical industry. shipyards and ports, in the south and southeast regions (HÜBNER et al., 2021).

Vieira (2003) reports that they face challenges related to vulnerable ecosystems impacted by intensive and disorderly urban-industrial activity, real estate speculation, predatory fishing and mass tourism models supported by large resorts and luxury condominiums.

Corrêa et al. (2018), when referring to fishing activity in the northern region, bring in their research allegations from fishermen that the reduction of fish stocks and the main difficulties to carry out their activity are related to the pollution of lakes, disorderly fishing, the lack of inspection and support from environmental agencies and studies of the historical impacts caused by the action of fishing on these bodies of water, the lack of security (theft of equipment and canoes), structural disorganization of the sector, problems and disputes between fishermen for fishing areas, lack of infrastructure for conservation, landing and local commercialization, in addition to the prohibition of some residents preventing passage and access to the lakes.

Capellesso and Cazella (2011), in a research carried out in the municipalities of Garopaba and Imbituba in the state of Santa Catarina, found that artisanal fishing has as important causes the problems of management of fishing resources and environmental impacts, forcing the use of pluriactivity, especially due to the excessive effort of catching industrial fishing, the use of meshes and gear prohibited by artisanal fishermen in the lagoons, the low salinization resulting from the closure of natural dams and excessive rainfall and the impacts of the release of water from rice cultivation areas near the Rio d'Una represent the main causes of the drop in fishing production.

Knox and Trigueiro (2015), in a research carried out on the coast of Espírito Santo, bring the testimony of an artisanal fisherman in the region that translates the impact on their activities:

> That's it, we've got too many problems, see? The first problem is that we have some trawlers here that come from Santa Catarina and are putting an end to our fishing here, [...] fishing that you can do in years, a lifetime of fishing, in one day they can do all this fish [...] (KNOX; TRIGUEIRO, 2015, p.4).

Correia and Sovierzoski (2005), when referring to artisanal fishing in the state of Alagoas, state that it is the target of environmental impacts that reflect the lack of environmental awareness of users and the absence of ecologically correct administrative policies, citing what happens to reef ecosystems, such as: inadequate navigation causing mechanical impacts; the use of corals and other invertebrates in the manufacture of artifacts for commercialization; sale of fish considered to be ornamental animals; predatory fishing, especially of species of high economic value, such as lobster and octopus, and disorderly tourism.

Throughout history, it has been noted that the treatment given by the State to artisanal fishermen had objectives other than to provide protection to their traditional way of life, privileging mercantile interests over fishing, to the detriment of the social, economic and environmental conditions in which they have always been inserted.

The legislation itself and the implementation of the rules of the Executive Branch are in the sense of establishing formal conditions such as: the requirement of personal documents, registration in the social registries of the Federal Government and affiliation to a Fishermen's Colony as requirements for their recognition as artisanal fishermen, which allows us to infer that they are on the margins of the interests of the State and private capital. they are victims of the harmful exploitation of the natural environment on which they depend.

Even the action of the state, through environmental agencies, generates conflicts with fishermen if it is not carried out correctly. This occurred during IBAMA's tenure, which led to conflicts with artisanal fishermen, since, by prohibiting fishing for certain periods, it generated dissatisfaction, fear and revolt on their part. Dias Neto (2010, p.80), in a work developed in the interior of Rio de Janeiro, brings statements by fishermen who portray this situation:

> I've gone into hiding several times (laughs). It's listening to the noise of IBAMA's engine and going straight to the boards! Wait for them to pass and go back to work. Because I'm working, I'm not doing anything wrong. Wrong is stealing! I'm a fisherman! Everyone is afraid. But you can't just sit at home.
>
> Suddenly, someone arrives shouting in Ponta Grossa "the IBAMBAS are in the Lagoon" Then the women are all desperate, thinking that their husbands are going to be caught or arrested (...). A fisherman who is a fisherman even faces the devil, how can he not face IBAMA?

In the same vein, Knox and Trigueiro (2013) bring results of research developed in fishing communities on the metropolitan coast and north of Espírito Santo.

> The sea was good for catching lobster, then they arrived [IBAMA], and oh, you can't and so on (...) people forbid us, low-income fishermen, for example, the trawler goes out there and catches at least 1000 kg (...) but they don't prohibit trawlers, they only prohibit us (KNOX; TRIGUEIRO, 2015, p. 49).

Knox (2009) also presents a work on fishing activity, this time on Pitangui Beach, in the municipality of Extremoz, in Rio Grande do Norte, in which he also notes the conflict between artisanal fishermen and IBAMA:

> The complaints are many. According to Mr. Neco, president of the Colony, the wife of a fisherman who owned a boat in this situation of conflict with IBAMA even wrote a letter to the President of the Republic, because in the way that the seizures and fines were made to her husband's boat, he ended up bankrupt and had to sell the boat (KNOX, 2009, p.117).

In addition to the conflicts generated with artisanal fishermen, the management of fishing by IBAMA caused dissatisfaction on the part of investors in industrial fishing, causing them to pressure the federal government to resume the economy of the sector, which led to the creation of the Executive Group of the Fishing Sector (GESPE) in 1995, through Decree 1697/95. which was composed of ministerial members and representatives of public and private institutions, such as fishing companies (CYRINO, 2018).

In addition, the fishermen's colonies, whose purpose is to represent the fishermen and defend their interests, have not been committed to the interests of artisanal fishermen, often being managed by people unrelated to their needs.

It can be said, then, that Brazilian artisanal fishermen have several points in common, starting from their origin coming from the miscegenation of knowledge, of blacks, Indians and Portuguese, passing through the traditional ways in which they carry out fishing activity and transmit knowledge from generation to generation, in addition to the difficulties reflected by environmental factors, the exploitation of fishing by the fishing industry, disorderly tourism, pollution, overfishing and the very treatment meted out by public authorities that hinder access to their rights.

II. The Protection of Artisanal Fishermen through Marine Extractive Reserves

Limitations of the Resex in protecting these communities and the environment in which they live were found, in addition to several conflicts that compromise their survival. In this context, there is the difficulty in its management, the lack of support from the state, the absence of data on the environmental impact caused by artisanal fishing and the absence of detailed biological studies on the marine species exploited.

In addition, there was a lack of clarity regarding the right of use established by Law 9.985/2000, given the difficulties related to the limitation of the common use of the marine areas covered by the Resex to a specific part of the traditional fishing populations, mainly because this limitation may lead to the exclusion of other users who are not members of this population (MILANO, 2011).

In fact, the management model of the Resex transferred to the coastal and marine environment encounters difficulties, especially because establishing public ownership and domain in these areas involves a complexity that can generate conflicts of rights between artisanal fishermen and the non-fishing community, as reported by Santos and Schiavetti (2013, p.1):

> The conflict is due to the impediment of access to resources in the areas delimited as a reserve by citizens not designated as a traditional population. This restriction of access has no basis in Brazilian law and may generate conflicts between beneficiaries and excluded persons.

In addition, there is a contradiction between the environmental legislation that governs the Resex, and certain rules for the use of fishery resources formulated by the co-management regime in the Marine Extractive Reserves, as in the case involving the use of wood taken from mangrove regions that is prohibited by federal legislation but considered necessary and legitimate by users (GLASER; OLIVEIRA, 2004).

On the other hand, the Resex Legislation does not clearly define sustainability[1], which generates uncertainty in the regulation of the norm for the protection of fishermen's rights, since its concept covers several aspects, namely: ecological, environmental, economic, social, cultural and political.

One point that creates an obstacle to the protection of Brazilian artisanal fishermen concerns the requirement of their registration in the General Fisheries Registry (RGP) to have access to benefits such as Pronaf, closed season insurance and social security benefits.

This Registry is provided for in the legislation that establishes the National Fisheries Policy in Brazil, which understands the artisanal fisherman as one who carries out a professional activity, autonomously or in a family economy regime, with his own means of production or through a partnership contract, landed, being able to use small vessels, including those that carry out work of making and repairing fishing gear and

[1] According to Freitas (2011), sustainability involves 5 dimensions that are intertwined, namely: a) the social dimension, related to health, education, security, which need to be universalized effectively and efficiently, otherwise the management model will be autophagic; (b)the environmental dimension, linked to concern for the destruction of nature and the finiteness of its resources; c) economic dimension, which defends the balance between efficiency and equity, advocating the restructured consumption and production and a vision of nature not restricted to simple capital; d) the ethical dimension, in the sense that all beings have an intersubjective and natural connection, imposing solidarity as a universalizable duty-pleasure, imposing on those who achieve greater self-awareness the duty to safeguard the integrity of all beings as much as possible, so as not to cause unjust damage by action or omission; and e) legal and political dimension, in the sense that the search for sustainability is a right and finding it is an inalienable and intangible constitutional duty to recognize the freedom of each citizen (FREITAS, 2011).

equipment, the repairs carried out on small vessels (with a gross tonnage of less than or equal to 20[2]) and the processing of artisanal fishing products (BRASIL, 2021a).

Currently, the RGP is regulated by Ordinance 265, of June 29, 2021, of the Secretariat of Aquaculture and Fisheries (SAP) (BRASIL, 2021a), linked to the Ministry of Agriculture and Livestock and Supply (MAPA), which establishes the following requirements for obtaining the registration of artisanal fishers:

> a) filling out an application in the Computerized System of the General Registry of Fishing Activity – SisRGP, by filling out the Electronic Application Form for the Professional Fisherman's License", available on the official website of the Ministry of Agriculture, Livestock and Supply;
> b) clear and up-to-date 3x4 photo;
> c) copy of official photo identification;
> d) copy of registration in the Registry of Individuals in good standing;
> e) copy of proof of residence or declaration according to the model available in Annex II of the Ordinance;
> f) copy of proof of enrollment in the Social Integration Program (PIS) or the Public Servant Heritage Training Program (PASEP) or the Worker's Registration Number (NIT) or Social Identification Number (NIS);
> g) copy of the sheets of the Registration and Registration Booklet – CIR valid with the personal data of the interested party, in the case of a professional fisherman or fisherwoman on board; and
> h) declaration of affiliation, in the case of fishermen and fisherwomen affiliated to any entity linked to the fishing activity, duly signed, according to the model available in Annex III of the Ordinance.

The requirements described above demonstrate that, to be properly recognized as an artisanal fisherman, there must be the presentation of documents and obedience to bureaucratic procedures. In addition, they allow us to conclude that any person who presents such documents and manages to comply with the bureaucratic procedures is considered to be an artisanal fisherman.

Despite the norm described above, article 3 of Decree 6.040/2007 states that artisanal fishermen constitute a social group belonging to traditional populations, not making any type of formal requirement, other than their own recognition as such based on their social, cultural, religious and economic reproduction and the territories they occupy:

> culturally differentiated groups that recognize themselves as such, that have their own forms of social organization, that occupy and use territories and natural resources as a condition for their cultural, social, religious, ancestral and economic reproduction, using knowledge, innovations and practices generated and transmitted by tradition (BRASIL, 2007).

The requirement of the RGP recently caused a difficulty in the recognition of thousands of artisanal fishermen in Brazil, since it served as a justification for canceling thousands of registrations of artisanal fishermen on the grounds that many of them did not exclusively carry out the fishing activity and that there was a lot of fraud in their concession, as reported by the Office of the Comptroller General of the Union (CGU). which assessed that 66% of the inspected fishermen who received the closed season insurance did not obtain income exclusively from fishing, and access to the benefit was undue, which would have represented an expense of about 2 billion reais to the Federal Government in 2015 alone, as shown in part of the excerpt from the report:

> In view of what was found in this report, we conclude that the fisherman's registration is not effective, because the information recorded is not reliable to revert to benefits for fisheries management, and is inherent at an intolerable level, to justify the maintenance of public policy in the face of the aforementioned percentage of losses reflected in the closed insurance, an irregularity that is aggravated by the lack of inspection by MAPA and the lack of penalties for the colonies and other entities representatives who present unreliable documentation for registration by the Ministry (CGU, 2017, p. 55).

It is observed that this evaluation did not consider the economic, social and environmental situation of artisanal fishermen, especially with regard to the low income they earn, which, even though it consists exclusively of fishing, is insufficient for their maintenance. In addition, it demonstrates a lack of knowledge of the social conditions in which they are inserted, which demands, for their livelihood and that of their families, the performance of other activities to guarantee a minimum income.

Thus, there is a conflict between the two main norms of the Federal Executive Branch, which generates legal uncertainty that prevents the recognition of artisanal fishermen and, consequently, is reflected in the guarantee of their material rights (social benefits, social security benefits, granting of credit for the development of their activities).

It is also noted that most of the Marine Extractive Reserves do not yet have data on the sustainability of extractivism carried out within their boundaries and the literature on management within their scope is still scarce, and the few results available are not sufficient for a conclusion. In this regard, Seixase Kalicoski (2009) found in a study carried out in the Marine Resex of Arraial do Cabo/RJ, that the increase in fish capture in the first years of its institution could be related to the conservation of local habitats as well as to a response to the relocation of industrial fishing that had to abandon the place.

[2] Gross tonnage is the sum of all the volumes of the covered spaces, permanently closed and watertight that are not under pressure. Its calculation is made using the formula AB=K1V, in which V is the total volume of all enclosed spaces of the vessel expressed in cubic meters and K1=0.2+0.02log10V (BRAZILIAN NAVY, 2021).

In the same sense, Lopes, Silvano and Begossi (2011) point out the lack of improvement in fish capture in the perception of artisanal fishermen after nine years of existence of the Marine Resex of Corumbau/BA.

Regarding the environmental impacts caused by artisanal fishing, it has recently been noted that the coast of the Northeast and Southeast regions of Brazil was hit by the largest environmental disaster caused by an oil spill in the country's history, which affected beaches in all northeastern states and the states of Rio de Janeiro and Espírito Santo.

In the Southeast Region, the accident mainly affected the community of Grussaí, in the municipality of São João da Barra, in the state of Rio de Janeiro (SILVA; SHRIKE; CALIL, 2020).

The first oil slick was recorded on August 30, 2019 in the state of Paraíba, and spread to more than 70% of the 3,300 kilometers of coastline in the other states of the Northeast, reaching almost 500 locations by the beginning of November.

In Bahia, the oil slick reached the beaches of Trancoso, Arraial D'Ajuda (in Porto Seguro), the Abrolhos Archipelago – in which one of the most diverse areas in Brazil is located – and, in total, 31 cities in Bahia were affected, which led the State Government to declare an emergency situation (G1 BA, 2019).

Along the entire northeastern coast, artisanal fishermen were severely affected, since the oil contaminated the marine fauna to the point of compromising the commercialization of the fish.

On the coast of Ceará, for example, the Ceará State Department of the Environment, based on data provided by IBAMA, notified until November 10, 2019, 25 beaches affected by the oil in 14 municipalities, namely: Aracati, São Gonçalo do Amarante, Caucaia, Icapuí, Paracuru, Barroquinha, Fortaleza, Aquiraz, Fortim, Jijoca de Jericoacara, Cascavel, Paraipaba, and Trairi, in addition to 28 records of affected fishing colonies (BRUNO, 2019).

On the coast of Pernambuco, as in other northeastern locations, there were reports of serious damage to fishing, especially in economic, social and environmental aspects, as reported in Ramalho in a survey carried out shortly after the occurrence of the disaster:

> Fishing communities are no longer able to sell shellfish, oysters, mussels and crabs. Through interviews and meetings, 51 people were interviewed, including fishermen (17 women and 18 men), 6 middlemen and 10 fish market stallholders in affected municipalities (São José da Coroa Grande, Tamandaré, Rio Formoso and Cabo de Santo Agostinho) and non-affected municipalities (Goiana, Itapissuma, Olinda and Recife, which were also suffering the negative repercussions of the oil). Between the second half of October and the first week of November, the sale of these products plummeted between 80% and 100% in Pernambuco. The sale of open-sea fish (mackerel, snapper and dorado) was also affected, decreasing by at least 60%, as well as farmed species (salmon, shrimp), by around 50% compared to market prices before the spill. Although the fishing sector has been affected as a whole, the fishermen themselves have been hit the hardest, as they fish for shellfish, oysters and mussels (RAMALHO, 2019, p. 1).

In this regard, Araújo, Ramalho and Melo (2020) report statements by fishermen from Pernambuco who show concern about their livelihood, as a result of the consequences of the accident:

> What are we going to eat?! Beef, chicken, salad?! The salmon thing? This is the stuff of rich people, of granfino, people with money. We have always eaten what comes from our waters, and it is free, the fruit of our work, it is a gift from God to be a fisherman, and we suffer from the fish suffering from all this [the oil spill] (crab fisherman from Carne de Vaca beach) (ARAÚJO; BRANCH; MELO, 2020, p.3-4).

Despite the complexity in which Brazilian artisanal fishermen are inserted and the difficulties they face, it is possible to affirm that the Marine Extractive Reserve constitutes an important instrument for the protection of their environment and their livelihoods, as it establishes specific rules within their area, considering the peculiarities of the populations and the environment of each one of them.

As the objective of the thesis involves the protective role that the Jequiá Extractive Reserve gives to artisanal fishermen in relation to their livelihoods, culture and natural resources, before analyzing their narratives, the conditions that this conservation unit offers are exposed.

III. General Aspects of the Protection of the Livelihoods, Culture and use of Natural Resources of Artisanal Fishermen in the Lagoa de Jequiá Marine Extractive Reserve

In the state of Alagoas, the practice of artisanal fishing occurs mainly in lagoon regions, especially in the Mundaú, Manguaba, Roteiro and Jequiá da Praia lagoons, the latter being protected by the Jequiá Extractive Reserve, as reported by Chagas et al. (2021). The objective of the reserve is to ensure the sustainable use and conservation of renewable natural resources, protecting the livelihoods and culture of the local extractivist population (ICMBIO, 2023), which is composed mostly of artisanal fishermen.

In 2014, in order to mitigate prohibited fishing and reduce conflicts in the region, a fishing agreement was signed between ICMBio and the fishermen of the Jequiá Extractive Reserve (ICMBIO, 2014a), which established the minimum mesh sizes of the nets and reinforced the prohibition of the use of trawling and waiting fishing techniques.

That same year, Ordinance No. 78 (ICMBIO, 2014b) was published, approving the profile of the beneficiary family of the Lagoa do Jequiá Marine

Extractive Reserve, establishing requirements, without which they cannot have access to the resources offered by it. Such requirements include: a) being born in the communities immediately surrounding the conservation unit or married to people who are natural from that area and live in the communities; b) be residents of the communities in the immediate vicinity of the RESEX whose main productive activity is artisanal fishing or occupations linked to fishing by-products; c) be residents of the communities of the conservation unit that aim at conservation and depend on the natural resources of the Resex for the maintenance of their traditional way of life.

In 2018, an ICMBio ordinance detailed some of the fishing equipment used in the Resex and disciplined various aquatic activities in the unit, to regulate the exploitation of resources (ICMBIO, 2018).

Despite having been legally created for the protection of artisanal fishermen who live in its surroundings and who use its natural resources, the Jequiá Resex has problems arising from environmental impacts that affect this extractivist population, threatening their way of life and culture.

In a study carried out in the Resex of Jequiá by Palmeira (2007), problems related to urban occupation and tourism were observed, including the lack of public policies and that

> there is a need to control the use and occupation of the land, especially in the villages of Lagoa Azeda and Barra do Jequiá, in which the configuration of the buildings has been made without taking into account the natural characteristics of the area, such as: advance of the sea, lagoon margin, slopes, cliffs, restinga vegetation and mangroves (...). The analyses suggest that the existing tourism activities in the study area have possible positive and negative impacts of tourism, as well as deficiencies in the implementation of infrastructure, and have not corresponded to a socio-spatial development as it has excluded some essential participants in this process, namely the fishermen and the population in general. (...). When talking about tourism activity and especially when it is intended to develop tourism in a sustainable way, one should not forget the importance of infrastructure for the functioning of the city, both for the population and for tourists (PALMEIRA, 2007, p.118).

The main tourist attraction of the Municipality of Jequiá da Praia is in the vicinity of the mouth of the Jequiá River (Figure 1), and in its surroundings there is a complex that includes a bar, restaurant and the availability of boat trips (Figure 2) throughout the Resex, in addition to a resort that is being built.

Source: SANTOS (2020)

Figure 1: Aerial view of the mouth of the Jequiá River and the tourist resort "Dunas de Marapé" (on the upper right) and street vendors (on the left), where most of the tourists who frequent the Jequiá Extractive Reserve are concentrated.

Source: Author (2021).

Figure 2: Vessel used in the tour of tourists through the Resex of Jequiá.

There is a private tourist enterprise that does not have environmental licensing, existing at the mouth of the Jequiá River, which receives most tourists. Tourism activity is not orderly, awaiting regulations that contemplate the most suitable places for visitation, the carrying capacity of the environments and the participation of the beneficiary population in the exploitation of community-based tourism (ICMBIO, 2017).

Silva et al. (2015) found problems related to the disposal of solid waste in the Jequiá Extractive Reserve that are now inappropriately disposed of, causing significant impacts on the environment because they contain toxic substances, warning that such substances, exposed directly, incorrectly, will cause serious problems related to public health and degradation of natural resources in the area.

In addition, in the Jequiá Extractive Reserve, predatory fishing and the introduction of fish species that are foreign to the natural environment and kill native species, this generates a serious ecological imbalance and directly reflects on the fishermen's way of life, as it affects the number of species they capture to maintain their livelihood. and there are several testimonies to the effect that fish is increasingly reduced (GOMES; RODRIGUES, 2018).

In this regard, Chagas et al. (2021) state, in a survey carried out between 2016 and 2017, that 90% of artisanal fishermen in the Resex reported a decrease in the amount of fish – especially the carapeba (*Diapterus sp.*) and the camurim (*Centropomusundecimalis* and *C. paralleluess*) – and the disappearance of the mandim (*Cathoropsspixii*) and the yam (*Geophagus sp.*).

In the same research, the authors found two main causes to which fishermen attribute the decrease and disappearance of fish in the lagoon portion of the Resex: prohibited fishing (although none of them reported that they practiced illegal fishing) and divine punishment, but in addition to these the introduction of exotic fish species responsible for the predation of native species is identified. As the report below demonstrates:

> Prohibited fishing, combined with a "divine punishment" was pointed out by fishermen as the two main causes, both in the decrease and in the local disappearance of ethnospecies, but none of the eighty fishermen interviewed reported making use of equipment or techniques known to be illegal that may have led to the collapse of local stocks of these species. According to the fishermen themselves, the "divine punishment" would have occurred as a result of the enormous amount of fish, especially the mandim, which in the past were left to rot in the nets due to their abundance during fishing. The ethnoknowledge of the fishermen corroborates with the scientific knowledge by pointing out the anthropic action as being the main responsible for the decline and disappearance of ethnospecies in the lagoon. Among these actions, the introduction of exotic species is considered by several studies as the most impactful action on the aquatic system, as it causes the reduction or extinction of native species, through changes in their habitats, competition for resources or predation, transmission of pathogens and parasites and genetic degradation. In the Jequiá lagoon region, two exotic species were mentioned, tilapia (Oreochromis niloticus) and peacock bass (Cichla ocellaris), which, according to fishermen, were introduced approximately two decades ago and have possibly caused disturbances in the region since their introduction (CHAGAS et al., 2021, p.102).

Lopes (2020) found several environmental impacts due to anthropic action, highlighting the decrease in plant biodiversity, erosion, decrease in family income, occurrence of waterborne diseases in the population, alteration of the quality of the water body and disturbance of the ichthyofauna, as reported by the author:

> Although there are villages in a large part of the surroundings of the Lagoon, through satellite imagery, it is possible to observe that the urban area is found in the center of the municipality, where the Jequiá River is located. The agglomeration exerts enormous pressure on the surroundings of the Resex, together with the overexploitation of its natural resources, generates an ecological imbalance, reducing the biodiversity of the local fauna and flora. The part most affected by urban pressure, caused mainly by the agglomeration found in the center of the municipality, is the Jequiá River. The practices of suppression of vegetation and discharge of sanitary effluents take place, mainly in the stretch of the reserve. These agglomerations that develop in a disorderly way generate an environment of conflict. The suppression of vegetation is a practice prior to the establishment of the area as a conservation unit and has intensified according to urban growth and the consequent pressure on the Resex. Through satellite images, it is possible to observe that, from 2009 to 2019, the change in the natural landscape is strongly associated with agriculture and livestock, and it is possible to identify special characteristics of these activities, such as well-defined and homogeneous delimitation patterns.

> In view of the above, even though there is a formal protection directed by the Brazilian legal system through the REM Lagoa do Jequiá, the artisanal fishermen who live in it have compromised their existence, especially with regard to their livelihood, their culture and their environment, raising the question of whether it effectively achieves its purpose as a way to preserve the fishing resources on which they depend (LOPES, 2020, p. 42).

In relation to vegetation, the mangrove[3], which makes up most of the surroundings of the reserve, was the one that suffered the most degradation.

As this vegetation constitutes *habitats for several species*[4], its decrease generates serious consequences, such as the difficulty of reproduction and the development of more vulnerable species, with 90% of fish and 95% of all food from the sea depending on the mangrove area (CNUC, 2022).

In turn, the decrease in species has an impact on the lives of artisanal fishermen, since they depend on their capture to survive from the commercialization or even from their own consumption of the fish.

In addition to the decrease in fish due to the degradation of mangroves, it results from predatory fishing carried out by the fishermen themselves, according to a report brought by Lopes (2020, p. 53):

> In the past, we were afraid to go near there so as not to be fined. You could catch big fish, 15 kg, 20 kg. Whoever sees it today, it seems that it is a lie. What I fished, I could eat, I could sell and I even gave it to my neighbors. Nowadays, everyone goes back and forth, fishing here. No one respects it anymore. We fish while still innocent (cub). Those who have a conscience give back, but not everyone does that. They catch fish like this (small), brand new shrimp, which doesn't give them time to grow. Today, you can barely get enough to eat for the day.

In addition to the suppression of vegetation, it was found that the municipality of Jequiá da Praia does not have active sewage connections or volume of sewage collected and treated, and the houses have rudimentary septic tanks, which are holes in the soil made by the residents themselves and where the desires generated by the toilets go (PERFIL MUNICIPAL DE JEQUIÁ DA PRAIA, 2018), which leads to the irregular discharge of more than 95% of domestic effluents without prior treatment into the Jequiá River (CNUC, 2022).

Lopes (2020) developed studies on three main points of the Resex, having reached the important conclusion about the risk of diseases to the local population in this sense, reporting:

> In the Center region alone, a total of 21 sewage discharge points were identified, and this value is an estimate due to the fact that there may be other unidentified submerged points and the existence of new points after the field trip (...). Some of the main restaurants in Jequiá da Praia are located on Duas Barras Beach and is also a place of great tourist and leisure activity, with two effluent points identified. In Prainha, where the Jequiá River is located, there is the highest concentration of irregular discharge of sanitary effluent, with an estimated amount of twenty-one points of discharge of sanitary effluents directly into the water body (...). There is an association between exposure to contaminated water and the development of waterborne diseases and the amount of symptoms related to transmission for the group of exposed people in relation to the non-exposed group are the main results that support this hypothesis. The low knowledge about waterborne diseases shows, in addition to the failure of the education system, a low quality or absence of awareness programs among the population of Jequiá da Praia, an important intervention for the promotion of public health (LOPES, 2020, p. 79 and 100).

Despite these problems, it is possible to perceive positive initiatives in the Jequiá Resex that can contribute to improving the lives of artisanal fishermen, such as the recent publication of its Management Plan (PM)[5] (BRASIL, 2023), and the presence of the Jequiá da Praia Women in Action Association (AMAJE).[6]

The Management Plan of the Jequiá Extractive Reserve not only verifies the current situation of the natural resources existing in the unit and of the artisanal fishermen, establishing rules and suggesting a series of measures aimed at achieving the objectives set forth in Law 9985/2000, especially those related to the

[3] The mangrove is a coastal ecosystem of transition between two environments: terrestrial and marine, characteristic of tropical and subtropical regions and subject to the tidal regime. Its development takes place in areas such as estuaries, bays and lagoons, and is of essential importance for its ecological function, as it provides food, protection and reproduction for several animal species (BERNINI et al., 2006).

[4] There are several native species in the Jequiá Extractive Reserve, including fish, shellfish and crustaceans popularly known in the region as: Oyster, Sururu, Maçunim, Aruá, Spider Crab, Maria Fumaça Crab, Xié, Uçá Crab, Guaiamum Crab, Mangrove Krab, Painted Lobster, Pink Shrimp, White Shrimp, Hake, Curimã, Carapeba and Agulhinha.

[5] According to article 2 of Law 9.985/2000, the management plan is a technical document through which, based on the general objectives of a conservation unit, its zoning and the rules that should govern the use of the area and the management of natural resources are established, including the implementation of the physical structures necessary for the management of the unit (BRASIL, 2000). It provides general indicators for the conservation, zoning and uses of environmental space in 3 different dimensions: spatial, establishing what should be done in a given time frame, establishing when it should be done; and methodological, establishing how it should be done (MARUTHI, 2006).

[6] The Association of Women in Action of Jequiá da Praia (AMAJE), registered in the National Registry of Legal Entities under No. 46.220.652/0001-32, was created on 04.12.2022 (https://solucoes.receita.fazenda.gov.br/Servicos/cnpjreva/Cnpjreva_Comprovante.asp), with the objective of bringing together women fishermen on the shore of the Jequiá Lagoon and thus making this category a political voice. There are more than 50 women involved who articulate a sustainable enterprise aimed at improving the quality of life of fishermen, shellfish gatherers and artisans in riverside communities, one of their activities being the reuse of crab waste, which promotes food security and has become a source of income and reference in the municipality. The project also contributes to depolluting the Jequiá Lagoon (UNITED NATIONS BRAZIL, 2022).

protection of natural resources, livelihoods and culture of artisanal fishermen.

With regard to the measures provided for in the PM, the normative components that establish the zoning and the general rules that should govern the use of the Resex and the management of its natural resources are highlighted, delimiting six areas, each of them with greater or lesser restrictions, namely: a) conservation zone; b) restricted use zone; c) communal use area; d) infrastructure zone; e) environmental suitability zone; f) zone of different public interests (BRASIL, 2023; ICMBIO, 2023a).

The Conservation Zone contains natural environments of relevant ecological, scientific and landscape interest, including a fish and crustacean nursery area, where there has been little human intervention, in which the direct use of natural resources is not allowed. Its objective is to maintain the environment in the most natural way possible and at the same time to provide primitive conditions for conducting research and visitation with a low degree of intervention[7]. Fishing, gathering, or direct use of fishing resources is not allowed (ICMBIO, 2023a).

The Restricted Use Zone contains natural environments of relevant ecological, scientific and landscape interest, where there has been little human intervention, admitting areas in medium and advanced degree of regeneration, allowing the direct use of low impact of natural resources, such as small-scale fishing. Its general objective is the maintenance of a natural environment and the reconciliation with the direct use of low impact of natural resources and carrying out research and visitation activities with a low degree of intervention (ICMBIO, 2023a).

The Community Use Zone is the largest area of the Resex, comprising the entire length of the lagoon, the channel and the sea (with the exception of the other zones), consisting of natural areas, which may present anthropogenic changes, where natural resources are already traditionally used by the beneficiary population or that have the potential to manage them. This area aims to maintain an environment as close as possible to the natural one, reconciled with the integration of the social and economic dynamics of the user population in the Resex, through the use of moderate impact on natural resources, in addition to carrying out research activities and visitation of a medium degree of intervention[8]. The exploitation of fishery resources is allowed as long as it is regulated in specific plans, in accordance with current legislation (ICMBIO, 2023a).

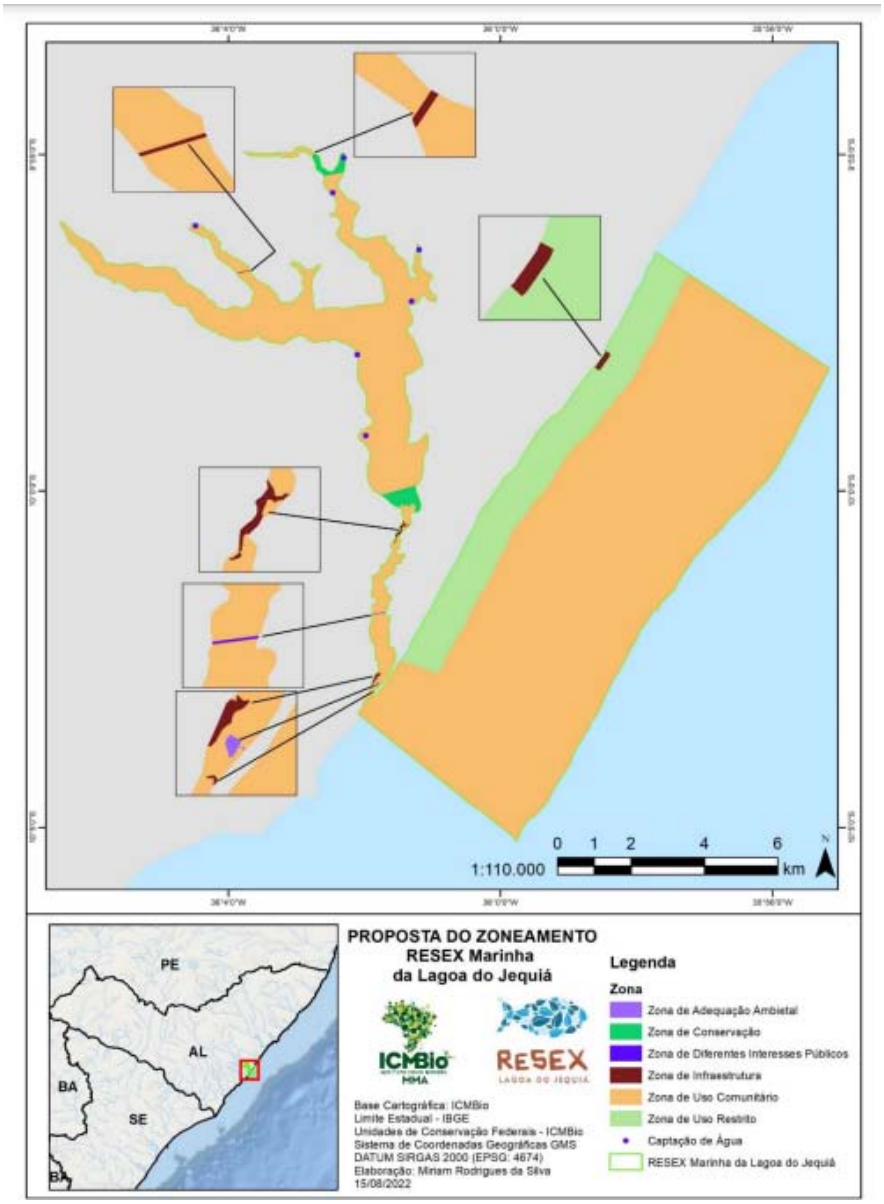
The Infrastructure Zone consists of natural environments or significantly anthropized areas, in which a high degree of intervention in the environment is tolerated, spatially concentrating the impacts of activities and infrastructures in small areas (ICMBIO, 2023a).

The Environmental Suitability Zone contains considerably anthropized areas or enterprises that are not of public interest, where it will be necessary to adopt management actions to halt the degradation of natural resources and promote the recovery of the environment, and where exotic species must be eradicated or controlled. It is provisional and, once recovered, will be incorporated into one of the permanent zones. Its objective is to halt the degradation of natural resources and, when possible, recompose the area, prioritizing the natural recovery of degraded ecosystems. It comprises the mangrove island and pedestrian bridge located at the mouth of the Jequiá River and currently used by the Dunas de Marapé project, supported by a Conduct Adjustment Agreement signed with ICMBio and the Federal Court. It has an area of 0.85 hectares (ICMBIO, 2023a).

The Zone of Different Public Interests contains areas occupied by projects of public interest or national sovereignty, whose uses and purposes are incompatible with its objectives of creating the Resex, with the general objective of reconciling the different public interests existing in the area, establishing procedures that minimize the impacts on the UC and the achievement of its objectives.

[7] Low-intervention visitation corresponds to primitive forms of visitation and recreation that occur in areas with a high degree of conservation, allowing the visitor to experience some level of challenge, loneliness, and risk. Encounters with other groups of visitors are unlikely or occasional. The infrastructure, when it exists, is minimal and aims to protect natural resources and the safety of visitors, and the presence of roads or motorized activities is uncommon (ICMBIO, 2023a).

[8] In the visitation of medium degree of intervention it is possible to experience a high degree of naturalness of the environment, however, it is already possible to detect some level of environmental alteration or evidence of human activities. Access to these areas can be achieved by motor vehicles. In terrestrial environments, roads are generally unpaved. Encounters with other visitors are more common, and there may be the presence of isolated residents, making it possible to experience the local way of life. The infrastructure is minimal or moderate, with the objective, in addition to safety and protection of natural resources, to improve the experience and provide convenience to the visitor, such as: bridges, small buildings, viewpoints, stairs, *decks, campsites, shelters, bathrooms, roads with permeable coating. (ICMBIO, 2023*)



Source: ICMBIO (2023a).

Figure 3: Zoning proposal for the Jequiá Marine Extractive Reserve, provided for in the Management Plan that was published in March 2023.

AMAJE comprises the women fishermen/ shellfish gatherers who live in the villages located along the lagoon portion of the Jequiá Extractive Reserve, which has played a relevant role in the construction of a protagonism that makes them come out of invisibility, based on initiatives aimed at the sustainable use of fishing resources, to the extent that the processing of crab shells provides the removal of waste that is discarded by the fishermen themselves.

Despite the short period of existence, the Women in Action Association of Jequiá da Praia has been standing out in the development of actions aimed at the empowerment of the fishermen of the RESEX of Jequiá, including obtaining important achievements, such as the 1st place in the "I Rural Women Award – Spain Recognizes", promoted by the Spanish embassy with the representations in Brazil. the Inter-American Institute for Cooperation in Agriculture, and UN Women (UNITED NATIONS BRAZIL, 2022).

The organization in association is observed in other fishing communities in Brazil and helps the work they do, making it more collective and structured, creating the possibility of inserting women in the political discussion and helping to recognize fishing as decent work, due to the work with other women in the fishing industry who are engaged in the associations and in the women's network (OAK; PEREZ, 2019), influencing public policies in the sector (GOES; CORDEIRO, 2018).

AMAJE stands out in the collection of crab shells discarded in the Jequiá Lagoon and in its

transformation into fertilizer that is supplied to a Sugar Mill located near the Resex and sold in small quantities to people interested in using the product. This initiative has brought hope to improve the livelihoods of the fisherwomen of the Resex.

Although AMAJE was created a little over a year ago, its performance has provided its members with the opportunity for political participation in the Management Council of the Jequiá Resex and the realization of actions that give protagonism to the members in the defense of artisanal fishing activity, including the realization of joint efforts for the cleaning of the Jequiá Lagoon and the development of a project that aims to transform crab waste into organic fertilizer. which is supplied to the Sinimbu Mill and uses it as an input for the cultivation of sugarcane.

AMAJE has its own building in which it established its headquarters (Figure 4) and a vessel that is used by the members to transport to the communities in which they live and which are in the surroundings of the Jequiá Lagoon (Figure 5).

Source: EMBRAPA, 2023.

Figure 4: AMAJE headquarters located in a shed donated by the Municipality of Jequiá da Praia.

Source: Author (2022).

Figure 5: Vessel acquired by the Association of Women in Action of Jequiá da Praia-AL and four associates.

The process of transforming crab shells to make handicrafts involves the following steps: 1) the collection of crab shells (of the genera *Callinetis, Cronius, Portunus*) discarded in the lagoon after evisceration and/or those that will be discarded in the garbage; 2) the rejected shells are subjected to a dehydration process in an oven; 3) through manufacturing developed by shellfish gatherers, the handmade pencil holder is built with the dehydrated shell, along with material from "PET bottles", palm trees/straws and varnish; 4) the shellfish gatherers sell handmade pencil holders at the value of R$ 20.00 each; 5) there is also the manufacture of baskets sold in the amount of R$180.00 each, in addition to the supply of bark for the manufacture of fertilizers that are sold in retail and wholesale to the Caeté Plant[9].

The crab shells collected are stored at the association's headquarters (figure 4) and transported in its own vessel (figure 5) to land provided by the Caeté Plant, which is close to one of the communities, where they are stored (figure 6), subjected to drying (figure 7) and then crushed (for transformation into fertilizer, figure 9) or taken for the production of handicrafts (figure 8).

As a result of these actions, the crab shells rejected after evisceration, instead of being thrown into the Jequiá Lagoon, are reused, preventing the shellfish gatherers and fishermen of the Lagoon from being injured during the fishing and leisure activity in the lagoon, as well as the entire community that makes use of the Lagoon.

The project currently benefits 124 associated shellfish gatherers, non-associated shellfish gatherers from the communities surrounding the Jequiá Extractive Reserve (estimated at 500), in addition to fishermen who use the lagoon to survive (more than 2,000 are registered), the non-fishing community of Jequiá that uses the lagoon for leisure and other activities, the local environment. In addition, it allows shellfish gatherers and other members of the community to engage in an artisanal activity linked to fishing, allowing the strengthening of their identity as members of a traditional community, also contributing to the mental health of members of the fishing community who are no longer able to fish, but can develop artisanal activity.

AMAJE's initiative reveals the ability of fisherwomen to seek solutions to social and environmental problems that have a positive impact on their livelihoods and that of the entire community that depends on the Jequiá Lagoon, involving the development of simple and sustainable technological processes that generate products (handicrafts and organic fertilizer) that provide social innovation[10] as they create an effective and sustainable solution to a problem that does not only affect them (lagoon pollution), obtaining an income from its commercialization, contributing to their survival and benefiting the community, in addition to being able to be extended to Brazilian Marine Extractive Reserves that have realities similar to those of the Jequiá Extractive Reserve.

It is important to emphasize that an improvement is necessary to better meet the objectives of the Project, given that the way it develops is very rudimentary, not having an adequate structure for storage, transport and instruments necessary for the processing of crab waste (since this is being done on open-air land provided by a Sugar Mill located in the vicinity of the Resex and devoid of basic infrastructure), nor offering protection to their health, as they do not have sufficient resources to pay for protective equipment such as gloves, boots, and appropriate clothing, as can be seen in Figures 6 and 7.

[9] Data collected by the author during a visit to AMAJE's headquarters, in Jequiá da Praia-AL, in October 2022, when the interviews were conducted.

[10] The concept of social innovation is used, which understands it as "a new solution to a social problem, which is more effective, efficient, sustainable or fair than existing solutions, and by which the value created reverts mainly to society in particular" (PHILLS JR; DEIGLMEIER; MILLER, 2008, p. 34).

Source: Author (2022).

Figure 6: Crab waste collected and placed on the land provided by the Caeté Plant (in an open place and without adequate structure) to carry out the beginning of the drying process.

Source: The author, 2022.

Figure 7: Drying process of crab waste for the manufacture of fertilizer. In the background, a fisherwoman can be seen spreading crab waste without using adequate protective instruments.

Source: Author (2022).

Figure 8: Handmade product (pencil holder) produced by AMAJE fishermen, from crab bark, wooden sticks and coconut palm straw.

Source: Author (2022).

Figure 9: Fertilizers produced from crab waste, bagged for retail sale.

It is also important to highlight that, despite the rudimentary way in which they are developing the project and all the difficulties faced, the fishermen's initiative earned them "1st place in the Rural Women Award – Spain Recognizes", promoted by the Embassy in Spain with the representations in Brazil of the Inter-American Institute for Cooperation on Agriculture (IICA), the Food and Agriculture Organization of the United Nations (FAO) and the UN and Women[11], which demonstrates the potential of the project and the importance of the creation of the association.

This fact has consequences, not only for the natural resources of the reserve, but also for the health of the surrounding population, as sewage is discharged untreated into the lagoon and canal and brings risks of infectious diseases transmitted through contaminated water, such as cholera, leptospirosis, worms, generating symptoms such as fever, weakness, diarrhea, headache, and loss of appetite, as shown in a study by Lopes (2020). Thus, it can be seen that the Jequiá Extractive Reserve is inserted in an environment composed of elements (human, animal and vegetable) that form a network, whose survival depends on the balance between them, so that the impact caused in one of them affects the entire system, threatening its existence, even if there is legal protection.

The creation of AMAJE can be seen as an initiative that takes them out of invisibility, giving them a voice in the deliberative council of the Conservation Unit, but also providing autonomy in relation to male fishermen and a perspective of developing a project involving the sustainability of the communities in which they live.

In addition, the women's initiative can encourage the creation of other innovative projects involving the sustainability of artisanal fishermen, their environment and their culture, contributing to their maintenance as members of traditional populations.

The example of AMAJE, as well as other associations created within the scope of Brazilian artisanal fishing, shows that associativism has been constituted as a path to the autonomy of fishermen, as it unites those most interested in the preservation of their way of life, their environment and the natural resources offered by them. It happened in the Chilean case.

In Chile, a fishing legal regime was created that grants territorial use rights to artisanal fishermen's associations, with the adoption of a policy that, for 25 years, has been providing for the sustainability of biodiversity in marine areas (GELCICH, 2019).

This regime, known by the English acronym TURF's (*Territorial Use Rights in Fisheries*), adopts a model in which fishermen assume primary responsibility for the management, collection and maintenance of fishery resources, under a legal framework and with permanent government supervision (NEHER; ARNASON; MOLLETT, 1988; SHOTTON 2000; SWARTHY; RAVENGA, 2014).

The implementation of TURFs has enabled Chilean fishermen to take effective control of their fishing

[11] The objective of the contest is to highlight experiences that encourage the economic autonomy of rural women to promote gender equality, increase their visibility and value diversity as a matrix of economic, social and cultural development.

decisions within their management areas (GELCICH; EDWARDS-JONES; KAISER, 2007), particularly with regard to the size and location of the territories; the number of species they intend to capture or allow others to capture; the methods and/or arts they use; the timing of the collection and the allocation of fishing quotas for each fisherman (subject to the officially designated harvest season, minimum harvest sizes and approved TACs); the potential prices accepted for its resources; to the buyers to whom they will sell; and the distribution of income obtained from sales among the associated fishermen (GELCICH et al., 2006; GELCICH; EDWARDS-JONES; KAISER, 2007).

It should be noted that the exercise of effective control of decisions by fishermen in the TURFs does not exclude the participation of the State and scientists, which are important for the maintenance of the regime to the extent that State supervision is a fundamental element for its success (SCHUMANN, 2007; CASTILLA; GELCICH, 2008) and that scientists establish a high degree of cooperation, as they develop analyses and management plans based on the data provided by fishermen, acting as bridges between them and the state (SCHUMANN, 2007, 2010).

One of the most important and powerful legacies of the TURF system is the requirement, support and incentives for fishers to come together in formal fisheries associations, which provides them with more voice and legitimate power in decision-making, helping them to become active stewards of fishery resources, as well as encouraging interaction between scientists, fishermen and the government, allowing them to learn from each other (MORENO; RAVENGA, 2014).

These associations are responsible for organizing resource management, imposing strict local rules for resource extraction (GELCICH et al., 2010; ORENSANZ; PARMA, 2010), which are, in some cases, stricter than those established in official regulations (MELTZOFF et al., 2002); allowing fishermen to sell their catch exclusively on legal markets and to get a better and fairer price for the product (ORENSANZ; PARMA, 2010), collaborating with other associations to generate collective actions to create innovative business initiatives[12] (CASTILLA; GELCICH, 2008), demonstrating that the TURF policy encouraged self-empowerment and bottom-up governance to manage fisheries in Chile (MORENO; RAVENGA, 2014).

It is not possible to affirm that the Chilean model fully applies to the Brazilian Marine Extractive Reserves, but, to the extent that it gives protagonism to fishermen in the management of fisheries in their territories through associations, with a bottom-up governance system – in which the State exercises more of a supervisory and supervisory role and scientists act as technical consultants – it can be a reference to improve the co-management model of these fishing units. conservation. It is possible to give protagonism to artisanal fishermen in the Marine Extractive Reserve through the promotion of associations, in order to provide governance, where the State would act more in the supervision than in the decision within the scope of these conservation units.

Although Brazil has not reached the same level as Chile in terms of the organization of artisanal fishermen, there are examples of artisanal fishermen's associations throughout the national territory in addition to AMAJE, which demonstrate the importance of these entities for the protagonism of these peoples, such as the Women's Network in the Resex of Canavieiras in Bahia (CARVALHO; PEREZ, 2019), Institutional Arrangements and Implementation of the Canavieiras Extractive Reserve/BA, that of the Caminho de Berbigão Association/ACB[13], in the Pirajubaé Resex in Santa Catarina; as well as in fishing communities in Amapá (SANTOS et al., 2018).

In this context, despite the fact that Brazilian environmental legislation is considered one of the most advanced in the world, its effectiveness is insufficient to the extent that "there is a procedural, organizational and structural deficit with regard to environmental protection agencies and the means available to properly exercise their attributions" (SARLET; FENSTERSEIFER, 2013, p.36), and it can be said that this statement is applicable to the legislation that regulates the Marine Extractive Reserves.

IV. Final Considerations

As a way of protecting the livelihoods and culture of Brazilian artisanal fishermen, as well as the sustainable use of their natural resources, the Marine Extractive Reserves are important because they delimit marine and lagoon areas that contain ecological elements essential for the survival of several species of fish, establishing a set of rules that aim to organize their territory. in the sense of conserving the natural resources on which they depend, and conserving their traditions that have been passed down from generation to generation since the colonial period.

However, there are limitations of this protection due to the difficulties faced by its management, the lack of support from the State and the lack of detailed studies on the species exploited and on the impacts caused by fishing activity, revealing that the rules established in the legislation and other normative

[12] For example, cooperatives and companies were founded to find new markets for benthic resources (CASTILLA; GELCICH; DEFEO, 2007; CASTILLA; GELCICH, 2008), and/or collectively sell resources from various associations, adding value to their fishery products.

[13] ACB holds the Contract for the Concession of Real Right of Use (CCDRU), which is the legal instrument that establishes the rights and duties of the State and the Community for the management of the RESEX (BRASIL, 2000).

instruments alone are not capable of protecting this population. because they can become innocuous if there is no initiative from public authorities, society, and the fishermen themselves in order to create social, economic, environmental, and cultural conditions suitable for their survival.

One of the difficulties in the management of the Marine Extractive Reserve is that they are located in marine and lagoon areas that are subject to the use of the general population, so that establishing public ownership and domain in them is a difficult task, especially because it is not possible to delimit them in the same way as areas on land, where barriers are placed that control access.

In addition, the lack of human and financial resources allocated to these conservation units has repercussions on the way ICMBio operates within its limits, as its large extensions require sufficient personnel to supervise and develop activities to support fishermen, as well as vessels, motor vehicles and equipment that assist in monitoring occurrences within its limits. and without them, your task is impaired.

The State's participation, in turn, is timid, because in addition to not guaranteeing sufficient resources for ICMBio to promote its support and inspection activities, it does not promote the formulation of specific public policies for the artisanal fishermen who reside in them, especially with regard to subsidies for the development of their activity, in order to enable the purchase of petrechos. vessels, fuel and support structures, being limited only to the granting of social benefits such as closed season insurance and social aid that are insufficient for the continuity of fishing activity.

References Références Referencias

1. ALAGOAS. *State Decree No. 82,995, of May 30, 2022.* Provides for the creation of the financial aid called rain aid, aimed at mitigating the impacts and losses caused by the intense rains that occurred in May 2022, and makes other provisions. Available at: <https://www.imprensaoficial.al.gov.br/storage/files>. Accessed on 18 Apr. 2023.
2. ALLEGRETTI, M. The social construction of public policies. Chico Mendes and the rubber tappers' movement. *Development and Environment,* n. 18, p. 39-59, jul./dez. 2008.
3. ALVARES, C. A.; STAPE, J. L.; SENTELHAS, P. C.; DE MORAES GONÇALVES, J. L.; SPAROVEK, G. Köppen's climate classification map for Brazil. *Meteorologische Zeitschrift,* v. 22, n. 6, p. 711-728, 2013.
4. ARAÚJO, M. E. de; RAMALHO, C. W. N.; MELO, P. W. de. Artisanal fishermen, consumers and the environment: immediate consequences of the oil spill in the State of Pernambuco, Northeast Brazil. *Cadernos de Saúde Pública,* v. 36, n. 1, e00230319, 2020.
5. ASSIS, D.M.S.; TAVARES-MARTINS, A.C.C.; BELTRÃO, N. E. E.; SARMENTO, P.S.M. Environmental perception in traditional communities: a study in the Soure Marine Extractive Reserve, Pará, Brazil. *Ambiente e Sociedade,* São Paulo, v. 23, p.1-19.
6. AZEVEDO, N.T.; PIERRI, N. Fisheries policy in Brazil (2003-2011): the choice for productive growth and the place of artisanal fishing. *Development and Environment,* Curitiba, v. 32, p. 61-80, dez. 2014.
7. NORTHEAST BANK. Agroamigo Fortaleza. [n.d.]. Available at: <https://www.bnb.gov.br/agroamigo>. Accessed on 15 Apr. 2023.
8. BARBOSA DE ALMEIDA, M. W.; REZENDE, R. S. A Note on Traditional Communities and Conservation Units. *Ruris,* v. 7, n. 2, p. 185-196, 2013.
9. BARBOSA DE ALMEIDA, M.W.; ALLEGRETTI, M.; POSTIGO, A. The legacy of Chico Mendes: successes and obstacles of the Extractive Reserves. *Development and Environment,* Curitiba, v. 48, p. 25-49, nov. 2018.
10. BARDIN, L. *Content analysis.* São Paulo: Edições 70, 2010.
11. BECK, A. Farmers and fishermen: a contribution to the discussion of the concept of artisanal fisherman. In: DIEGUES, A. C. S. (org.). *Artisanal fishing:* tradition and modernity. São Paulo: Program for Research and Conservation of Wetlands in Brazil/ IOUSP/Ford Foundation/IUCN, 1989.
12. BECK, U. *Risk Society:* towards another modernity. São Paulo: Editora 34, 2010.
13. BENETTI, A.; BIDONNE, F. The environment and water resources. In:TUCCI, C.E.M. *Hydrology:* science and application. Porto Alegre: Ed da Universidade UFRGS/ABR, 1995.
14. BENTES FILHO, G. R. P. From *North to South: The mission of the cruiser "José Bonifácio" and the incorporation of the fisherman into a national project (1900-1930).* 2018. Dissertation (Master's Degree in History) – Center for Human Sciences, Federal University of Rio Grande do Norte, Natal.
15. BERNINI, E.; SILVA, M. A. B. da; CARMO, T. M. S. do; CUZZUOL, G. R. Chemical composition of sediment and leaves of mangrove species from the São Matheus River estuary, Espírito Santo, Brazil. *Braz. J. Bot.,* v. 29, n. 4, dez. 2006.
16. BRAZIL. *Decree-Law No. 288, of February 28, 1967.* Available at: <http://www.planalto.gov.br/ccivil_03/Decreto-Lei/Del0288.htm#art48%C2%A72>. Accessed February 12, 2022.
17. BRAZIL. *Federal Law No. 7,345, of July 24, 1985.* It regulates the public civil action of liability for damages caused to the environment, to the consumer, to goods and rights of artistic, aesthetic,

historical, touristic and landscape value (vetoed) and provides other measures. Available at: <https://www.planalto.gov.br/ccivil_03/leis/l7347orig>. Accessed on 02 May. 2023.
18. BRAZIL. *Federal Constitution of 1988.* Promulgated on October 5, 1988. Available at: <http://www.planalto.gov.br/ccivil_03/constituicao/constituição.htm>. Accessed on: 5 Apr. 2023.
19. BRAZIL. *Decree No. 98,897, of January 30, 1990.* It provides for extractive reserves and makes other provisions. Available at: <http://www.planalto.gov.br/ccivil_03/decreto/antigos/d98897.htm#:~:text=DECRETO%20No%2098.897%2C%20DE,vista%20o%20disposto%20no%20art.>. Accessed on 19 May. 2022.
20. BRAZIL. *Federal Law No. 9,985, of July 18, 2000.* Regulates article 225, § 1, items I, II, III and VII of the Federal Constitution, establishes the National System of Nature Conservation Units and provides other provisions. Available at: <http://www.planalto.gov.br/ccivil_03/leis/l9985.htm>. Accessed on 10 May. 2019.
21. BRAZIL. *Federal Decree No. 27 of September 2001.* Creates the Jequiá Lagoon Marine Extractive Reserve, in the Municipality of Jequiá da Praia, State of Alagoas, and makes other provisions. Available at: <https://www.ima.al.gov.br/wp-content/uploads/2015/03/Decreto-Jequia-da-Praia.pdf>. Accessed: 10 mai. 2019.
22. BRAZIL. *Decree No. 4, 340, of August 22, 2002.* Regulates articles of Law No. 9,985, of July 18, 2000, which provides for the National System of Nature Conservation Units - SNUC, and provides other provisions. Available at: <http://www.planalto.gov.br/ccivil_03/decreto/2002/d4340.htm>. Accessed on 15 May. 2022.
23. BRAZIL. Ministry of Sports. *Food Acquisition Program (PAA).* 2003a. Available at: <https://www.gov.br/cidadania/pt-br/acoes-e-programas/inclusao-produtiva-rural/paa>. Accessed on 21 May. 2022.
24. BRAZIL. *Federal Law No. 10,779, of November 25, 2003b*.Provides for the granting of unemployment insurance benefits, during the closed season, to professional fishermen who carry out fishing activities in an artisanal manner. Available at: <https://www.planalto.gov.br/ccivil_03/leis/2003/l10.779.htm>. Accessed on 30 Apr. 2023.
25. BRAZIL. *Federal Decree No. 6,040, of February 7, 2007.* Establishes the National Policy for the Sustainable Development of Traditional Peoples and Communities. Available at: <http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2007/decreto/d6040.htm>. Accessed on: June 20, 2019.
26. BRAZIL. *Law No. 11,288, of June 13, 2008.* Provides for the Colonies, Federations and National Confederation of Fishermen, regulating the sole paragraph of article 8 of the Federal Constitution and repeals the provisions of Decree-Law No. 221, of February 28, 1967. Available at: <https://www.planalto.gov.br/ccivil_03/_ato2007-2010/2008/lei/11699.htm>. Accessed on 28 Apr 2023.
27. BRAZIL. *Federal Law No. 11959 of June 29, 2009.* Provides for the National Policy for the Sustainable Development of Aquaculture and Fisheries, regulates fishing activities, repeals Law No. 7.679, of November 23, 1988, and provisions of Decree-Law No. 221, of February 28, 1967, and provides other provisions. Available at: <http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2009/lei/111959.htm>. Accessed: 10 out. 2021.
28. BRAZIL. Ministry of Tourism. *Dynamics and Diversity of Community-Based Tourism:* a challenge for the formation of public policy. Brasilia: Ministry of Tourism, 2010.
29. BRAZIL. Chamber of Deputies. *Legislation on fisheries and aquaculture:* constitutional provisions, laws and decrees related to fisheries and aquaculture. Brasília: Chamber of Deputies, Edições Câmara, 2015. Available from: <http://bd.camara.gov.-br/bd/bitstream/handle/bdcamara/24080/legislação_pesca_aquicultura.pdf?sequence=1>. Accessed on 10 jan. 2021.
30. BRAZIL. Ministry of Industry, Foreign Trade and Services. Secretariat of Aquaculture and Fisheries. *Number of fishermen and fishing vessels in Pernambuco, registered in the General Registry of Fishing Activity Spreadsheet with statistical data obtained through the filing of an Official Letter with the Secretariat of Aquaculture and Fisheries of Pernambuco (SAP/MDIC).* Recife: SAP/MDIC, Oct. 2017a.
31. BRAZIL. Ministry of Education. *Knowledge connections: dialogues between the university and popular communities.* Brasília-DF: MEC, 2017b. Available at: <http://portal.mec.gov.br/conexoes-de-saberes/dialogos-entre-a-universidade>. Accessed on 15 Apr. 2023
32. BRAZIL. Ministry of Education. *Pronatec.* Brasília-DF: MEC, 2017c. Available at: <http://portal.mec.gov.br/pronatec>. Accessed on April 18, 2017.
33. BRAZIL. Chamber of Deputies. *Bill No. 131, of February 5, 2020.* Brasília: Chamber of Deputies, 2020. Available at: <https://www.camara.leg.br/proposicoesWeb/prop_mostrarintegra?codteor=1854982&filename=PL+131/2020>. Accessed on: 03 feb. 2022
34. BRAZIL. *SAP/MAPA Ordinance No. 265, of June 29, 2021a.* Establishes the rules, criteria and administrative procedures for the registration of individuals in the General Registry of Fishing Activity, in the category of Professional Fisherman, and for the granting of the Professional Fisherman's License. Available at: <https://in.gov.br/en/web/

dou/-/portaria-sap/mapa-n-270-de-29-de-junho-de-2021-329018765>. Accessed on: 13 jan. 2021.
35. BRAZIL. *Law No. 14,284, of December 29, 2021b.* Establishes the Auxílio Brasil Program and the Alimenta Brasil Program; sets targets for poverty rates and amends Law No. 8742 of December 7, 1993; repeals Law No. 8742 of December 7, 1993; repeals Law No. 10,836, of January 9, 2004, and provisions of Laws No. 10,696, of July 2, 2003, 12,512, of October 14, 2011, and 12,722, of October 3, 2012; and makes other arrangements. Available at: <https://www.planalto.gov.br/ccivil_03//_Ato2019-2022/2021/Lei/L14284.htm>. Accessed on 18 Apr. 2023
36. BRAZIL. *ICMBIO Ordinance No. 742/2023, of March 09, 2023.* Approves the Management Plan for the Jequiá Lagoon Marine Extractive Reserve (Process 02070.007458/2019-18). Available at: <https://www.mpf.mp.br/al/arquivos/2023/portaria-icmbio-no-742-09-03-2023/view>. Accessed on: 06 mai. 2023.
37. BRAZIL. Ministry of Science, Technology, Innovation and Communications. *Digital inclusion: telecentres.* Brasília-DF: MCTIC, [n.d.]. Available at: <http://www.mctic.gov.br/mctic/opencms/comunicacao/SETEL/inclusao_digital/telecentros/TELECENTROS.html>. Accessed on 20 Apr. 2023.
38. BRUNO, A. *Dear members of the Working Group to Combat Oil Slicks on the Coast of Ceará and representatives of municipal administrations.* Secretariat of the Environment of the State of Ceará, 2019. Available at: <https://www.sema.ce.gov.br/2019/12/03/manchas-de-oleo-no-ceara>. Accessed on 16 jan. 2021.
39. CALLOU, A. B. F. *The voice of the sea: symbolic construction of the reality of Brazilian fishermen by the mission of the cruiser 'José Bonifácio' (1919-1924)*". 1994. Thesis (Doctorate in Communication) – School of Communications and Arts, University of São Paulo.
40. CAPELLESSO, A.J. E.; CAZELLA, A.A. Artisanal fishing between economic crisis and socio-environmental problems: a case study in the municipalities of Garopaba and Imbituba (SC). *Ambiente & Sociedade [online],* v. 14, n. 2, p. 15-33, 2011.
41. CARDOSO, P. O.; DOULA, S. M. Marine extractive reserves: perspectives and limitations for young fishermen. *Acta Biológica Catarinense,* v. 5, n. 2, p. 5-19, May/Aug. 2018.
42. CARVALHO, I. D; PEREZ, L. S. *The female figure in fishing activity: how the precariousness in the trajectories of shellfish gatherers in Canavieiras impact on their consolidation as women* entrepreneurs. 2019. Final Report (Local Connection Project) – São Paulo School of Business Administration of the Getúlio Vargas Foundation (EAESP/FGV), São Paulo.
43. CARVALHO, M. C. V. de. *Santos and the Human Geography of the São Paulo Coast.* 1944. Thesis (Doctorate in Human Geography) – Faculty of Philosophy, Letters and Human Sciences, University of São Paulo, São Paulo.
44. CATELLA, A. C.; MORAES, A. S.; MARQUES, D. K. S.; NASCIMENTO, F. L.; LARA, J. A. F. de; OLIVEIRA, M. D. de; BORGUESI, R. *Fishing:* a strategic activity for the conservation of the Pantanal. Corumbá: Embrapa Pantanal, 2012.
45. CASCUDO, L. da C. *Jangada:* an ethnographic research. 2nd ed. Rio de Janeiro: Letras e Artes, 1964.
46. CASTILLA, J. C.; GELCICH, S.; DEFEO, O. Successes, lessons and projections from experience in marine benthic invertebrate artisanal fisheries in Chile. In: MCCLANAHAN, T. R.; CASTILLA, J. C. (Eds.). *Fisheries management:* progress toward sustainability. Blackwell, Oxford: 2007.
47. CASTILLA, J. C.; GELCICH, S. Management of the loco (Concholepas concholepas) as a driver for self-governance of small-scale benthic fisheries in Chile. In: TOWNSEND, R.; SHOTTON, R.; UCHIDA, H. (Eds.). *Fisheries Technical Paper No. 504, Case studies in fisheries selfgovernance.* Rome: FAO, 2008.
48. ABOUT 16,000 fishermen are affected by oil slicks in Salvador and other regions of the state, Bahia Pesca estimates. *G1 BA,* October 23, 2019. Available at: <https://g1.globo.com/ba/bahia/noticia/2019/10/23/bahia-pesca-estima-que-cerca-de-16-mil-pescadores-sao-afetados-por-manchas-de-oleo.ghtml>. Accessed on: 13 feb. 2022.
49. UGC. *Evaluation Report on the Execution of Government Program No. 70, Inspection and Monitoring for the Sustainability of Aquaculture and Fisheries Resources.* Brasilia, 2017. Available at: <https://eaud.cgu.gov.br/relatórios/9977.pdf>. Accessed on 15 jan. 2021.
50. CHAGAS, N. Z.; ARAUJO, D. de M.; SCHIAVETTI, A.; ROMERO, R de M. Fishing activity and perception of fish stocks in the lagoon portion of the Jequiá Lagoon Marine Extractive Reserve, Alagoas, Brazil. *Gaia Scientia,* v. 15, n. 2, 2021.
51. *CNUC – National Registry of Conservation Units.* 2022. Available at: <pp.powerbi.com/view?r=eyJrIjoiNDJiMTk4MGUtYmU0Ny00YzEwLWJmMzctNTZkM2JlMTBmOThlIiwidCI6IjM5NTdhMzY3LTZkMzgtNGMxZi1hNGJhLTMzZThmM2M1NTBlNyJ9&pageName=ReportSectione0a112a2a9e0cf52a827>. Accessed on 29 jan. 2022.
52. COELHO, V.M.T.; DUARTE, U. Potential for contamination of groundwater aquifer by domestic sewage. Quantification of bacteriological decay. *Revista Águas Subterrâneas,* São Paulo, v. 22, n.1, p.1-12, 2008.

53. COHEN, A.N.; CARLTON, J.T. Accelerating invasion rate in a highly invaded estuary. *Science,* v. 279, p. 555-558, 1998.
54. COLAUTTI, R. I.; MACLSAAC, H. J. A neutral terminology to define 'invasive' species. *Diversity and Distributions,* v. 10, p. 135-141, 2004.
55. CORIOLANO, L.N.M.T; LIMA, L.C. (Org.). Community Tourism in the Northeast of Brazil. In: BARTHOLO, R.; SANSOLO, D.G.; BURSTYN, I. (Org.). *Community-Based Tourism:* diversity of Brazilian perspectives and experiences. Rio de Janeiro: Letra e imagem, 2009. p.277-287.
56. CORRÊA, J. M. S.; ROCHA, M. dos S.; SANTOS, A. A. dos; SERRÃO, E. de M.; ZACARDI, D. M. Characterization of artisanal fishing in Lake Juá, Santarém, Pará. *Revista Agrogeoambiental,* Pouso Alegre, v. 10, n. 2, p. 61-74, jun. 2018.
57. CORREIA, M.D.; SOVIERZOSKI, H. H. *Marine ecosystems:* reefs, beaches and mangroves. Maceió: EDUFAL, 2005.
58. COSTA, A. A. *In search of a transition strategy for the environmental sustainability of artisanal fishing in the municipality of Rio Grande/RS - Patos Lagoon Estuary.* 2004. Dissertation (Master's Degree in Environmental Education) – Graduate Program in Environmental Education, Federal University of Rio Grande.
59. COSTA, H.A. Review of the book "CARNEIRO, D. M. R. Destinations of tourism: paths to sustainability. Rio de Janeiro: FGV, 2013". *Caderno Virtual de Turismo,* Rio de Janeiro, v. 14, n. 1, p. 96-100, Apr. 2014.
60. CUNHA, C. C. *Extractive Reserves: institutionalization and implementation in the Brazilian State in the 1990s.* 2010. Thesis (Doctorate in Psychology) - Institute of Psychology, Federal University of Rio de Janeiro, Rio de Janeiro.
61. CUNHA, L. H de O. Extractive Reserves: an alternative production for biodiversity conservation. In: ENCONTRO DOS POVOS DO VALE DO RIBEIRA, 2001, São Paulo. *Annals...* São Paulo: NUAPUB-USP, 2001. Available at: <https://nupaub.fflch.usp.br/sites/nupaub.fflch.usp.br/files/color/resex.pdf>. Accessed on 27 jan. 2022.
62. CYRINO, C. de O. and S. "*To fishermen modernity!*" *trajectories of fisheries policy in the regulation of artisanal fishing.* 2018. Dissertation (Master's Degree in Social Sciences) – Center for Human and Natural Sciences, Federal University of Espírito Santo.
63. DE PAULA, C. Q. Environmental impacts on Brazilian artisanal fisheries: a geographical interpretation. *Revista PerCursos,* Florianópolis, v.19, n.41, p.79-106, Sep/Dec. 2018.
64. DIAS, C.B. *Whaling in colonial Brazil: contracts and contractors in Rio de Janeiro in the seventeenth century.* 2010. Dissertation (Master's Degree in History) – Institute of Human Sciences and Philosophy, Department of History, Fluminense Federal University, Niterói.
65. DIAS NETO, J. Fishing in Brazil and its institutional aspects – a record for the future. *CEPSUL Journal – Biodiversity and Marine Conservation,* Santa Catarina, v.1, n. 1, p.66-80, 2010.
66. DIEGUES, A. C. *Fishermen, Peasants and Sea Workers.* São Paulo, Editora Ática, 1983.
67. DIEGUES, A. C. *Peoples and Seas:* reading in maritime socio-anthropology. São Paulo: NUPAUB-USP, 1995.
68. DIEGUES, A. C. The socio-anthropology of maritime fishing communities in Brazil. *Ethnográfica,* v. 3, n. 2, p. 361-375, 1999.
69. DIEGUES, A. C.; ARRUDA, R.S.V. *Traditional knowledge and biodiversity in Brazil.* Brasilia: Ministry of the Environment, 2001.
70. DIEGUES, A. C. (Org.). *Enciclopédia Caiçara:* Vol. I – The researcher's view. São Paulo: HUCITEC/ NUPAUB-USP, 2004.
71. FABRINO, N.H.; NASCIMENTO, E.P. do; COSTA, H.A. Community-Based Tourism: a reflection on its concepts and practices. *Caderno Virtual de Turismo,* Rio de Janeiro, v. 16, n. 3, p.172-190, dez. 2016.
72. FASSARELLA, S. S. Women's work in the context of artisanal fishing: perceptions from the female perspective. *SER Social,* v. 10, n. 23, p. 171-194, 2009.
73. FREITAS, J. *Sustainability:* the right to the future. Belo Horizonte: Forum, 2011.
74. FREYRE, G. *Northeast.* 7. ed. Rio de Janeiro: Global, 2004.
75. FURTADO, L. G. Artisanal fishing: a delineation of its history in Pará. *Bulletin of the Emílio Goeldi Museum of Pará. New Anthropology Series,* Belém, n. 79, p. 1-50, Apr. 1981.
76. GARCIA, N. M.; YUNES, M. A. M.; CHAVES, P. F.; SANTOS, L. O. dos. Educating boys and girls: generational transmission of artisanal fishing in the family environment. *Psicol. educ.* São Paulo, n. 25, p. 93-112, Dec.2007.
77. GELCICH, S.; EDWARDS-JONES, G.; KAISER, M.J.; CASTILLA J.C. Co-management policy can reduce resilience in traditionally managed marine ecosystems. *Ecosystems,* v. 9, p. 951-966, 2006.
78. GELCICH, S.; EDWARDS-JONES, G.; KAISER, M. J. Heterogeneity in fishers harvesting behavior under a Territorial user rights policy. *Ecological Economics,* v. 61, n. 2-3, p. 246-254, 2007.
79. GELCICH, S.; HUGHES, T.; OLSSON, P.; FOLKE, C.; DEFEO, O; FERNANDEZ, M.; FOALE, S.; GUNDERSON, L.; RODRIGUEZ-SICKERT, C.; SCHEFFER, M.; STENECK, R.; CASTILLA, J. C. Navigating transformations in governance of Chilean marine coastal resources. *Proceedings of the National Academy of Sciences of the United*

States of America, v. 107, n. 39, p. 16751-17060, 2010.
80. GELCICH, S.; MARTINEZ-HARMS, M. J.; TAPIA-LEWIN, S.; LAVÍN, F. Comanagement of small-scale fisheries and ecosystem services. *Conservation Letters,* v. 12, n. 2, e12637, feb. 2019.
81. GIL, A. C. *How to design research projects.* 4 ed. São Paulo: Atlas, 2008.
82. GIULIETTI, N.; ASSUMPÇÃO, R. de. Brazil's fishing industry. *Agricultura em São Paulo,* São Paulo, v. 2, n. 42, p. 96-127, 1995.
83. GLASER, M.; OLIVEIRA, R.S. Prospects for the co-management of mangrove ecosystems on the North Brazilian coast: whose rights, whose duties and whose priorities. *Natural Resources Forum,* v. 28, n. 3, p. 224-233, 2004.
84. GOES, L.; CORDEIRO, R. The fisherwoman in the daily life of artisanal fishing. *Psicol. Ver. (Belo Horizonte),* Belo Horizonte, v. 24, n.3, p. 778-796, dez. 2018.
85. GOMES, A.C.A.; MEURER, A.P.S. PINTOR, G.M.Z. The use of reverse logistics to meet socio-environmental responsibility: an emu case study in the sugarcane agroindustry in Paraná. *Revista Orbis Latina,* Foz do Iguaçu, v.6, n. 2, jul./dez. 2016.
86. GOMES, T.; RODRIGUES, M. Predatory fishing: threatens the only existing marine extractive reserve in Alagoas. Socio-environmental, February 4, 2018. Available at: <https://uc.socioambiental.org/en/noticia/186853>. Accessed on 12 feb. 2023.
87. GUIMARÃES, S.R.; LEITÃO, M. do R. de F. Artisanal fishing: reflections on public policies in the Z-33 Fishermen's Colony in Porto Jatobá, Pernambuco. *Revista Interações,* Campo Grande, v. 21, n.2, p.347-361, Apr/Jun 2020.
88. GUIMARÃES, T. C. S. *Invasive Alien Species of Fauna in Federal Conservation Units in Brazil: Systematization of Knowledge and Implications for* Management.2015. Dissertation (Master's Degree in Ecology) – University of Brasilia, Brasilia.
89. HEYWOOD, V. H. Patterns, extents and modes invasions by terrestrial plants. In: DRAKE, J. A.; MOONEY, H. A.; DI CASTRI, F; GROVES, R. H.; KRUGER, E. J.; REJMÁNEK, M. M.; WILLIAMSON, M. (Eds.). *Biological invasions.* New York: John Wiley & Sons, 1996.
90. HÜBNER, J. C.; VEIGA, K. R. da; LONGARAY, A. da S.; TRENTIN, G.; CALDASSO, L. P.; UMPIERRE, M. B.; WALTER, T. Environmental conflicts related to artisanal fishing in the Brazilian coastal zone. *Archive of Marine Sciences,* Fortaleza, v. 53, n. 2 (Special), p.43-51, 2020.
91. IBGE. Brazilian Institute of Geography and Statistics. *Cities: MunicipalityofJequiáDaPraia.2019.* Available at:<cidades.ibge.gov.br/brasil/al/jequia-da-praia/panorama>. Accessed in Jan.2022.
92. ICMBio. Chico Mendes Institute for Biodiversity Conservation. *Report of the protection plan of the ResexJequiá Alagoas – AL.* Brasília: ICMBio, 2011.
93. ICMBio. Chico Mendes Institute for Biodiversity Conservation. *Report of the Discussion Process of the Management Agreement of the Jequiá Lagoon Marine Reserve.* Jequiá da Praia-AL: Ministry of the Environment, 2014a.
94. ICMBio. Chico Mendes Institute for Biodiversity Conservation. *Ordinance No. 78, of July 18, 2014b.* Approves the Profile of the Beneficiary Family of the Jequiá Lagoon Marine Extractive Reserve (Process No. 02124.000006/2014-10). Available at: <https://www.ibama.gov.br/component/legislacao/?view=legislacao&legislacao=133559> Accessed on 04 Feb. 2022.
95. ICMBio. Chico Mendes Institute for Biodiversity Conservation. *CCDRU (2017).* Available at: <www.icmbio.gov.br/portal/busca?searchword=CCDRU&searchphrase=all> Accessed on 05 Feb. 2022.
96. ICMBio. Chico Mendes Institute for Biodiversity Conservation.*Ordinance No. 870, of October 11, 2018.* Approves the management agreement of the Marine Extractive Reserve of Jequiá da Praia – AL.
97. ICMBio. Chico Mendes Institute for Biodiversity Conservation. *Management Plan for the Jequiá Lagoon Extractive Reserve.* Brasilia: ICMBio, 2023a. Available at: <https://www.gov.br/icmbio/pt-br/assuntos/biodiversidade/unidade-de-conservacao/unidades-de-biomas/marinho/lista-de-ucs/resex-marinha-da-lagoa-do-jequia/arquivos/pm_resex_lagoa_do_jequia_v5.pdf>. Accessed on 06 May.2023.
98. ICMBio. Chico Mendes Institute for Biodiversity Conservation. ICMBio opens selection process for hiring temporary environmental agents. *ICMBio*, April 20, 2023b. Available at: <https://www.gov.br/icmbio/pt-br/assuntos/noticias/ultimas-noticias/icmbio-abre-processo-seletivo-para-contratacao-de-agentes-temporarios-ambientais#:~:text=O%20agente%20tempor%C3%A1rio%20ambiental%20%C3%A9,de%20apoio%20ao%20uso%20p%C3%BAblico>. Accessed on 23 Apr. 2023.
99. IRVING, M.A. Reinventing reflection on community-based tourism - innovating is possible In: BARTHOLO, R.; SANSOLO, D.G.; BURSZTYN, I. (Org.). *Community-based tourism:* Brazilian perspectives and experiences. Rio de Janeiro: Letra e imagem, 2009. p.108-119.
100. ISHISAKI, F.T. *Whole fisheries:* history, overview and analysis of federal public policies. Rio de Janeiro: Instituto Talanoa, 2021.
101. KNOX, W. *Living from the sea:* ways of life and fishing. Natal: EDUFRN, 2009.
102. KNOX, W.; TRIGUEIRO, A. Artisanal fishing on the coast of Espírito Santo. In: KNOX, W. TRIGUEIRO, A. (orgs.). *Knowledge, Narratives and Conflicts in Artisanal Fishing.* Vitória: EDUFES, 2015.

103. LIMA, J. R. da CRUZ. *Characterization of the fishing associations practiced on the coast of the State of Pernambuco with a focus on the fishermen's colony Z 9 (São José da Coroa Grande).* 2019. Thesis (Doctorate in Fisheries Resources and Aquaculture) – Federal Rural University of Pernambuco.
104. LOCKWOOD, J. L.; HOOPES, M. F.; MARCHETTI, M. P. *Invasion Ecology.* New Jersey: Blackwell Publishing, 2007.
105. LOPES, D. V.S. *Evaluation of the environmental impact and association between exposure to contaminated water and the risk of developing waterborne diseases in an extractive reserve.* 2020. Dissertation (Master's Degree in Societies, Technologies and Public Policies) – Centro Universitário Tiradentes.
106. LOPES, P.F.M.; SILVANO, R.A.M.; BEGOSSI, A. Extractive and sustainable development reserves in Brazil: resilientalternatives to fisheries? *Journal of enviromental Planning and management,* v. 54, n. 4, p. 421-443, 2011.
107. MALDONADO, S.C. *Fishermen of the sea.* 2. ed. São Paulo: Ática, 1988.
108. MANESCHY, M. C.; SIQUEIRA, D.; ÁLVARES, M. L. M. Fisherwomen: gender subordination and empowerment. *Estudos Feministas*, Florianópolis, v. 20, n. 3, p. 713-737, dez. 2012.
109. BRAZILIAN NAVY. *Regulation for the determination of the tonnage of vessels.* 2021. Available at: <https://www.marinha.mil.br/dpc/sites/www.marinha.mil.br.dpc/files/Arqueacao.pdf>. Accessed on 18 jan. 2022.
110. MARQUES, S.M. *Let's do a thesis?* São Paulo: Avercamp, 2012.
111. MARUTHI, P. *The process of preparing a General Plan for a Protected Area.* AWF Working Papers. Nairobi: Conservation Science, 2006. Available at: <https://www.awf.org/sites/default/files/media/Resources/Books%2520and%2520Papers/AWF_GMP_for_Protected_Areas_paper.pdf>. Accessed on 09 jan. 2023
112. MENESES, D. de A. *Public Policies and Federal Conservation Units. Case Study. Jequiá Lagoon Marine Extractive Reserve and the Bolsa Verde Program.* 2018. Dissertation (Professional Master's Degree in Biodiversity in Conservation Units) – Research Institute of the Botanical Garden of Rio de Janeiro, Rio de Janeiro.
113. MILANO, Y.M.R. The implications of the Concession Agreement the Real Right of Use for the management of a Marine Extractive Reserve. *Revista de Direito da UFF,* Rio de Janeiro, v. 4, n. 11, p.1-16, 2011.
114. MINAYO, M. C. de S. *The challenge of knowledge:* qualitative research in health. 12. ed. São Paulo: Hucitec, 2010.
115. MONTEIRO, A. A. Araçá: a fishing community of Portuguese origin. In: DIEGUES, A. C. S. (Org.). *Artisanal fishing:* tradition and modernity. São Paulo, Program for Research and Conservation of Wetlands in Brazil/IOUSP/Ford Foundation/IUCN, 1989.
116. MORENO, A.; RAVENGA, C. *The System of Territorial Use Rights in Fisheries in Chile.* Arlington: The Nature Conservancy, 2014. Available at: <https://www.nature.org/media/chile/system-of-TURFs-in-Chile.pdf>. Accessed on 27nov. 2022.
117. MPA. *Artisanal Fishing.* 2014. Available at: <http://www.mpa.gov.br/pesca/artesanal>. Accessed: 30 out. 2015.
118. MUNIZ, T. de S. *The gold of the sea: from the emergence of the lobster fishing industry in Brazil to the condition of the artisanal fisherman in the history of the present time (1955 to 2000). A Maritime Socio-Historical Narrative.* 2005. Dissertation (Master's Degree in Social History) – Federal University of Ceará, Fortaleza.
119. MUSSOLINI, G. Aspects of culture and social life on the Brazilian coast. *Revista de Antropologia,* São Paulo, v. 1, n. 2, 1953.
120. UNITED NATIONS BRAZIL. *Farmers from AL, MG and MS win award for rural* women.April 29, 2022. Available at: <https://brasil.un.org/pt-br/180040-farmers-from-al-mg-e-ms-win-pr%C3%AAmio-for-rural-women>. Accessed on: 12 Apr. 2023.
121. NAVI, S.M.F; ABESSA, D.M de S. Pollution management in marine and coastal Conservation Units of the State of São Paulo. *CEPSUL Journal – Biodiversity and Marine Conservation,* v. 12, 2023.
122. NEHER, P. A.; ARNASON, R.; MOLLETT, N. (Eds.). Rights based fishing. Reykjavik: NATO Advanced Research Workshop on Scientific Foundations for Rights Based Fishing, 1988.
123. OLIVEIRA, O.M.B.A. de; SILVA, V.L.da. The process of industrialization of the fishing sector and the destructuring of artisanal fishing in Brazil since the 1967 Fisheries Code. *Sequence,* 2012, n.65, p. 329-357.
124. OLIVEIRA, T. M. V. Non-probabilistic sampling: adequacy of situations for use and limitations of samples for convenience, judgment and quotas. *Administration On Line,* v. 2, n. 3, 2001.
125. ORENSANZ, J. M.; PARMA, A. *Chile, Territorial Use Rights, Successful experiment*?Samudra Report No. 55, p. 42-46, 2010.
126. PAIOLA, L. M.; TOMANIK, E. A. Traditional populations, social representations and environmental preservation: a study on the prospects for the continuity of artisanal fishing in a riverside region of the Paraná River. *Acta Scientiarum. Human and Social Sciences,* v. 24, p. 175-180, Apr. 2008

127. PALMEIRA, M.V.L. *Urban development and tourism: an analysis of urban occupation in Jequiá da Praia Alagoas.* 2007. Dissertation (Master's Degree in Dynamics of Inhabited Space) – Faculty of Architecture and Urbanism, Federal University of Alagoas, Maceió.
128. PASQUOTTO, V.F. *Artisanal fishing in Rio Grande do Sul: the fishermen of São Lourenço do Sul and their strategies of social reproduction.* 2005. Dissertation (Master's Degree in Rural Development) – School of Economic Sciences, Federal University of Rio Grande do Sul, Porto Alegre.
129. PASQUOTTO, V. F. Commercialization, public policies and social reproduction in artisanal fisheries. In: LOBO, A. (Org.). *In the nets of artisanal fishing.* Brasília: IBAMA, 2007. p. 225-239.
130. PAULA, C. Q de. *Geography(s) of Brazilian artisanal fisheries.* 2018. Thesis (PhD in Geography) – Institute of Geosciences, Federal University of Rio Grande do Sul, Porto Alegre.
131. *Municipal PROFILE of Jequiá da Praia-AL.* Secretary of State for Planning, Management and Heritage, 2018.
132. PHILLS JR, J. A.; DEIGLMEIER, K; MILLER, D.T.; Rediscovering social innovation. *Stanford Social Innovation Review,* v.6, n.4 p. 34-43, 2008.
133. PIMENTEL, D. *Biological Invasions:* Economic and Environmental Costs of Alien Plant, Animal, and Microbe Species. 2. ed. Massachusetts: Taylor & Francis, 2011.
134. *FULL POLICY,* 2021. History, Overview and Analysis of Federal Public Policies. Available at: <https://www.politicaporinteiro.org/wp-content/uploads/2021/04/Pesca-Por-Inteiro_V14.pdf>. Accessed 15 Apr. 2023.
135. RAMALHO, C.W.N. The historical formation of artisanal fishing: origins of a culture of work based on the feeling of art and freedom. *Caderno de Estudos Sociais,* Recife, v.24, n 2, p. 251-285, dez. 2008.
136. RAMALHO, C. W. N. State, fishermen and national development. From the naval reserve to aquaculture. *Ruris,* v.8, n.1, p.31-62, mar. 2014.
137. RAMALHO, C. W. N. The possible impacts of oil spills on artisanal fishing communities in Pernambuco: a brief and provisional assessment. *Recife: Center for Humanities, Seas and Rivers Studies (NUHUMAR),* Federal University of Pernambuco, p. 01-05, 2019.
138. SANSOLO, D. G.; BURSZTYN, I. (Org). Community-based tourism: potential in the Brazilian countryside. In: BARTHOLO, R.; SANSOLO, D.G.; BURSZTUN, I. (Org). *Community-based tourism: diversity of Brazilian perspectives and experiences.* Rio de Janeiro: Letra e imagem, 2009. p. 23-30.
139. SANTOS, A.C.M.; SANTOS, K.; FORTUNATO, W.; SILVA, D; LEO,T.; RIBEIRO, A. Socio-environmental conflicts and problematizations in fishing: reports of artisanal fishermen from the locality of the Fortaleza stream, Macapá - Amapá - Brazil. *Environmental Management & Sustainability Journal,* Florianópolis, v. 7, n. 3, p.174-190, jul/set. 2018.
140. SANTOS, C.Z.; SCHIAVETTI, A. Marine Extractive Reserves of Brazil: contradictions of legal order, sustainability and ecological aspect. *Bulletin of the Fisheries Institute,* v. 39, n. 4, p. 479-494, dez. 2013.
141. SANTOS, I. J. de A. *Evaluation of the environmental impacts on the Jequiá River and its surroundings, in the urban area of the municipality of Jequiá da Praia, Alagoas.* 2020. Monograph (Course Completion Work) – Centro Universitário Tiradentes, Maceió.
142. SARLET, I.W. *The Effectiveness of Fundamental Rights:* A General Theory of Fundamental Rights from a Constitutional Perspective. 10th ed. Porto Alegre: Livraria do Advogados Editora, 2011.
143. SARLET, I.W.; FENSTERSEIFER, T. *Environmental Constitutional Law:* Constitution, Fundamental Rights and Environmental Protection. 3 ed. São Paulo: Revista dos Tribunais, 2013.
144. SASSEN, S. Expulsions: Brutality and Complexity in the Global Economy. Rio de Janeiro/São Paulo: Paz e Terra, 2016.
145. SCHERER, L.; FRANCO, M. B.; FERNANDES, S. B. V. Eco 1992: Nuances, advances and interrogations. *Hall of Knowledge,* v. 2, n. 2, 2016.
146. SCHUMANN, S. Co-management and "consciousness": Fishers' assimilation of management principles in Chile. *Marine Policy,* v. 31, p. 101-111, 2007.
147. SCHUMANN, S. A tenuous triumvirate: The role of independent biologists in Chile's co management regime for shellfish. *Marine Policy,* v. 34, n. 1, p. 133-138, 2010.
148. SCHWARTZ, R. G. Fundamental social rights and the judicialization of policies: some considerations. *Revista da AJURIS,* Porto Alegre, v. 43, n. 141, p. 265-292, dez. 2016. Available at: <http://revistadaajuris.ajuris.org.br/index.php/REVAJURIS/article/view/569>. Accessed on 22 Apr 2023.
149. SEIXAS, C. S; KALICOSKI, D. C. Participatory management of fisheries in Brazil: survey of initiatives and documentation of processes. *Development and Environment,* n.20, p.119-139, Jul./Dec. 2009.
150. SHOTTON, R. Use of property rights in fisheries management. In: Proceedings of the Fishrighs, 99., 1999. Freemantle, Western Australia. Proceedings... Rome: FAO, Fisheries technical paper No 404/1., 1999.
151. SILVA, M. C. S. *Organization and autonomy of the community of Redonda.* 2004. Dissertation (Master's Degree in Development and Environment) – Federal University of Ceará.

152. SILVA, D.D.; MIGLIORINI, R.B.; CASTRO E SILVA, E.; LIMA, Z. M. de. MOURA, I. B. de M. Lack of basic sanitation and groundwater in a groundwater aquifer: Bairro Pedra Noventa region, Cuiabá (MT). *Sanitary and Environmental Engineering Journal,* v.19, n.1, jan/mar 2014.
153. SILVA, A. P. *Brazilian artisanal fisheries:* conceptual, historical, institutional and prospective aspects. Palmas: Embrapa Fisheries and Aquaculture, 2014.
154. SILVA, J. C.; SANTOS, I. J. de A.; SIVA, P.N. da.; SILVA, G.S, LIMA, S.F. de. The harmful household waste of the riverside dwellers of the RESEX Marinha Lagoa do Jequiá da Praia-AL. *Exact and technological sciences,* v. 3, n.1, p. 117-130, 2015.
155. SILVA, J.S.C.; SHRIKE, J. de L.; CALIL, J. G. S. The great forgotten disaster: preliminary analysis of the oil spill on the Brazilian coast (August 2019-March 2020) and its impacts on the coast of Bahia. *Rev. UFMG,* v.27, n.3, p. 54-79, Sep/Dec. 2020.
156. SILVA, L.G.S. *Caiçaras and jangadeiros:* maritime culture and modernization in Brazil. São Paulo: CEMAR - USP, 1993.
157. SILVA, L. G. S. History and Environment: small-scale maritime fishing in Brazil. *Journal of Sociology and Politics,* Curitiba, 10/11, pp. 219-231, 1998.
158. SILVA, L. G. S. da. *The work, the festival and the rite:* people of the sea and slavery in Brazil (10th, 7th to 19th centuries). Campinas: Papirus, 2001.
159. SILVA, L. M. A.; DIAS, M.T. Artisanal fishing in the State of Amapá: Current Status and challenges. *Bol. Tech. Cient. Cepnor,* v. 10, n. 1, p. 43-53, 2010.
160. SOARES, L. C. The slaves of gain in Rio de Janeiro in the nineteenth century. *Revista Brasileira de História,* São Paulo, v. 8, n. 16, p. 108-142, 1988.
161. TIMM, J. U. Fishing craftsmanship: its origins, adversities and perspectives. The national focus is the Santa Catarina problem. *Revista de Administração Pública,* Rio de Janeiro, v. 12, n. 3, jul./set, 1978.
162. TORRES, R.; GIANELLA, L. The vulnerability of Brazilian artisanal fishermen: a sociodemographic analysis. *Geonorte Magazine,* v.11, n.38, p.162-185, 2020.
163. VASCONCELLOS, M., DIEGUES, A.C.; KALIKOSKI, D.C. Coastal fisheries of Brazil. In: SALAS, S.; CHUENPAGDEE, R.; CHARLES, A.; SEIJO, J. C. (Eds.). *Coastal fisheries of Latin America and the Caribbean.* Rome: Food and Agriculture Organization of the United Nations, 2011. p. 73-116.
164. VASCONCELLOS, M., DIEGUES, A.C.S.A; SALES, R.R. Limits and possibilities in the management of coastal artisanal fisheries. In: COSTA, A.L (org). *In the nets of artisanal fishing.* Brasília: IBAMA, MMA, 2007. p.15-83.
165. VIEIRA, P. F. (Org.). *Conservation of biological and cultural diversity in coastal areas.* Approaches and experiences in Latin America and the Caribbean. Florianópolis: APED, 2003. p. 25-33.
166. VOLPATO, G. *Science: From Philosophy to Publishing.* 6. ed. São Paulo: Cultura Acadêmica, 2013.
167. WITTENBERG, R.; COCK, M. J. W. Invasive alien species: a toolkit of best prevention and management practices. Wallingford, UK: CAB International, 2001.
168. ZAMBONI, A.; DIAS, M.; IWANICKI, L. *Fisheries Audit Brazil 2020:* An integrated assessment of governance, the situation of stocks and fisheries. Brasília, DF: Oceana Brasil, 2020.