THE EFFECTS OF URBAN/INDUSTRIAL EXPANSION IN GUANABARA BAY ON THE PERCEPTION OF ARTISAN FISHERMEN

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Introduction

In the historical context of the Guanabara space, the various regional economic development cycles will shape the urban/industrial occupation of the Rio de Janeiro Metropolitan Region around Guanabara Bay, which, in the recent process of industrial modernization, has intensified its residential, industrial and road use, becoming the scene of conflicts of interest of various agents who share this geographical space, including artisanal fishermen (DA SILVA, 2015).

More specifically, in the mid-2000s, the Region witnessed a new process of social and spatial change linked to industrialization and urbanization, materialized by a cycle of industrial expansion led by investments in the oil section, related to the oil fields exploration of Campos Basin and Pre-Salt Basin. In Guanabara Bay, there was an accelerated process of industrial and urban occupation by the various operating agents, related to this new regional economic cycle (DA SILVA, 2011).

The following stand out in the investments made or underway in the Guanabara Bay region: the new facilities of the Petrobras Research Center – CENPES, on the campus of UFRJ – Federal University of Rio de Janeiro; the installation of pipeline networks connecting the Bacia de Campos, the Duque de Caxias Refinery – REDUQ; the oil and gas transfer terminals in Comprida and Redonda islands and works related to the cons-

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truction of the Rio de Janeiro Petrochemical Company (COMPERJ) (DA SILVA, 2011 and Dias et al., 2013).

This new cycle of industrial expansion has been characterized in two ways: 1) an industrial occupation that takes into account only the structural advantages of proximity to raw material sources and the consumer market of products and services; 2) an increase in the environmental degradation of the region's ecosystems, as a result of the increasing irregular occupation of the remaining mangrove areas, resulting from the migratory cycle provided by the demands of employment and services in the region.

According to Dias et al. (2013), these factors, associated with pollution caused by domestic and industrial sewage disposal and the disposal of garbage in natural areas, have caused negative impacts on fishing communities, loss of fish production and urban/industrial pressure that advances on their territories.

This study focuses on the artisanal fishing community of Itaoca Island, located in the eastern region of Guanabara Bay, in the municipality of São Gonçalo, Rio de Janeiro. Considered a peripheral neighborhood where the population's income and education levels are low (MASTERPLAN, 2013), Itaoca is home to a community of artisanal fishermen who traditionally survive and support their families through fishing, but which over the years have felt the impacts of industrial activity and pollution on their way of life.

Therefore, it is important to identify how fishermen in this community relate to Guanabara Bay in order to obtain the resources necessary for their livelihoods, and also their perception on the use of their territories by other agents, with economic purposes other than fishing, as well as the consequences on their lives by this use. This can contribute not only to formulating policies that will mitigate such impacts, keeping these fishermen in their activity, but also to promote the development of the region.

Based on studies of environmental perception, one can understand the interaction between man and the environment, their expectations, conduct, judgments (Zampieron et. al., 2003). Several authors have conducted perception studies in order to understand the relationship between fishermen and the environment, and also with the transformations observed in their environments and how these changes impact their activities (Liao, Huang, Lu, 2019; Oliveira, Santos and Turra, 2018; Santos et. al., 2018; Araújo, Aguiar Netto, Gomes, 2016; Marcomin, Sato, 2016).

In this regard, an exploratory research with a qualitative approach was developed to understand the environmental perception of a group of fishermen from Itaoca Island about the effects of the urban/industrial expansion in Guanabara Bay on their fishing and housing spaces, considering the meanings behind the traditional experience and work spaces, and also explain the main problems and conflicts generated by these externalities.

Methodology

a) Considerations about the study area: Itaoca Island

Located in the receding concave of Guanabara Bay, in the municipality of São Gonçalo, Rio de Janeiro, the island of Itaoca (Figure 1), which has an area of about 8.47

km², has the Imboaçu river as a partial hydrographic separator with the continent, whose winding channel, now heavily polluted with untreated sewage along its route in this region, also has extensive mangrove coverage on both banks (MASTERPLAN, 2013).

Figure 1 – Location of Itaoca Island in Guanabara Bay.

Source: Adapted from Google Maps (2019).

The island's population, estimated at 3,917 inhabitants, is relatively divided between men (50.1%) and women (49.9%), comprising 59.2% of people aged 19 to 60 years, which indicates that the majority of the population is economically active and may, except for some specific disability, perform work activities (IBGE, 2010). Another predominant characteristic refers to the low income level observed. Also, according to Census data (IBGE, 2010), in about 25% of households, monthly income is equal to or less than 1

minimum wage; 32.3% is between 1 and 2 minimum wages and in only 15.6% the average household income is equal to or above 3 minimum wages. The average income in Itaoca corresponds to 52% of the average income of Brazil and 62.3% of the average income of the municipality of São Gonçalo.

In addition to low income, the area is characterized by inadequate sanitation conditions. Of the total households (1.257), only 7.3% have sewage collection by a general network. In 35.3%, the collection is done through a rudimentary cesspit and in 19.1% the sewage is discharged into ditches. This factor, together with the destination of garbage, which in 33.1% of households is burned on the property and 6.7% thrown on vacant land (IBGE, 2010), contributes to the worsening of environmental conditions and quality of life of the population.

Along with the services, commerce and industrial sectors, predominant in the municipality of São Gonçalo, fishing is an industrially and artisanal activity developed on the Island, contributing to the maintenance of the families that traditionally apply this activity. In addition to shrimp and fish fishing activities, crabs and crabmeat are carried out, as well as the production of fishing gear.

Despite its economic and socio-cultural importance in the region, there is not much data about the production, the generated value and the fishermen involved. The information available is that provided by Residents' and/or Fishermen's Associations, which is sometimes contradictory. There are also some studies that present fishing data in Guanabara Bay and São Gonçalo (IBAMA, 2002, Fiperj 2013), which use different calculation methodologies, and so not consider the professionals related to fishing by categories and/or do not specify Itaoca-related details.

According to the President of COPALISG – the São Gonçalo Fishermen's Co-operative, the fishing community of Itaoca is estimated at 600 individuals, including 350 men and 250 women, consisting of fishermen, crab collectors, crabmeat and manufacturers of fishing gear, all considered artisanal fishermen according to their representative associations, and mainly concentrated in Praias da Luz, da Beira and São Gabriel. Despite the estimate, the representative of Copalisg states that there are no records of everyone, which prevents the availability of more accurate data.

However, according to data based on the monitoring of fishing activity in the state of Rio de Janeiro, collected for the municipality of São Gonçalo (considering 4 collection points in Itaoca and 2 in Gradim) and comprising the period of June 2017 and July 2018, in the artisanal fishery, there was monthly average of 172 production units, which can be a vessel, or fisherman, a floating net or a trawl (FIPERJ, 2018 a; FIPERJ, 2018 b).

As for production, according to monitoring, about 53,883 tons were unloaded in the municipality in that period. Of the total, 15,356.1 tons (28.5%) came from artisanal fisheries (FIPERJ, 2018 a; FIPERJ, 2018 b). Monitoring also indicated that the captured species have changed over time, and the sardine and horsetail species, which accounted for the largest volume unloaded in 2011 and 2012, in 2017 and 2018 gave way to other types of sardines (sardinha-boca-torta, sardinha-laje and savelha) (FIPERJ, 2018 b). The change in species may lead to a loss in production value, as the sardinha-boca-torta sardines, which increased their catch by 40 times compared to 2012, have a lower market value than the true sardines.

b) Method

The fieldwork of this research was developed in two stages. The first, held from February to July 2016, aimed to identify, through direct observations, the geographical occupation of the fishing community in the region, its leaders, its representative associations, its *modus operandi* to carry out its work and production marketing activities, as well as its social interactions. In this phase, the goal was to establish contacts with the representatives of the fishermen's associations, in order to understand its universe of meanings, especially regarding Guanabara Bay and its traditional activities. Another objective was to understand the relationships created with the government and other social actors who share the same spaces.

In the second stage, which took place from August 2016 to February 2017, the objective was to capture the environmental perception of the members of this fishing community. Thus, a semi-structured questionnaire with open- and closed-ended questions (Annex) was prepared, so that the interviewees could express their perceptions about the environmental conditions in their fishing and housing spaces and about the impacts the operations of other agents had on their activities.

The interviews were held on Saturdays, the day the fishermen attend the co-operative. The number of interviews was defined according to non-probabilistic sampling, for convenience, with the fishermen who were available when invited participated in the survey (MALHOTRA, 2001). It is noteworthy that generalization was not the objective, affirming the exploratory character of the research, given the difficulty, for security reasons, in obtaining field data in the studied region. In total, 28 interviews were conducted, and at the end the answers began to recur (which, according to Minayo (2004), indicates that the number of interviews is satisfactory). In this regard, the results and observations for the group studied contribute to understanding the fishermen's perception of the environment and the impacts of anthropic activity on the locality. In addition, they may indicate the prospect of continuity (or discontinuity) which generates the activity, contributing to the design of public policies for the sector.

The narratives were analyzed in order to allow the perception of the interviewees regarding the proposed themes, which were selected to be included in the text, for those that showed similarities or differences in relation to such perceptions. Thus, a greater diversity of perceptions was inserted in the discussion.

Results and discussions

a) Profile of the artisanal fishermen interviewed

Among the randomly chosen fishermen interviewed, 13 were men and 15 were women, approaching the distributive occupational trend of the island, in terms of gender, presented by IBGE data in 2010.

The age distribution of respondents was varied, as shown in Table 1. Most of them were over 50 years old (64.3%), with the participation of only 3.6% of young people aged

between 18 and 25 years. It is noteworthy that in 2010, IBGE data indicated a concentration of 59.2% of the population between 19 and 60 years old and that, in the study in question, there was a predominance of individuals over 50 years, especially among women.

Table 1 – Age group of interviewed fishermen from Itaoca Island

AGE RANGE	MEN	WOMEN	TOTAL
Between 18 and 25 years	1	0	1
Between 26 and 33 years	1	0	1
Between 34 and 41 years	3	1	4
Between 42 and 49 years	2	2	4
Over 50 years	6	12	18
Total	**13 men**	**15 women**	**28 interviewed**

Among the individuals interviewed, at least 58% reported living in the region under study since birth or longer than 50 years. This factor may contribute to the greater reliability of information about the spatial modifications of the locality, since they are people who have known, for a long time, the environment of Itaoca Island.

In the interviews, 76% reported having children who are old enough to start fishing. However, they are not motivated to continue the tradition, which makes us believe that in Itaoca, the fishing craft has aroused little interest in younger generations, who prefer to perform other activities, such as mechanic, driver or construction, as they believe it is more profitable and continuous than the fishing activity. A similar result was found by Martins et. al., (2015), who evaluated the fishing activity in a community of São Mateus, ES. According to the authors, fishermen believe that fishing is unattractive to young people and would not like their children to work in this activity. In a study that analyzes the perception of traditional fishermen in Laguna, SC, Marcomin and Sato (2016), besides corroborating this outlook, conclude that this factor may contribute to the extinction of fishing in the locality. Diegues (1988) addresses the subject by discussing the loss of fishing grounds in other typical communities. According to the author, from 1960 onwards, environmental degradation and loss of territories caused by urban advancement over the traditional areas of the long-established fishermen in the Iguape, Cananeia, Ubatuba and Paraty regions were observed. The construction of roads accessing these coastal areas of the States of São Paulo and Rio de Janeiro changed the social and cultural environment of the long-established communities. Many fishermen began performing other activities, such as construction workers or as housekeepers in tourist houses, because they feel more assured in collecting a better income for their subsistence from these sources than from fishing.

Based on the analysis of the schooling profile of those interviewed (Table 2) it was observed that 78% of the interviewed had incomplete Elementary School and only 3.6% had completed High School, showing the low level of education among the fishermen interviewed in Itaoca Island.

Table 2 – Schooling profile of the fishermen interviewed in Itaoca Island

Profile		**Interviewees**
Schooling	1st to 5th grade	78.50%
	6th to 8th grade	14,30%
	Incomplete high school	0.0%
	Complete high school	3.60%
	Only writes name	0.0%
	Did not attend school	3.60%

According to Diegues (1988), due to the fact it is cultural appropriation, the artisanal fishing activity that is transmitted from one generation to another, which does not require schooling as a prerequisite, may be one of the factors that explains the low education level in the artisanal fishing communities. Another factor that can be attributed to this fact, according to studies by Martins (2009), is the low income of families, since small-scale artisanal fishing cannot go beyond subsistence, which in practice requires all family members begin to engage in this activity early on.

Despite the significant female presence (54% of the universe interviewed), the activities of men and women are in different universes (Table 3). While fishing is a predominantly male activity, women are in charge of repairing nets, collecting crabs, shellfish and crabbing, activities that can be reconciled with household chores.

Table 3 – Main occupations of fishermen interviewed in Itaoca Island

Main Occupations	Men	Women
Fisherman	11	2
Remove meat from crabs	0	8
Crab, fiddler crab collector and others	5	7
Other activities (repair boats, mechanics, manufacture of fishing gear)	4	0

Source: Field Research
Note: It was found that some of the interviewees have more than one occupation.

All fishermen said they perceived the reduction in fishing production in recent years. Currently, the average fish catch by fishery, according to the answers, is about 44 kg, in which the reported values ranged from 20 kg to 100 kg/fishery. The species captured, according to 91% of respondents, are Corvina, Mullet, Catfish and Sardines. For the activity, all respondents use fishing nets, longlines and cast nets. The production is marketed, in most cases, near the Fisherman's Colony Z8, in Gradim, however, two fishermen market their product directly on the beach.

In the case of crab and fiddler crab collectors, the average catch is 14kg per fishing expedition, ranging from 5kg to 20kg. Most of them use the trawl net (66%), and hand--catch and crab traps are also used. Both types of crab are marketed near restaurants and directly on the beach. IBAMA, in a survey carried out between 2001 and 2002, identified that in general, restaurants and markets were the preferential places for marketing the fiddler crabs and the fairs and roads for the larger crabs (IBAMA, 2002).

As for the fishing frequency, 32% of respondents reported fishing every day of the week, while 50% carried out fishing 5 to 6 days and 18% 3 to 4 days. When asked what they do when they are not fishing, 50% said they work at home and 28.6% work in other activities during their free time. Another 21.4% said they use their free time to take care of children and leisure time.

Overall, all respondents said they were affiliated with a fishermen's association on the island. In Itaoca, in addition to COPALISG, they are also part of other associations, the Praia da Luz Siri Fishermen and Crabmeat Association - APESCA SIRI LUZ and the São Gabriel Fishermen and Crabmeat Association. However, during the surveyed period, it was not possible to confirm the number of their respective associates because they were inactive during this period.

b) The environmental perception of Itaoca fishermen

Respondents generally expressed their perceptions on the "environment" and "pollution" by relating them, respectively, to the space where human life and other living beings are inserted, and to the conditions of spatial transformation by human actions.

> "Environment is the bays, the mangroves, the forests, the places of living beings." (Fisherman E)
> "Environment is everything that surrounds us and is part of life." (Fisherwoman C)
> "Environment is to have good conditions for the life of people and animals. It's having clean beaches, clean mangroves." (Fisherwoman D)

Although their concepts are not scientifically based, because they are outside the knowledge formulation standards, they are guided by the uncompromised understanding of what is real, denoting knowledge derived from the common sense of perceiving space and its transformations related to specific characteristics of people's daily activities, hence their autochthonous sense, as defined by Reigota (2013).

Thus, the perception of Itaoca's environmental pollution was not only related to understanding what is visible, apprehended by the volumes, colors, movements, which, when altering the landscape, transmit different meanings to the observed space, as well as issues related to its use.

> "The mangroves of this whole region are full of trash. There are many pet bottles and plastic bags." (Fisherman B)
> "The mangrove is rotten. There are days when the stench of sewage is very strong. In addition, there is a large amount of trash that is dragged over the mangroves. I don't know how crabs can still be found there." (Fisherwoman C)
> "[...] There are days when we cast the net to fish and it is full of garbage. So first we take out the trash and return it to the bay. Only then do we collect the fish." (Fisherman F)

When asked if they caused damage to the environment, the vast majority (82%) said no, with the remaining small portion sometimes saying yes. However, when asked about the fisherman's relationship with the environment, 61% of respondents answered that the vast majority, in their opinion, does not have a caring relationship.

> "The vast majority only complains, but do not take care of anything." (Fisherwoman D)
> "The relationship is one of carelessness. Many throw trash everywhere." (Fisherwoman H)
> "These guys don't take care of anything. When they arrive after fishing, they leave everything that is garbage on the beach." (Fisherman H)

Based on the answers, it can be seen that the issue of environmental preservation is not an attitude instilled among the members of this community. Hence the disorganization of the occupied spaces, with the presence of large amounts of garbage scattered in the living space and working areas.

According to Tuan (2012), since the preservationist attitude is a cultural attitude, implying firmness of interest and value, it requires a conceptualized experience, partially personal and largely social. In this context, it is noted that the members of this community, lacking environmental education, do not feel integrated in the process of preserving the environment.

Lopes and Guedes (2013), in their research on the environmental perception of fishermen in the municipality of Macaíba-RN, concluded that the fact that these fishermen participate in environmental education activities, they have a broader environmental view of environmental problems in their communities, making them more active before local government and society representatives, which is not the case in the Itaoca community.

Regarding the negative impacts on the fishing activity, the responses pointed to the pollution of waters and mangroves by sewage and garbage (41.1%), and also activities related to Petrobras (44.1%) as factors that most impact fishing. The perception of these factors, when referring to the question of responsibilities, will point out the Governments, especially the local governments, for the lack of actions for garbage collection and sewage treatment, and also Petrobras, for the occupation of fishing spaces, as the main causes responsible for the environmental damage.

Part of this perception may be related to environmental sanitation conditions in the locality. As already presented, there is a large percentage of households not served by sewage collection and for many their garbage is not collected, but is burned at the property. Dias et al. (2013), in their work on the social and environmental impacts in Guanabara Bay related to Comperj, presenting the perception of fishermen in the Magé-RJ region about the environmental impacts on fishing, indicate that, in the fishermen's view, the responsibilities are due to the lack governmental actions in resolving the issue of pollution, such as public policies at the Federal and State levels that are related to the implementation process of this Petrobras venture. The results therefore signal a certain uniformity of perceptions in the fishing communities of this region in Guanabara Bay, since by sharing the same areas as fishing territories, they feel the same effects.

c) The meanings of living and working spaces

In the survey there was unanimity in the respondents' answers regarding the importance of Guanabara Bay and Itaoca Island for their lives and for the community. It can be seen that this importance is somewhat related to the meanings they attribute to the spaces, not only associated with fishing and housing, but defined as a space of belonging, which refers to an affective relationship established by tradition. This affective bond between people and places or environments is defined by Tuan (2012) as "Topophilia", which is the result of personal experience marked by cultural values, thereby generating social representations.

> "I'm from southern Bahia. I came to Rio with a construction company and moved to Governador Island. When the job was over I went to work with a fellow who fixed fishing boats. That's how I started fishing. In 1980, I came to Itaoca and ended up meeting my wife, a fisherman's daughter here. When we got married, her father got me this space to build our home and that's how I stayed here. At that time it was very quiet around here. Only fisherman lived here and everyone knew each other. I've had a chance to leave, but my wife's family and my children don't want to. They are very attached to this place, despite the current safety problems and precarious fishing." (Fisherman J)
> "I have live here since I was born. My family has always lived as fishermen. In the past, I liked to catch crabs in the mangroves. It was really great. The mangroves were not the filth of today. Today, you walk for hours inside this rotten swamp to catch a few crabs. [...] I now fish more at the bay. [...] At sea we also have a lot of problems, but I don't think of leaving. My family and my children are here." (M)
> "Without the bay there would be no fishing. It is important because all the fishermen on the island depend on her to support their families."(Fisherwoman C)

Therefore, the importance attributed to Guanabara Bay and the mangroves is related to fishermen's perception of these ecosystems as spaces that support their social identity, namely fishing. Thus, these ecosystems are recognized as generators of job opportunities for families in Itaoca, despite the precariousness that an exogenous gaze may encounter upon arrival, the fishermen's affective relationship with the ecosystems is undeniable. The collective representations and their meanings emerge from this relationship between ecosystems and the subjects throughout the history of occupation of that space.

According to Franco and Van Stralen (2012), in the study of the importance of housing space in the production of subjectivity, the living space, besides the sense of housing and protection, gives the subject the opportunity to create a reference in the world, a basis for exploring other places, outside the home, in the search for their survival and encounters with other subjects, this exit movement to search and to return allows the subject to make the dwelling space their place of belonging.

Martins (2010), in his study on the perceptions of the residents of Alfenas and Fama in Furnas Lake, also shows, based on authors such as Simon Shana (1996), that the core perceptions of the environment bring memories, myths and meanings, making them inseparable and capable of generating their own identification, in which the mystique of a particular landscape tradition, in which its mapped topography is elaborated and enriched as the homeland. For the authors, spatial changes will give rise to rework symbolic references, especially in younger generations, which will insert a critical perception in their worldview with regard to spatial modifications.

d) Fishermen's perception of the negative externalities generated by the urban/industrial expansion on their traditional fishing and housing spaces

Based on the analysis of the interviewees' reports, it can be seen that the fishermen of the Itaoca community relate the urban/industrial expansion on housing and fishing spaces to three factors:

1) The occupation of fishing grounds by activities related to Petrobras, especially with regard to the presence of industrial facilities within the Bay and the constant movement of petroleum-related vessels;
2) The presence of COMPERJ facilities within one of its traditional living and fishing spaces, which is Praia da Beira;
3) The installation project of an industrial condominium, City Pesca, in Beach of Beira.

It should be noted that the perception of these three factors is related to the loss of ownership of territories, both housing and fishing, which are considered as impacting the survival of fishing activity and community life.

For fishermen, as regards what generates the interference in fishing at sea, the activities related to Petrobras are the main responsible factors for reducing the fishing space in Guanabara Bay, as shown in the following statements:

> "The way this is headed, with so many things being placed in Guanabara Bay, we will soon have nowhere to fish. Too many tugboats, too many ships and too many pipelines thrown into our fishing space." (Fisherman J)
> "They are ruining our fishing space. If the pipelines weren't enough, this amount of vessels moving about makes the activity almost impractical." (Fisherman C)
> "In the old days, in the sardine season, even boats from other regions came to fish in these waters. Now, besides the garbage and this bunch of ships parked here at the end of the bay, how can you fish?" (Fisherman K)

In fact, the industrial expansion in the waters of Guanabara Bay is visible by the physical presence of the enterprises and equipment related to the new oil industry cycle. This industrial expansion in the Guanabara space has generated significant negative impacts on artisanal fishing by overlapping its activities in the fishing territories, as pointed out in the studies by Faustino and Furtado (2013) in their work: Oil Industry and Environmental Conflicts in Guanabara Bay: The Comperj Case.

Also Freitas and Rodrigues (2015), in research on the social determinants of health in artisanal fisheries in Sepetiba Bay, RJ, point to the deterritorialization of traditional spaces by other economic agents, as generators of negative impacts on artisanal fisheries, affecting the life and health of fishermen in that region.

The construction of the COMPERJ pier at Praia de Beira was presented, in the interviewees' report, as the factor that most impacted the practice of the most lucrative activity on the island, shrimp and crab fishing, with negative economic consequences for families who live off this activity.

> "My fishing is in pens. But in the shrimp season we go for this fishing because it is more valued. After the construction of this pier here on the island, the shrimp disappeared. They messed with the bottom of the bay to make this channel. And they placed the dock right in the direction of the net drag. If you deviate, the net gets tangled in the lines they left there." (Fisherman L)
> "The dredging of the canal has greatly reduced shrimp fishing and, moreover, the canal areas are full of entanglements that damages the nets." (Fisherman E)
> "[...] the construction of the piers have greatly affected the shrimp and crab fishing. During dredging the shrimp and crab are gone and it's no longer as they were before." (Fisherman B)

For the fishermen based on Beira beach, this venture poses a threat to their stay on that beach, since the State Government intends to install an industrial condominium, the "City of Fishing", using the facilities of COMPERJ built there. The availability of the pier facilities with port and retroport infrastructure, which will be for sporadic use by COMPERJ, the easy access by BR-101 to large consumer centers and the low cost of expropriation, as the area is sparsely inhabited and most of its constructions are simple, were the State Government's instigators for the installation of this condominium aimed at processing fish from industrial fishing (MASTERPLAN, 2013).

According to the fishermen of the Praia da Beira community, the installation plan of this project in Beira beach has already arrived. Nothing has been discussed with the community. Everything was imposed.

> "[...] We met at the CIEP and were informed that the Government was going to install, in the area of the COMPERJ Pier, an industrial condominium, the Fishing City and therefore the space would be expropriated. They told us that the community would benefit greatly from the jobs that will be generated and that those with housing on the premises would not be harmed, as they would be compensated to be able to purchase their homes elsewhere." (Fisherman J)
>
> "Our living space has to be maintained because we need to be close to the sea. We, unlike the onboard fishermen, who spend days at sea during the boat's fishing period, go out daily to fish, usually at dawn, and come back at dusk. In the morning, we rest. In the afternoon, we prepare the nets and longlines. Early in the evening, we go to the fishing grounds to set the longlines and the traps and come home and rest until dawn, when we go to sea again to complete the fishing work. How are we going to do all this away from the sea?" (Fisherman B)

For the President of COPALISG, who says that this project, the Fishing City, will benefit the fishermen of Itaoca, he knows nothing about the community life of artisanal fishermen.

In this regard, Clímaco (2015), in an analysis of the traditional communities (quilombolas) displaced by the Alcântara Rocket Launching Center, in Maranhão, identifies that in the populations that have links of common origin, the identification with the constructed and materialized space establishes elements of identity and belonging to this territorialized space. Such perception of space, in the cases of deterritorialization imposed by the public power, in which these communities, when they perceive that they are treated as if they did not exist as subjects, have the sensation of territorial loss, a fact that generates uncertainties and conflicts.

With the financial crisis of the State from 2016 onwards, the expropriation process was suspended, leaving a depiction of degradation in Beira beach, since the already expropriated properties were partially destroyed and in an environment of uncertainty, the families who had their homes marked for expropriation are not taking care of their spaces, disfiguring the image of that area.

It is important to point out that, despite the imminent risk of removing part of the community from its traditional space, there is no articulation between the fishermen of Beira beach with the other members of this community residing in the other beaches, and no interactions are seen with the representative entities, in order to generate political articulation that will make the presence of fishermen more inclusive in matters concerning their lives and their communities.

Final remarks

The research showed that the participating individuals have a clear perception of the environmental changes to which their fishing and housing spaces are subjected. In this regard, they expressed their perceptions regarding both the environmental degradation of fishing spaces and the loss of their fishing and housing territories due to activities performed by other economic agents. These factors, in the report of the respondents, have generated negative impacts on fish production, making the economic sustainability of their activities unfeasible and threatening the survival of this community. Thus, what is seen in Itaoca is a community that maintains artisanal activities in the midst of a region that has been undergoing a process of urban intensification, perhaps due to the geographical peculiarities of metropolises such as Rio de Janeiro, where urban and nature constantly collide with environmental impacts.

The low financial result of the fishing activity, due to the drop in production, was pointed out as the main cause the younger generation has abandoned the occupation of fisherman, which leads us to believe that this is one of the causes of the significant presence of people over 50 years old in the researched universe. This suggests that, on the Island of Itaoca, the fisherman activity is in decline due to the lack of generational renewal.

A more regular and continuous market outlet for guaranteed income would be to join a cooperative system in order to establish more sustainable economic activities such

as Malacoculture (oyster and mussel farming), such as community associations for shared management of fishery resources, such as: Fishing Management in Canto do Mangue (RN); Fishing Management in Baixo São Francisco Alagoano (AL) and Fishing Management in Lagoa de Saquarema (RJ), mentioned in the study by Kalikoski and Seixas (2009) regarding this topic. However, issues such as the rise in violence, represented by the presence of drug trafficking in the region, have been a strong inhibiting factor in technical and financial support initiatives to implement sustainability alternatives in this community.

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Questionnaire: Perception of fishermen from Itaoca Island, RJ

1. Gender: ( ) Male ( ) Female
2. Age range: ( ) 18 to 25 years old ( ) 26 to 33 years old ( ) 34 to 41 years old ( ) 42 to 49 years old ( ) Over 50 years old
3. Place of birth:
4. Schooling: ( ) 1st to 5th grade ( ) 6th to 8th grade ( ) Incomplete high school ( ) Complete high school
( ) Writes name only ( ) Did not attend school
5. Marital Status: ( ) Single ( ) Married ( ) Divorced ( ) Widower ( ) Other
Children: ( ) 1-2 children ( ) 3-4 children ( ) More than 4 children ( ) No children
6. How long have you lived in Itaoca?
7. Main Occupation:
( ) Farmer ( ) Fisherman ( ) Collector of crabs, crabs and others
( ) Farmer and fisherman ( ) Other
8. Always performed this kind of activity ( ) Yes ( ) No
9. How long have you performed this occupation? ( ) Under 5 years ( ) 5 to 10 years ( ) 11 to 20 years ( ) 21 to 30 years ( ) Over 30 years
10. How often do you work in this occupation during the week?
( ) 1 – 2 days ( ) 3 – 4 days ( ) 5 – 6 days ( ) every day
11. Do you perform any other occupation? If so, which one(s)?
12. What are the advantages and disadvantages of your main activity?
13. Have you considered abandoning this activity? Why?
14. What do you do when you are not in this activity?
( ) works in another activity ( ) works at home ( ) takes care of children
( ) other
15. Are you part of any fishermen's co-operative or association?
( ) Yes ( ) No. If yes which one?
17. Are your children interested in fishing? Why?

18. What part of the day do you usually fish?
( ) morning ( ) afternoon ( ) night
19. Do you usually fish alone?
( ) Yes ( ) no
If not, with how many people?
20. What fishing gear do you use?
21. At what time of year do you fish? Why?
22. What is the average weight of fish obtained in each fishing outing?
23. What types of fish are most common?
24. After catching fish, how is storage done?
( ) straight on the boat without ice ( ) on ice ( ) other. If other, which one?
25. Upon arrival, what is the treatment given to the fish? Is it intended for own consumption or is it marketed?
26. Have you observed changes in fishing activity in recent years? If so, what has changed and why do you think it has changed? ( ) Yes ( ) No
27. How important is Guanabara Bay to you?
28. How important is Guanabara Bay to your community?
29. What do you think about the fishing conditions in the waters of Guanabara Bay?
30. In your view, are there factors that negatively impact fishing in Guanabara Bay? If so, which one? ( ) Yes ( ) No
31. How important are mangroves to you? And to your community?
32. Have you heard of COMPERJ? What does it represent to you?
( ) Yes ( ) No
33. In your opinion, will the operations of the COMPERJ pier impact the fishing activities of the Itaoca community? If so, which one(s)
( ) Yes ( ) No
34. In your opinion, has the construction of the COMPERJ pier and the equipment transport road had any impact on the fishing and crustacean collection activities carried out by the Itaoca community? If so, which ones?
( ) Yes ( ) No
35. Regarding COMPERJ, what is your opinion about the relationship of this venture with the community of Itaoca?
36. Also regarding the COMPERJ, in your perception, what is the opinion of most residents about the effects of this project on the community of Itaoca?
37. What is the environment?
38. How do you describe the relationship between fishermen and the others that make up the environment? Why do you describe it this way?
39. Are you interested in environmental issues?
( ) Yes ( ) no ( ) I don't know
40. Do you consider that you do any damage to the environment in your daily life?
( ) Yes ( ) no ( ) I don't know

41. Do you think the pollution levels observed in this region affect the health of the

residents of this community? Why?
( ) I don't know ( ) no
42. Who do you think is responsible for causing damage to the environment?
( ) government ( ) industrial sector ( ) commercial sector ( ) society
( ) individuals ( ) I don't know
43. Do you think pollution affects the production of fishing activity? Why? ( ) Yes ( ) No
44. What do you think about the conditions of the mangroves:
( ) are preserved ( ) are degraded by pollution
( ) threatened in order to meet urban development activities
( ) I don't know
45. In your opinion, do mangroves have any importance for fishing? Why?
46. Over the years, the quantity of fish caught in Guanabara Bay:
( ) decreased ( ) increased ( ) not changed ( ) I don't know

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Original Article

THE EFFECTS OF URBAN/INDUSTRIAL EXPANSION IN GUANABARA BAY ON THE PERCEPTION OF ARTISAN FISHERMEN

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THE EFFECTS OF URBAN/INDUSTRIAL EXPANSION IN GUANABARA BAY ON THE PERCEPTION OF ARTISAN FISHERMEN

***Abstract*:** The objective of this research was to obtain the environmental perception of fishermen of Itaoca Island regarding the effects of urban/industrial expansion in Guanabara Bay on their fishing and housing spaces. Through exploratory qualitative research, it was possible to understand the interactions of these fishermen with the space in which they are inserted in Guanabara Bay and their perceptions on the externalities that reach their community. The results showed that the urban/industrial advance, resulting from the current cycle of regional development related to petroleum, has been a threat to the survival of fishing activity, both by the environmental impacts to the region's ecosystems that significantly damage it, and by the pressure exerted on their living and fishing spaces.

***Keywords*:** Pollution; Itaoca; Petroleum; Environmental Perception.

OS EFEITOS DO AVANÇO URBANO/INDUSTRIAL NA BAÍA DE GUANABARA NA PERCEPÇÃO DE PESCADORES ARTESANAIS

***Resumo*:** A pesquisa objetivou conhecer a percepção ambiental de pescadores da Ilha de Itaoca acerca dos efeitos do avanço urbano/industrial na Baía de Guanabara sobre seus espaços de pesca e moradia. Por meio da pesquisa qualitativa exploratória puderam ser entendidas as interações desses pescadores com o espaço em que estão inseridos na Baía de Guanabara e que percepções fazem das externalidades que chegam à sua comunidade. Os resultados apontaram que o avanço urbano/industrial, resultante do atual ciclo de desenvolvimento regional relacionado ao petróleo, vem se constituindo numa ameaça à sobrevivência da atividade pesqueira, tanto pelos impactos ambientais aos ecossistemas da região que a prejudicam significativamente, como pela pressão exercida sobre seus espaços de moradia e de pesca.

***Palavras-chave*:** Poluição; Itaoca; Petróleo; Percepção Ambiental.

LOS EFECTOS DEL AVANCE URBANO / INDUSTRIAL EN LA BAHÍA DE GUANABARA POR LA PERCEPCIÓN DE LOS PESCADORES ARTESANOS

***Resumen*:** La investigación tuvo como objetivo conocer la percepción ambiental de los pescadores de la isla de Itaoca sobre los efectos del avance urbano / industrial en la Bahía de Guanabara en sus espacios de pesca y vivienda. A través de la investigación exploratoria cualitativa se pudieron entender las interacciones de estos pescadores con el espacio en el que se insertan en la Bahía de Guanabara y qué percepciones hacen de las externalidades que llegan a su comunidad.Los resultados apuntaron que el avance urbano/industrial, resultante del actual ciclo de desarrollo regional relacionado al petróleo, viene convirtiéndose en una amenaza a la supervivencia de la actividad pesquera, tanto por los impactos ambientales a los ecosistemas de la región, que la perjudican significativamente, como por la presión ejercida sobre sus espacios de morada y pesca.

***Palabras clave*:** Itaoca; Contaminación; Petróleo; Percepción Ambiental.
