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Dynamics of Shellfish Fishing in Igarassu–PE: Contributions to the Sustainable Management of Anomalocardia flexuosa

Liliane Guimarães Rocha
Doctoral Student in Environmental Engineering
Universidade Federal Rural de Pernambuco, Brazil
liliane.rocha@ufrpe.br
https://orcid.org/0009-0000-4659-5917

Romildo Morant de Holanda
Professor with a PhD in Natural Resources
Universidade Federal Rural de Pernambuco, Brazil
romildo.morant@ufrpe.br
https://orcid.org/0000-0001-7945-3616

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Dinâmica da Pesca de Mariscos em Igarassu–PE: Subsídios para o Manejo Sustentável da Anomalocardia flexuosa

RESUMO

Objetivo - Descrever a dinâmica da pesca de mariscos no município de Igarassu – PE.

Metodologia - Foram realizadas visitas à campo de caráter exploratório com registros fotográficos. Foi realizada uma pesquisa de opinião por meio de um questionário semi-estruturado, direcionado aos marisqueiros, com perguntas voltadas à caracterização da população, volume de marisco capturado, percepção ambiental, aspectos históricos, estratégias de mitigação de impactos, além de questões relacionadas à ergonomia e à segurança do trabalho. A bibliografia levantada sobre a prática de mariscagem na região estudada e em outros locais foram incrementadas às informações para melhor descrição da atividade.

Originalidade/relevância - O estudo preenche a lacuna da escassez de dados sobre a atividade da mariscagem na região e traz uma abordagem sustentável para o tema.

Resultados - Os resultados indicaram que a atividade de mariscagem em Igarassu - PE é exercida majoritariamente por homens de forma precária insustentável com a prática de sobre-exploração, gerando grande quantidade de resíduos e de forma insalubre em termos de saúde e segurança do trabalho.

Contribuições teóricas/metodológicas - O estudo gera informações fundamentais para subsidiar os tomadores de decisão na elaboração de estratégias voltadas ao manejo sustentável e socialmente inclusivo da pesca de A. flexuosa na região.

Contribuições sociais e ambientais -O estudo aborda o tema da pesca sustentável e traz a discussão sobre a reciclagem dos resíduos gerados para promoção de renda para os marisqueiros e organização destes em cooperativas que garantam práticas mais sustentáveis e salubres da mariscagem.

PALAVRAS-CHAVE: Sustentabilidade. ESG. Resíduos.

Dynamics of Shellfish Fishing in Igarassu–PE: Contributions to the Sustainable Management of Anomalocardia flexuosa

ABSTRACT

Objective – To describe the dynamics of shellfish harvesting in the municipality of Igarassu, Pernambuco, Brazil.

Methodology - Exploratory field visits were carried out, accompanied by photographic documentation. An opinion survey was conducted using a semi-structured questionnaire directed at shellfish gatherers, with questions focusing on population characterization, volume of shellfish harvested, environmental perception, historical aspects, impact mitigation strategies, as well as issues related to ergonomics and occupational safety. The bibliography collected on shellfish gathering practices in the study area and in other locations was incorporated into the analysis to provide a more comprehensive description of the activity.

Originality/Relevance - The study addresses the lack of data on shellfish harvesting in the region and introduces a sustainable approach to the topic.

Results - The results indicated that shellfish harvesting in Igarassu–PE is predominantly carried out by men, under precarious and unsustainable conditions, including overexploitation, generation of large volumes of waste, and exposure to unhealthy and unsafe working conditions.

Theoretical/Methodological Contributions - The study provides essential information to support decision-makers in formulating strategies aimed at the sustainable and socially inclusive management of *Anomalocardia flexuosa* fishing in the region.

Social and Environmental Contributions - The study addresses the theme of sustainable fishing and introduces a discussion on recycling the generated waste as a source of income for shellfish gatherers, as well as the organization of cooperatives to promote more sustainable and healthy shellfish harvesting practices.

KEYWORDS: Sustainability. ESG. Waste.

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Dinámica de la Pesca de Moluscos en Igarassu–PE: Aportes para el Manejo Sostenible de Anomalocardia flexuosa

RESUMEN

Objetivo - Describir la dinámica de la recolección de mariscos en el municipio de Igarassu, Pernambuco, Brasil.

Metodología - Se realizaron visitas de campo de carácter exploratorio con registros fotográficos. Se llevó a cabo una encuesta de opinión mediante un cuestionario semiestructurado dirigido a los recolectores de mariscos, con preguntas orientadas a la caracterización de la población, el volumen de mariscos recolectados, la percepción ambiental, los aspectos históricos, las estrategias de mitigación de impactos, así como cuestiones relacionadas con la ergonomía y la seguridad laboral. La bibliografía recopilada sobre la práctica de la recolección de mariscos en la región estudiada y en otros lugares fue incorporada a la información para una mejor descripción de la actividad.

Originalidad/Relevancia - El estudio llena el vacío de datos sobre la actividad de recolección de mariscos en la región y aporta un enfoque sostenible al tema.

Resultados - Los resultados indicaron que la actividad de recolección de mariscos en Igarassu–PE es ejercida mayoritariamente por hombres, en condiciones precarias e insostenibles, con prácticas de sobreexplotación, generación de gran cantidad de residuos y en un ambiente insalubre en términos de salud y seguridad laboral.

Aportes teóricos/metodológicos - El estudio genera información fundamental para respaldar a los responsables de la toma de decisiones en la elaboración de estrategias orientadas al manejo sostenible y socialmente inclusivo de la pesca de *Anomalocardia flexuosa* en la región.

Aportes sociales y ambientales - El estudio aborda el tema de la pesca sostenible y propone la discusión sobre el reciclaje de los residuos generados como una fuente de ingresos para los recolectores de mariscos, así como la organización de estos en cooperativas que garanticen prácticas más sostenibles y saludables de recolección.

PALABRAS CLAVE: Sostenibilidad. ESG. Residuos.

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1 INTRODUCTION

Aquatic food systems exhibit great diversity and provide multiple benefits and services in environmental, economic, and social spheres. Fisheries and aquaculture production reached a record of 223 million tons in 2023, with 11% represented by mollusk production (FAO, 2024).

Small-scale extraction accounts for a significant share, particularly in the production of bivalve mollusks, constituting an important source of income for the subsistence of traditional communities living in coastal areas around the world (Lima; Andrade & Sousa, 2022).

Among the bivalve mollusks most exploited by commercial fishing, species of the family Veneridae stand out, especially Anomalocardia flexuosa (Linnaeus, 1767) (Lima; Andrade & Sousa, 2022). This species is found in the West Indies, Brazil, and Uruguay, presenting a wide geographic distribution. Regarding habitat, it occurs in a variety of environments such as coves, bays, estuarine mouths, marshes, and unvegetated shoals, living buried in sediments, mainly sandy-muddy (Lopes et al., 2022; Nascimento et al., 2022).

The state of Pernambuco, Brazil, was once considered the main producer of A. flexuosa, with Mangue Seco beach, in the municipality of Igarassu, accounting for approximately 50% of the catches in the state (Lima, Andrade & Gálvez, 2020). The site is favorable for shellfish harvesting due to the formation of geographic features that, over time, have become suitable for the activity (Oliveira; Castilho; El-Deir, 2016).

Research related to the characterization of artisanal mollusk fisheries and their management is generally deficient or superficial, despite the activity being a very important source of income in Brazil (da Silva Mourão et al., 2020).

For sustainable fishing, it is essential to understand the stages of extraction and commercialization, as well as the behavior of harvesters. A. flexuosa is collected using varied techniques among coastal communities, and knowledge of these practices is crucial for management. However, the scarcity of data on production and stocks hinders effective fisheries management actions (da Silva Mourão et al., 2021).

In light of the above, the objective of this research is to describe the dynamics of shellfish harvesting in the municipality of Igarassu – PE, generating fundamental information to support decision-makers in developing strategies aimed at the sustainable and socially inclusive management of A. flexuosa fishing in the region.

2 METHODOLOGY

The research was conducted in the municipality of Igarassu – PE (Figure 1), more specifically at Mangue Seco beach, which is located in the Metropolitan Region of Recife, on the northern coast of the state of Pernambuco. The area covers 306,879 km² at a latitude of 7º83'41" and a longitude of 34º90'63" (IBGE, 2021; Igarassu, 2015). The municipality has beaches with warm and calm waters that favor shellfish harvesting through artisanal fishing, a traditional activity in the region (Lavander et al., 2022).

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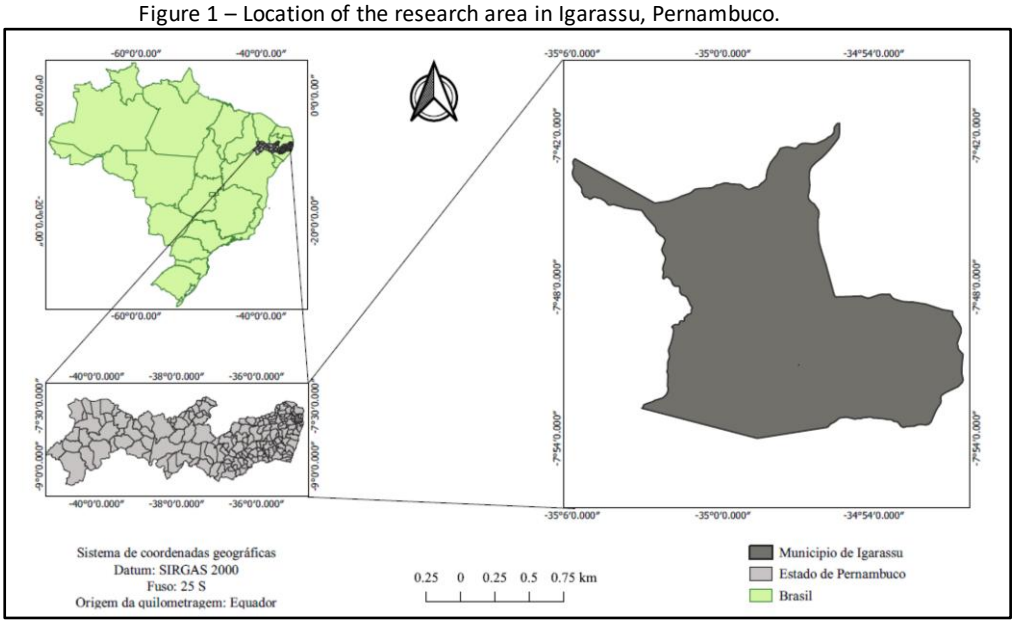
Figure 1 – Location of the research area in Igarassu, Pernambuco.



Source: Cunha (2020).

Exploratory field visits with photographic records were carried out between September 2023 and October 2024. An opinion survey, based on a semi-structured questionnaire, was conducted with shellfish gatherers, containing questions about population characterization, aspects related to the quantity of shellfish harvested, environmental perception, historical aspects, impact mitigation, ergonomics, and occupational safety.

There is a difficulty in determining the sample size due to shellfish harvesting being carried out informally (de Moraes Câmara et al., 2023). The shellfish gathering process takes place throughout the year on sandbanks (crôas) that become visible during low tide (Cidreira-Neto et al., 2019). Thus, the interviews were conducted with shellfish gatherers who performed the activity during low tide. In total, 65 shellfish gatherers were interviewed at Mangue Seco beach.

The purpose of the interview was to understand the routine of shellfish harvesters and their relationship with the environment, analyze how waste generated by the activity is disposed of, explore possibilities for reuse/recycling of this waste, and assess worker well-being in relation to occupational diseases and accidents.

The responses were tabulated in a spreadsheet, where the data were organized into charts, tables, and graphs. The bibliography collected on shellfish harvesting practices in the studied region and in other locations was incorporated into the information to provide a better description of the activity.

The analysis of the consulted bibliography was carried out in three stages, consisting of content pre-analysis, material exploration, and treatment of results and interpretation, as described in Bardin's methodology (2016).

3 RESULTS

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Among the interviewees, 46 (73%) were men and 17 (27%) were women. The youngest and oldest shellfish gatherers were 16 and 62 years old, respectively, with an overall average age of 35 years (Table 1).

Table 1 - Profile of the Interviewees (n= 65)

Age (years)	% (n)
16-20	18,8 (7)
21-30	33,8 (22)
31-40	18,5 (12)
41-50	13,8 (9)
51-60	13,8 (9)
61-70	6,2 (4)
Não responderam	4,6 (3)
Experience in the practice (years)	**% (n)**
0 - 5	30,8 (20)
6 - 10	21,5 (14)
11 - 15	15,4 (10)
16 - 20	10,8 (7)
> 20	20,0 (13)
Activity learning source	**% (n)**
Family	49,2 (32)
Self-taught	36,9 (24)
Friends	12,3 (8)

Source: Authors (2025).

Shellfish harvesting is an activity carried out in multiple ways: individually, within families, or in community groups; involving the collection of different marine species and the use of techniques that are generally low in productivity (da Silva Mourão et al., 2020). According to Cunha et al. (2025), this activity in the municipality of Igarassu is passed down from parents to children as a form of tradition and also serves as an alternative to unemployment faced by the less qualified population. When asked, 83.1% of respondents stated that shellfish harvesting is their main source of income, while the remainder reported fishing only when they cannot find other, more profitable informal work, such as labor in civil construction.

Regarding the ancestry of the activity, 49.2% reported having learned the profession from their families, and when asked how long the activity had existed in the region, some referred back to the time of their grandparents and great-grandparents who already harvested shellfish.

According to Jesus et al. (2024), in regions with few opportunities for well-paid work, shellfish fishing can represent an important source of livelihood for the local community. Thus, many people end up dedicating years to shellfish collection in natural banks. Among the interviewees, 20% have up to 5 years of experience in shellfish harvesting, while a significant portion (13%) have more than 20 years in the profession.

Several authors report the predominance of women in shellfish harvesting (da Silva Mourão et al., 2020; da Silva Mourão et al., 2021; de Morais Câmara, 2023), but a different pattern was identified at Mangue Seco beach. This condition may be explained by the technique used to capture A. flexuosa with the aid of a tool called “puçá.” According to da Silva Mourão et

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al. (2021), who identified the use of a similar tool in another area, this technique requires considerable physical effort, making it more commonly practiced by men. Jesus et al. (2024) found a similar situation in the production of the bivalve Iphigenia brasiliensis (Lamarck, 1818) on Maranhão Island, where 88.68% of the fishers are men, and justified that one of the possible causes of male predominance is the high physical effort required in the activity.

There is no precise information on when the "puçá" was introduced into shellfish fishing in Igarassu, but it has now become a popular tool in the region, being used by both men and women (Lima, Andrade & Gálvez, 2020). The tool consists of a type of rake with a fishing net attached and a wooden handle (Figure 2a), where the shellfish are retained in the net. Some shellfish gatherers use a rope tied around the waist (Figure 2b) to facilitate dragging the tool.

Figure 2 – Shellfish harvesting process. (a) Tool called *puçá*; (b) Handling method of the *puçá*; (c) Bag where the collected shellfish are stored.

Source: Authors (2024).

According to Oliveira Lima Gomes et al. (2019), the dependence of shellfish gatherers on fishing for their subsistence implies an increase in harvesting to achieve greater financial returns. This may be the reason for innovations in shellfish fishing techniques, such as the use of tools like the puçá. Lima, Andrade & Galvéz (2020) estimated the selectivity of the tool introduced in shellfish fishing at Mangue Seco beach and concluded that even nets with 20 mm mesh size showed a low percentage of capture of individuals larger than 20 mm, which is the recommended size for harvesting mature individuals. When asked about selectivity in shellfish capture, 27.7% of respondents reported not making any size selection, and among those who did, 29.2% mentioned choosing the mesh size of the puçá net to target larger individuals.

The issue of intensive fishing is recognized by shellfish gatherers, with 67.7% acknowledging a decrease in the size and abundance of shellfish in the area. Some attributed this factor to the increase in the number of people fishing and the use of the puçá. The reduction of natural resources essential for survival, such as shellfish, can cause significant environmental

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impacts, including the decline or even extinction of these species, triggering negative consequences in social and economic spheres (de Moraes Câmara et al., 2023). According to da Silva Mourão et al. (2021), the "technological innovation" brought by the adoption of new tools in small-scale fisheries may ultimately increase the number of fishers and reduce selectivity by species and size, leading to overexploitation.

Despite recognizing the effects of overexploitation of shellfish resources in the region, 75.4% of respondents believe that production will not become extinct over time. Lima, Andrade & Galvéz (2020) emphasize that, given the area's great regional importance, the production of A. flexuosa at Mangue Seco beach requires urgent attention from national fisheries management to adopt sustainable management measures, such as establishing a minimum capture size and implementing spatial-temporal rotation of fishing areas. Moraes Câmara et al. (2023) also identified a lack of environmental awareness among sururu fishers in São José de Ribamar – MA, due to their inability to perceive environmental changes, and deemed environmental education practices necessary and urgent to ensure conservation and raise awareness among fishers as agents of protection and sustainable management of the environment from which they obtain food and income.

The work routine is exhausting: 56.3% of respondents work between 5 and 8 hours per day, and 34.4% between 8 and 12 hours per day, averaging 5 days per week. After collection, shellfish are stored in tubular mesh bags, usually reused from agriculture (such as carrot and onion transport), typically with a capacity of 50 kg (Figure 2c), and transported to the shucking site, where the meat is separated from the shell. Regarding the location of shucking, 70.8% of respondents reported performing it on the beach, while the remainder preferred to do it at home. The municipality of Igarassu provides a bus for transporting shellfish gatherers, and 40% of respondents use this service, which facilitates the transport of collected shellfish to their homes. The shucking process is carried out in a rudimentary manner by cooking the shellfish in empty paint cans over a fire made with wood collected locally. According to Cunha et al. (2025), this wood comes from nearby mangroves, and its use for economic purposes constitutes an environmental crime, as it originates from an Environmental Protection Area (APA).

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Figure 3 – Shellfish processing: (a) Cooking; (b) Shucking site (meat-shell separation).

Source: Authors (2024).

After the shucking process, the shellfish meat is bagged and sold. The post-fishing process is carried out under precarious conditions, which jeopardize the hygienic and sanitary quality of the meat, discouraging the final consumer, who values food safety. As a result, fishers end up selling their production to middlemen, a situation regularly reported in small-scale fisheries, which leads to a reduction in the profit margin obtained from the activity (Mottola et al., 2020). Among the interviewees at Mangue Seco beach, 73.5% reported selling their production at home and/or on the beach, where the presence of middlemen is noted, while the remainder reported selling to restaurants, fish markets, and fairs in the city of Igarassu or nearby municipalities. Cunha et al. (2025) states that the presence of middlemen in shellfish harvesting in Igarassu creates an economic dependency among fishers, almost establishing a labor pattern.

3.1 Waste disposal issues

In response to the evaluated questionnaire, it was found that each fisher produces, on average, 8 kg of shellfish meat per day. A large volume of waste is generated in the shellfish processing stage; according to Lavander et al. (2011), the meat yield index of A. flexuosa at Mangue Seco beach is only 13.77%. Considering the amount of meat produced by the respondents in this study, it is estimated that an average of 50 kg of shells per person per working day are discarded. Based on the sample size of this research, this results in an average of 3,250 kg of shells discarded per day at Mangue Seco beach.

Shell disposal is carried out irregularly: 95.4% of respondents reported not making any use of the waste, and 66.1% discard it on the beach even after shellfish processing, 10.8% in vacant lots, and the remainder dispose of it together with household waste. This situation leads to the accumulation of shells along the beach, causing environmental impacts (Figure 4).

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Figure 4 – Shell Disposal Area in Igarassu/PE..

Source: Authors (2024).

The inadequate disposal of shellfish shells alters the soil, water, and marine ecosystems. Around the world, shell piles can be found causing environmental damage through the strong odor produced by the decomposition of organic matter and also through visual pollution (Popović; Lorencin; Strunjak-Perović; Čož-Rakovac, 2023). According to Fagundes and Silva (2022), shell disposal in mangrove areas leads to the silting of water bodies and environmental imbalance in these ecosystems. They also state that disposal in vacant lots can favor the proliferation of animals and insects that transmit diseases, in addition to affecting the safety of bathers due to the sharp and cutting characteristics of the waste (Fagundes; Silva, 2022).

Among those interviewed in this study, 29.2% reported the presence of animals and insects near discarded shell piles, such as dogs, cats, rats, and cockroaches. The shells discarded on the beach are collected by the municipality of Igarassu, but without planned frequency. The greatest challenge faced by the municipality in managing this waste is its destination, since sending it to landfills generates high costs. It was reported by the institution that a transport company receives this waste to be used as landfill material for leveling unpaved roads.

Shellfish shells are composed of 95% calcium carbonate in the form of aragonite and calcite. This composition provides potential uses for the material in agriculture, in industry for the production of glass and rubber, in civil construction for application in mortars, floors, and coatings, and in the pharmaceutical industry for treatments such as osteoporosis (Fagundes; Silva, 2022). Although they do not reuse shells, 90.8% of respondents recognize that they can be used for handicrafts and civil construction, and 80% believe that shell reuse could bring economic benefits to the local community. However, 75.4% had never heard of or participated in any initiative for recycling or reuse of this waste.

The issue of urban solid waste goes beyond technical or operational limits, revealing itself as a complex challenge that encompasses social, cultural, environmental, and political dimensions (Cruz et al., 2025). Motolla et al. (2020) point out that an alternative to the problem of inadequate waste disposal is to promote the re-signification of shells as a resource of

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economic value, in addition to facilitating the creation of communication channels between the fishing community and entrepreneurs in sectors with potential interest in using this material. According to Jesus et al. (2024), diversifying sources of income can contribute to the economic sustainability of shellfish gatherers, while also favoring environmental conservation, valuing local culture, and boosting the regional economy. Beyond the environmental benefits of recycling this waste, the practice can generate economic advantages for both industrial and artisanal producers, becoming an additional source of income. This initiative becomes even more significant given the vulnerable social conditions in which many shellfish gatherer families live, often marked by lack of access to basic services such as health and education (de Santana; Aragão Júnior, 2023). Silva, Sanos & Chaves (2024) recommend that policymakers and solid waste managers promote partnerships with companies, NGOs, universities, and social mobilization organizations to articulate sustainable practices based on resource recovery, active social participation, and economic strengthening.

3.2 Occupational health and safety in shellfish harvesting

Despite the important role of fishers in global food production and the economy, the activity faces numerous occupational risks and health hazards due to heavy workloads, long working hours, and days with little rest. This situation exposes workers to possible injuries and health problems caused by the risks inherent to the activity (Shrestha et al., 2022).

Fishing activity is regulated by Regulatory Standard (NR) 31, which aims to define the principles to be followed in the organization and work environment, seeking to reconcile the planning and execution of sector activities with actions to prevent accidents and occupational diseases (Brazil, 2024).

According to the Pan American Health Organization, workers may be exposed to physical, chemical, biological, ergonomic, and accident-related risks (Brazil, 2001). Guertler et al. (2016), in a study on occupational risks arising from oyster production in Santa Catarina, Brazil, listed as the main risks of the activity exposure to solar radiation, excessive heat, humidity due to work at sea, cuts caused by tools, inadequate posture, excessive load lifting, among others. These same authors emphasized concern about the increase in musculoskeletal disorders among fishers due to the last two risks mentioned.

Among the interviewees in this study, 87.7% reported feeling pain due to shellfish harvesting work, with 80.0% reporting back pain, 14.0% knee/foot pain, 17.5% wrist/hand pain, and the remainder in other parts of the body. Silva et al. (2021) identified a similar situation regarding pain complaints in a study conducted with shellfish gatherers in Bahia, where 83.6% of respondents reported lower back pain, 84.2% upper back pain, 75.5% knee pain, and 74.8% wrist/hand pain.

Some diseases identified by Guertler et al. (2016) resulting from work at sea include skin cancer, repetitive strain injuries, respiratory and joint problems, hearing problems, alcohol and drug abuse, intoxication, dermatitis, and injuries caused by cuts, sprains, and falls.

When asked about the occurrence of occupational accidents, 60.0% of respondents reported having suffered some type of accident, with cuts from tools (66.7%), burns (51.3%), muscle strain (17.9%), and falls (5.12%) being the most common. The high rate of accidents

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reported in the study may indicate a lack of awareness among fishers regarding the risks of the activity. The absence of information about environmental risks is a major concern, as it makes workers more vulnerable to the impacts these risks can have on their health. Lack of awareness of danger is one of the main factors leading shellfish gatherers to suffer harm from exposure to risks present in their work environment, which can seriously compromise their health (Ipiranga et al., 2020).

To ensure worker safety and health, Brazilian labor legislation establishes the mandatory use of Personal Protective Equipment (PPE). These personal-use devices are intended to protect workers against risks that may compromise their physical integrity and health in the workplace, neutralizing or reducing the action of harmful agents, preventing injuries, or reducing their severity (Tiburcio et al., 2020). Field observations showed that, although not the most appropriate for the activity, 90.8% of respondents use some type of PPE, the most common being caps/hats (90%), long-sleeved shirts (76.7%), pants (25.0%), and sunscreen (18.3%). According to Ipiranga et al. (2020), the appropriate PPE kit for shellfish harvesting would consist of a long-sleeved shirt, cap, pants, boots or rubberized shoes, and gloves.

According to Shrestha et al. (2022), the scarcity of studies on occupational injuries in fishing is concerning and highlights the urgent need to implement specific records of such injuries, as well as to establish continuous monitoring of safety conditions in fishing activities in developing countries. Furthermore, the authors propose that universities promote research training programs to fill existing gaps in information and safety training for fishers. Ipiranga et al. (2020) also emphasize the need for fisher training and recommend their organization into cooperatives or community associations, managed and supervised competently, to promote the social advancement of shellfish gatherers with prioritization of their health and safety.

4 CONCLUSION

The activity of shellfish gathering plays a central role in the subsistence and cultural identity of many traditional Brazilian communities, especially in coastal areas. This study highlights not only the economic importance of this practice but also its complex integration into social and environmental dynamics. The figure of the gatherer emerges as a symbol of resistance, traditional ecological knowledge, and deep connection with the territory.

Throughout the analysis, it became evident that the legal and political recognition of these communities is still limited, putting at risk both their ways of life and the ecosystems on which they depend. Social invisibility and precarious working conditions create a scenario of vulnerability that demands urgent attention from public authorities. The valorization of local knowledge and the inclusion of these populations in decision-making processes are fundamental elements for building effective public policies.

Shellfish harvesting in Igarassu-PE, carried out with the use of a poorly selective tool that increases the amount captured and without sustainable management measures, indicates overexploitation that may lead to the extinction of the species A. flexuosa in the region. The adoption of public policies aimed at the sustainability of the activity is of utmost importance. In

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addition, the disposal of generated waste may cause irreversible problems in the area, such as mangrove siltation, degradation of coastal forests, and the proliferation of disease vectors.

The unhealthy conditions perceived in shellfish gathering and processing are also problematic, as they not only put the health and safety of gatherers at risk but also create insecurity in seafood consumption, making the adoption of better sanitary practices in these activities necessary.

It is concluded, therefore, that the full recognition of shellfish gatherers as rights-bearing subjects, guardians of biodiversity, and holders of traditional knowledge is an essential step toward building a sustainable and inclusive development model. Attentive listening to their voices, combined with the institutional strengthening of their practices, is the path to preserving local cultures and Brazilian coastal ecosystems.

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DECLARATIONS

AUTHORS CONTRIBUTION

Liliane Guimarães Rocha
Data curation, Formal analysis, Investigation, Writing – Original draft

Romildo Morant de Holanda
Study conception and design, Formal analysis, Writing – Critical review, Review and final editing, Supervision

DECLARATION OF CONFLICTS OF INTEREST

We, **Liliane Guimarães Rocha and Romildo Morant de Holanda**, declare that the manuscript entitled "**Dynamics of Shellfish Fishing in Igarassu–PE: Contributions to the Sustainable Management of Anomalocardia flexuosa**":

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- **Professional relationship**: No professional relationship relevant to the content of this manuscript was established.
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