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Chapter

# Mollusc Gathering in Tropical Regions of Brazil

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## Abstract

Gathering bivalve molluscs is an important part of extractive fishing activities in the northeastern region of Brazil and is performed mainly by women. This study addresses the invisibility of the activity despite the labor effort and income generation these women represent. Depending on the community, these fisherwomen either practice all steps of the activity or only some processes, such as preparing and selling the product, but are always involved in some part of the productive process. Despite participating in the generation of income, the work of these mollusc gatherers is considered invisible, without prestige and given little or no value when compared to other fishing activities, especially those exercised by men. Mollusc gathering may seem to be a non-complex practice, but requires a variety of traditional knowledge that is passed from one generation to the next. Such knowledge reflects the intimate understanding these workers have of productive processes and the environmental dynamics of coastal artisanal fishing. In the majority of traditional communities, the difficulties lead to the discouragement of this activity as work for future generations. Thus, there is a need for the recognition of the spaces of female mollusc gatherers, considering the relations between the need for economic production and social reproduction with the egalitarian representation of these workers in the entities of social representation of the class of fishers.

**Keywords:** fisherwomen, mollusc gatherers, traditional communities, traditional knowledge, gender issues, northeastern Brazil

## 1. Introduction

Artisanal fishing accounts for more than 90% of fishing jobs and the resulting catches correspond to more than half of the fishing production throughout the world [1]. In Brazil, artisanal fisheries in coastal waters account for 52.5% of all extractive fishing [2]. In 2007, northeastern Brazil was the second largest producing region of the country in terms of extractive marine fisheries, with 96.3% the result of artisanal fishing activities [3]. Among the total estimated production from extractive marine fisheries in the northeastern region in the same year, molluscs accounted for 5.8% [3], demonstrating the importance of this resource for the region.

Mollusc gathering in northeastern Brazil is performed mainly by women, whether participating in all steps of the activity or only in some processes, such as preparing the catch for sales and selling. Despite playing important roles in the productive and economic processes, women continue to be overlooked in official fishery statistics. In Ref. [4], women represent 24.35% of the General Fishery

Registry. However, this figure may not represent the effective participation of female labor in these activities, since not all fisherwomen are registered.

Gender division in terms of labor is an important factor to analyze in the lives of fisherwomen who participate in paid mollusc gathering activities and also perform housework. Although directly responsible for the maintenance and well-being of the family, women do not receive pay or recognition for their household chores. The work of women in artisanal fishing is also still considered invisible and seen as a marginal activity without prestige in terms of household income [5, 6], whereas the role of men is culturally linked to the productive sector. In this context, fisherwomen are unappreciated with regard to both housework and fishing activities.

Women in coastal communities in northeastern Brazil exercise an income-generating activity: the gathering of bivalve molluscs in estuarine and mangrove areas, the productive organization of which is directly related to the use, management and dynamics of natural marine resources [7]. Fishery resources in these areas are indispensible to the subsistence of traditional coastal communities. Bivalve molluscs are one of the important exploited resources with ecological and socioeconomic value and constitute either the main source of income of the families involved in this activity or a complementary source to other fishing activities [8].

In northeastern Brazil, the main marine bivalve species of economic importance in mollusc gathering are *Anomalocardia flexuosa* (Linnaeus, 1767) ("carib pointed venus" clam); *Phacoides pectinatus* (Gmelin, 1791) (thick lucine); *Ctena orbiculata* (Montagu, 1808) (dwarf tiger lucine); *Austromacoma constricta* (Bruguière, 1792) (constricted macoma); *Crassostrea mangle* Amaral & Simone, 2014 (mangrove oyster or bagpipe oyster); *Crassostrea brasiliana* (Lamarck, 1819) (diving oyster); *Iphigenia brasiliensis* (Lamarck, 1818) (giant false coquina); *Leukoma pectorina* (Lamarck, 1818) ("coroa de frade"); *Mytella charruana* (d'Orbigny, 1842) (charru mussel); *Mytella guyanensis* (Lamarck, 1819) (mangrove mussel); *Cyrtopleura costata* (Linnaeus, 1758) (angelwing clam); *Brachidontes exustus* (Linnaeus, 1758)

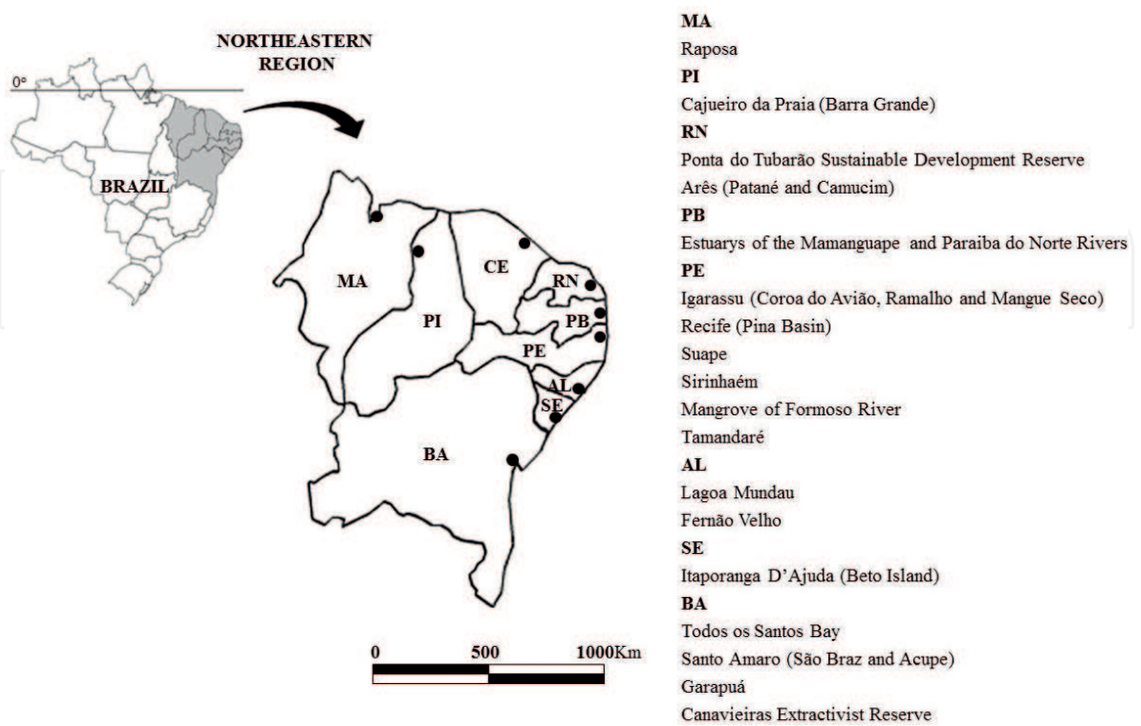



**Figure 1.**
*Map showing sites where gathering of molluscs of commercial importance is performed in northeastern Brazil cited in present study. States: MA—Maranhão, PI—Piauí, RN—Rio Grande do Norte, PB—Paraíba, PE—Pernambuco, AL—Alagoas, SE—Sergipe and BA—Bahia. • State's capital.*

(scorched mussel); and *Tagelus plebeius* (Lightfoot, 1786) (stout razor clam) [8–15, 17–20, 22–26, 28, 35, 38]. The species caught vary along the coast according to the type of substrate, which exerts an influence on the presence and abundance of species as well as catch processes.

The object of the present study was female bivalve mollusc gatherers on the northeastern coast of Brazil (**Figure 1**), particularly those in fishing communities of the Pina Basin in the city of Recife and the region of Suape in the city of Cabo de Santo Agostinho, both of which are located in the state of Pernambuco, where the authors have been developing research for more than 20 years, considering the work force and income generation of these women and, at the same time, their invisibility in extractive fishing activities.

## 2. Mollusc gathering in northeastern Brazil

In northeastern Brazil, bivalve mollusc gathering is the fishing activity that most employs women, but, nonetheless, these fisherwomen are both economically and socially marginalized, poor and have a low level of schooling, with little recognition among artisanal fishermen [8]. However, in the village of Acupe in the state of Bahia, the recognition of mollusc fisherwomen by other fishers has been occurring, probably due to the daily coexistence, as the mangrove is considered a place of interactions [16].

Brazilian legislation has made advances in terms of artisanal fishing in recent years. However, political policies continue to be out of step with the actual situation of mollusc gatherers, as evidenced by the lack of credit plans and accords, which impedes the purchasing of utensils and equipment for preparing the catch and aggregating value to the product.

Despite being the providers of many families, these working women of the tide go unseen by society. Moreover, mollusc gatherers face extreme working conditions, climate changes, the risk of accidents and illness due to the considerable physical effort exerted in unsanitary environments, which are reported as recurrent conditions in this activity, but mollusc gathering is an option where there is a lack of opportunity for formal labor. Moreover, the majority of gatherers also complement the family income with other types of work, since the activity does not ensure the sustenance of the family. These aspects serve to discourage this activity as work for future generations in the majority of traditional communities.

Another issue to consider is the participation of women who do not traditionally pertain to fishing communities, but have been gathering molluscs as a source of subsistence, especially in areas where there are large "pockets" of a marginalized population. This situation can lead to the marginalization of mollusc gathering and the possibility of its extinction as a traditional activity. Moreover, it can lead to overfishing due to the increase in effort and the lack of knowledge among these women regarding the proper techniques and processes of this activity.

In gender relations, which are passed down from generation to generation, there is the notion that fishing on the high seas is an activity that requires physical strength and is therefore considered men's work, whereas mollusc gathering is a lighter activity performed in mangroves and therefore considered women's work, as authors in Ref. [21] found among the residents of São Braz in the city of Santo Amaro in the state of Bahia. According to the author, the gender division in this community occurs due to the repulsion of the mangrove environment (mud), which is considered "dirty" and suitable for women's work, whereas the sea (water) is considered "clean" and a superior environment suitable for men's work. In the community of Beto Island in the municipality of Itaporanga D'Ajuda in the state of

Sergipe, the gender division is defined in work spaces, where men practice fishing and women gather molluscs and other products on the beach as well as in mangroves, lakes and rivers [22]. The same is found in the community of Cajueiro da Praia in the state of Piauí [23].

In northeastern Brazil, the predominance of women in mollusc gathering activities occurs in practically all communities, as seen in the municipality of Raposa in the state of Maranhão [24]; Cajueiro da Praia in the state of Piauí [23]; the Ponta do Tubarão Sustainable Development Reserve in the state of Rio Grande do Norte [11]; on the banks of the Paraíba do Norte River [25] and Mamanguape mangrove [26] in the state of Paraíba; in the Pina Basin in the city of Recife [12], in the mangroves of Formoso River [27], in the communities of Tamandaré and Sirinhaém [28], and in the region of Suape (reported by the authors) in the state of Pernambuco; in the community of Beto Island in the municipality of Itaporanga D'Ajuda in the state of Sergipe [22]; as well as in the mangroves of the Acupe district in the municipality of Santo Amaro [15, 16], in Todos os Santos Bay [29] and in the Canavieiras Extractivist Reserve [20] in the state of Bahia. In Barra Grande in the state of Piauí, mollusc gathering is a strictly female activity [17], as it is in the communities of Patané and Camucim in the municipality of Arês in the state Rio Grande do Norte, where these women are the wives of fishermen [18].

Therefore, mollusc gathering is an essentially female activity performed either individually or in groups composed of family members or neighbors who share transportation to the collection sites and the preparation of the catch for sale [8, 18]. One of the aspects that contribute to female participation in this activity is the possibility of working only a few hours per day close to home, which enables time for family and household tasks. In many communities, the groups are composed of the sons and daughters of the fisherwomen, which enables parental care, the transmission of knowledge on the techniques of the activity and an increase in the labor force.

The fishing community of Suape in the state of Pernambuco was the object of study by the authors in 1997 and 1998, when the area was considered one of the 12 main fishing colonies in the state [30, 31] and characterized as the most important coastal and estuarine zones in northeastern Brazil as a natural nursery for aquatic organisms that is practically pollution-free [32]. In 1979, work began on the Suape Port Industrial Complex, which required landfills and led to geomorphological and hydrodynamic changes [33]. The landfills of mangroves and possible pollution from the activities of the industrial complex exerted a direct influence on fishing production by compromising mollusc stocks as well as impeding the access of the fisherwomen to the molluscs. At the time, mollusc gathering was performed mainly by women and composed nearly completely by the shellfish *Anomalocardia flexuosa*, with rare catches of the giant false coquina (*Iphigenia brasiliensis*) and stout razor clam (*Tagelus plebeius*). Mollusc gathering was practiced by women who resided in the region as well as those from other municipalities, stimulated by the production of local stocks, which, however, were being affected by the impacts caused by the construction of the Suape Port. With the intensification of the enterprises at the Suape Port Industrial Complex, the socio-environmental impacts have deepened. The fisherwomen are being expelled from their territories and those who remain in the activity have seen their income diminished by the contamination of the molluscs and the decline in production [34]. Thus, the mollusc gatherers in the Suape region have been drastically affected and there is the real possibility of the extinction of this activity in one of the regions that was once considered to be among the most productive in the state of Pernambuco.

In the fishing community of Pina and Brasília Teimosa in the city of Recife, which has also been the object of study of the authors since 2006, the captures include the mussels *Mytella guyanensis* and *Mytella charruana*, the shellfish *Anomalocardia*

*flexuosa*, *Phacoides pectinatus* and *Ctena orbiculata*, the constricted macoma (*Austromacoma constricta*), stout razor clam (*Tagelus plebeius*) and the oyster *Crassostrea* spp. This community is considered an urban fishing community, in which there is considerable real estate pressure due to its location being parallel to the coast and very close to the beach, which places pressure on fishing activities [8]. Moreover, this community can be considered a true "mangrove civilization," with its sociocultural and economic traditions linked to the estuary-mangrove environment [35].

Mollusc gathering may appear to be a non-elaborate practice with little planning and, therefore, less valued. However, this activity requires knowledge, meanings and interests constructed over time and recognized by the practices of the community, and the gatherers have a body of indispensible knowledge on the activity [8]. This knowledge is passed down from generation to generation, mainly by family members, and involves the planning and organization of actions, knowledge on species of mollusc, the use of different types of gear and the choice and location of collection sites [21, 29, 35]. Such knowledge reflects the intimate understanding these workers have of productive processes and the environmental dynamics of coastal artisanal fishing. Traditional knowledge on the activity is a product of artisanal fishing, as fishers generally have information on the environmental variables that exert an influence on the catch as well as hydrodynamics, seasonality, the management of fishing gear and the ecology of the target species, which is fundamental to successful fishing [16, 36, 37]. The artisanal fishermen and fisherwomen in the coastal area are also the keepers of knowledge on types of mangrove vegetation and the interactions of species with the mangrove [38]. These characteristics make the mollusc gatherers traditional peoples and communities.

In Brazil, traditional peoples and communities are protected by the National Sustainable Development Policy for Traditional Peoples and Communities, which was instituted in 2007 through Decree n° 6.040 issued on February 7, 2007 [39]. In this decree, traditional peoples and communities are considered to be "culturally differentiated groups, who recognize themselves as such, who have their own social organization and occupy and use territories and natural resources as a condition for their cultural, religious, ancestral and economic reproduction, using knowledge, innovations and practices generated and transmitted by tradition" [39].

Like all artisanal fishing, mollusc gathering involves passing traditional empirical knowledge from generation to generation. Such information acquired from traditional knowledge includes catch sites, adequate conditions for greater production and the preparation of the product for the market. The productive process involves gathering, washing, cooking, sorting, packaging, weighing, storage and commercialization, normally with variations depending on the species (**Figure 2**).

Seasonal and climate conditions are determinant factors for the traditional knowledge of mollusc gathering, since these aspects exert an influence on production and safe working conditions. In the Pina Basin in the city of Recife, the fisherwomen report that the best season of the year for mollusc gathering is the "dry period," referring to summer. According to the women, the rainy season leads to the death of molluscs in the areas due to the influx of freshwater from the rains and rivers that drain into the estuary. This report that the rainy season harms the mollusc gathering activity has been made by fisherwomen from the communities of Patané and Camucim in the municipality of Arês in the state of Rio Grande do Norte [18]. Besides fishing issues, the fisherwomen of the Pina Basin report that the rainy period is less favorable due to the risk to life caused by precarious working conditions in the rain.

The dynamics of the tides and lunar cycles also affect the catch. At low tide, the banks of sediment on which the molluscs are gathered (locally denominated "crôas" [sandbanks]) are exposed and enable the gathering activity, lasting, on average, 3–5 hours in the Pina Basin. In the region of Suape, gathering activities also occurred at

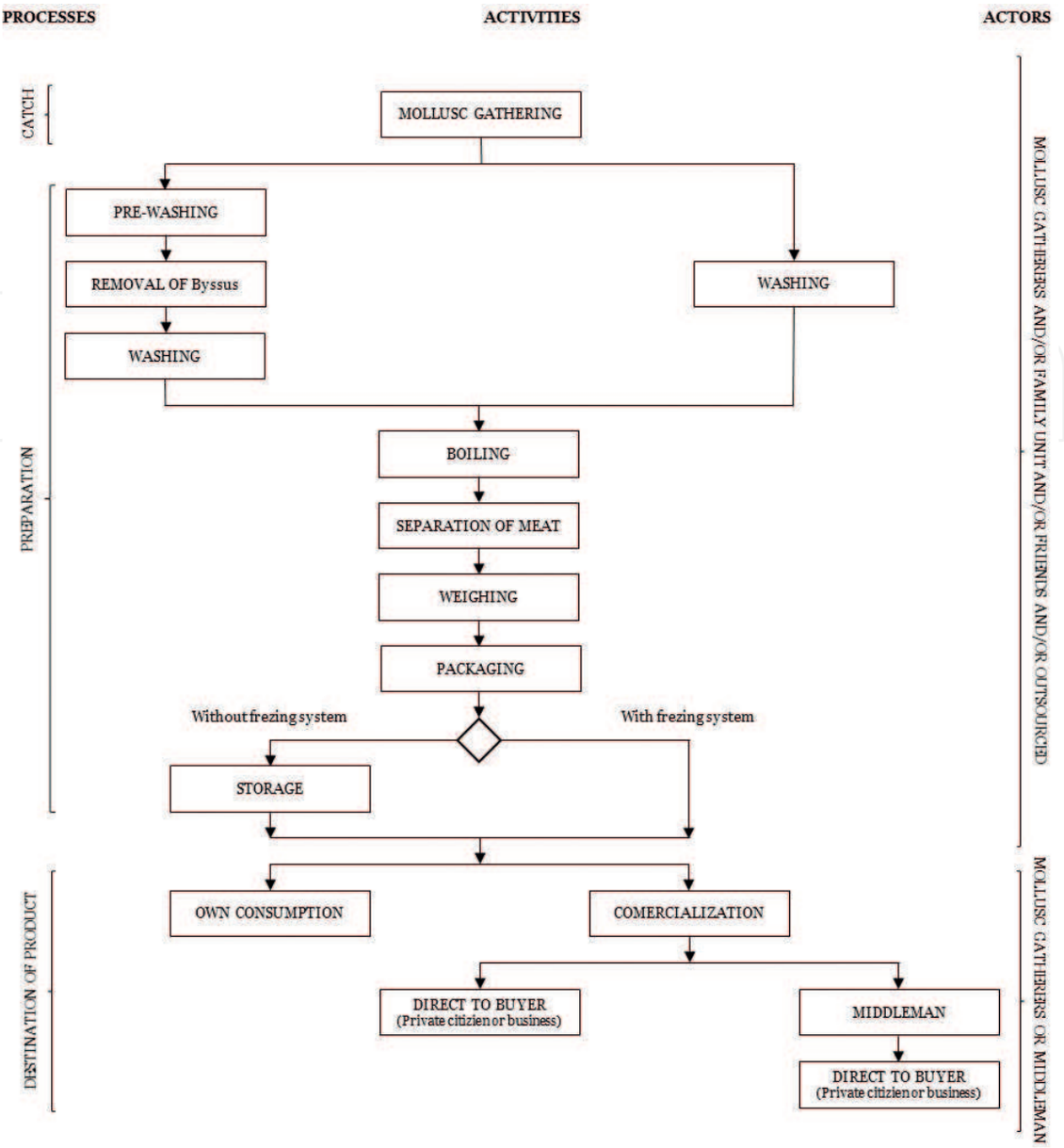



**Figure 2.**
*Flowchart of processes, activities and actors involved in productive chain of gathering molluscs of commercial importance commonly practiced by fisherwomen in northeastern Brazil (Byssus: filamentous structure used to anchor mollusc to substrate).*

low tide, when access to the banks of molluscs was possible, demonstrating knowledge of the tide variations to gain access to collection sites. The lunar phases recognized as the best for mollusc gathering are the full moon and new moon, which is in agreement with findings described in Ref. [15]. These correspond to the spring tides, which have a larger range of variation and are known locally as "the big tide."

There is also knowledge on the type of gear. The use of utensils varies based on the species targeted (**Table 1**) and type of substrate as well as the physical and age differences of the women. The fisherwomen normally use utensils that require less physical effort and cause less pressure on both the environment and the stocks, such as spoons, knives, cleavers, coconut shells, hoes, shovels, rakes, "bicheiros" (hooks formed by wooden pole with a curve iron rod at one end), hooks, sickles and spatulas or one's own hands, which, however, are less productive in comparison to "galeias" (empty plastic crates) (**Table 1**). In the community of Oiticica in the Canavieiras Extractivist Reserve in the state of Bahia, this activity was once practiced with the aid of cleavers, but began to be practiced with hoes in an effort

| Sites in northeastern Brazil with mollusc fisherwomen | Bivalve mollusc species | Common name | Types of gear of fishing | References |
|---|---|---|---|---|
| **Maranhão State** | | | | |
| Raposa | *Anomalocardia flexuosa* | Sarnambi | Cup; trawl nets; knives; rakes; hooks; spoons; trowel; one's own hands | [24] |
| | *Iphigenia brasiliensis* | Tarioba | | |
| **Piauí State** | | | | |
| Cajueiro da Praia (Barra Grande) | *Anomalocardia flexuosa* | Marisco | Shovels; spoons; one's own hands | [17, 23] |
| | *Crassostrea mangle* | Ostra | Knives; one's own hands | |
| | *Iphigenia brasiliensis* | Tarioba | One's own hands | |
| | *Mytella charruana* | Sururu; sururu-de-texto | Shovels; spoons; one's own hands | |
| | *Mytella guyanensis* | Sururu; sururu-de-dedo | Shovels; spoons; one's own hands | |
| | *Tagelus plebeius* | Tabaco-de senhora; pé-de-bode; bico-de-pato | One's own hands | |
| **Rio Grande do Norte** | | | | |
| Ponta do Tubarão Sustainable Development Reserve | *Anomalocardia flexuosa* | Búzio; marisco | Spoons; buckets; knives; coconut shells; pans; rakes; one's own hands | [11] |
| | *Mytella guyanensis* | Sururu | | |
| | *Phacoides pectinatus* | Búzio grande | | |
| Arês (Patané and Camucim) | *Anomalocardia flexuosa* | Lilius | One's own hands; cleavers; "jereré or arrastão" (trawl nets with rakes) | [18] |
| | *Crassostrea mangle* | Ostra | No data | |
| | *Mytella guyanensis* | Sururu | | |
| | *Tagelus plebeius* | Unha-de-velho | | |
| **Paraíba State** | | | | |
| Estuarys of the Mamanguape and Paraiba do Norte Rivers | *Anomalocardia flexuosa* | Marisco | No data | [13] |
| | *Crassostrea brasiliana* | Ostra de mergulho | | |
| | *Crassostrea mangle* | Ostra de mangue; ostra gaiteira | | |
| | *Iphigenia brasiliensis* | Taioba | | |
| | *Mytella charruana* | Sururu de croa | | |
| | *Mytella guyanensis* | Sururu | | |
| | *Tagelus plebeius* | Unha-de-velho | | |
| Estuary of the Paraíba do Norte River | *Anomalocardia flexuosa* | Marisco | Utensils; one's own hands | [25] |
| | *Crassostrea mangle* | Ostra de mangue | | |
| | *Mytella guyanensis* | Sururu | | |
| | *Tagelus plebeius* | Unha-de-velho | | |
| Estuary of the Mamanguape River | *Anomalocardia flexuosa* | Marisco | One's own hands; spoons | [26] |
| | *Crassostrea mangle* | Ostra | Iron utensils; cleavers | |
| | *Mytella guyanensis* | Sururu | One's own hands; iron utensils; cleavers | |

| Sites in northeastern Brazil with mollusc fisherwomen | Bivalve mollusc species | Common name | Types of gear of fishing | References |
|---|---|---|---|---|
| **Pernambuco State** | | | | |
| Igarassu (Coroa do Avião, Ramalho and Mangue Seco) | *Anomalocardia flexuosa* | Marisco | Net | [14] |
| Recife (Pina Basin) | *Anomalocardia flexuosa* | Marisco; berbigão; papa fumo; marisco de areia | "Galeia"; trowel; spoons; hoes; shovels; fork; one's own hands | Reported by the authors; [8, 12, 35] |
| | *Austromacoma constricta* | Marisco-casca-fina | "Galeia"; trowel; spoons; hoes; shovels; fork; one's own hands | |
| | *Crassostrea mangle Crassostrea brasiliana* | Ostra | Sickles; trowel; spatulas; knives; iron utensils | |
| | *Ctena orbiculata* | Marisco branco | "Galeia"; trowel; spoons; hoes; shovels; fork; one's own hands | |
| | *Mytella charruana* | Sururu de crôa; sururu; mexilhão do estuário | "Galeia"; trowel; hoes; one's own hands | |
| | *Mytella guyanensis* | Sururu; sururu raspado; mexilhão do estuário | Sickles; trowel; spatulas; hoes; knives; iron utensils | |
| | *Phacoides pectinatus* | Marisco-de-crôas; búzio grande; lambreta | "Galeia"; trowel; spoons; hoes; shovels; fork; one's own hands | |
| | *Tagelus plebeius* | Unha-de-velho | Hoes; "bicheiro"; hooks; iron utensils; knives; fork | |
| Suape | *Anomalocardia flexuosa* | Marisco | Hand nets or similar gear | Reported by the authors |
| | *Iphigenia brasiliensis* | Taioba | | |
| | *Tagelus plebeius* | Unha-de-velho | | |
| Sirinhaém and Tamandaré | *Anomalocardia flexuosa* | Mexilhão | Utensils; one's own hands | [28] |
| | *Crassostrea mangle* | Ostra | | |
| **Alagoas State** | | | | |
| Fernão Velho | No data | Marisco | No data | [40] |
| **Sergipe State** | | | | |
| Itaporanga D'Ajuda (Beto Island) | *Anomalocardia flexuosa* | Maçunim | Spoons; knives; cleavers | [22] |
| | *Mytella charruana* | Sururu | | |
| | *Crassostrea brasiliana* | Ostra | Cleavers | |
| **Bahia State** | | | | |
| Todos os Santos Bay | No data | Ostra; sururu; lambreta; sarnambi; bebe-fumo, ralacoco; marisco; machadinho | Hoes; cleavers; "bicheiros"; one's own hands | [29] |
| Santo Amaro (São Braz) | No data | Ostra | Cleavers | [21] |
| | | Marisco | Hooks | |
| | | Sururu | | |

| Sites in northeastern Brazil with mollusc fisherwomen | Bivalve mollusc species | Common name | Types of gear of fishing | References |
|---|---|---|---|---|
| Santo Amaro (Acupe) | *Anomalocardia flexuosa* | Marisco; bebe-fumo; papa-fumo | No data | [15, 38] |
| | *Brachidontes exustus* | Machadinha | | |
| | *Crassostrea mangle* | Ostra; ostra de mangue; ostra de laje; ostra de mergulho | | |
| | *Cyrtopleura costata* | Sururu-de-velho | | |
| | *Mytella charruana*<br>*Mytella guyanensis* | Sururu | | |
| Garapuá | *Phacoides pectinatus* | Lambreta | No data | [19] |
| Canavieiras Extractivist Reserve | *Phacoides pectinatus* | Lambreta | Hoes | [20] |

**Table 1.**
*Bivalve mollusc species of commercial importance, common name, gear, sites in northeastern Brazil where molluscs are gathered and authors cited in present study.*

to increase the catch rate, which has caused serious problems to the stocks [20]. In the community of the Pina Basin, male mollusc gatherers scrape the substrate with the edge of a plastic crate and then use the crate to sift and wash the molluscs. This process is more productive, but requires more physical effort and is therefore unviable for women. However, this method employed by the fishermen of the Pina Basin increases the pressure on the stocks, causing a decline in the species and impoverishing the area over time [8]. In the communities of Patané and Camucim, in the state of Rio Grande do Norte, fishing with the hands or machete was carried out with trawl net with rakes ("arrastão" or "jereré"), to increase harvesting, causing problems for reproduction of molluscs [18]. In the Suape community, mollusc production was conducted manually, with the aid of hand nets or similar gear.

The women are always involved in the preparation of the product for sale, working either alone or in groups that demonstrates the importance of women in the activity. Even in communities in which women do not participate in the collection process, they are responsible for the preparation and commercialization of the product. In the community of Brasília Teimosa, the presence of women occurs in both the capture and preparation stages of the molluscs [12]. The same occurred in the Suape region (studied by the authors) and on Beto Island in the municipality of Itaporanga D'Ajuda in the state of Sergipe [22], in the estuary of the Mamanguape River in the state of Paraíba [26], and in the community of Acupe in the state of Bahia [16]. In the community of Fernão Velho in the state of Alagoas, the preparation of molluscs and crustaceans as well as the salting of fishes are strictly performed by women [40]. Ref. [26] reports that the preparation for sales in Mamanguape occurs in the homes of the fisherwomen and, although generating income, it is considered an extension of housework, which further demonstrates the lack of recognition this work is given as a fishing activity.

The preparation of molluscs is quite rudimentary and normally involves boiling and separating the meat without adequate infrastructure under precarious hygiene-sanitation conditions, generally occurring around the residences of the fisherwomen. The boiling step can be considered quite unhealthy and taxing for these women, as it requires carrying firewood and inhaling a large amount of smoke. The separation

| Sites in northeastern Brazil of mollusk gathering | Common name | Molluscs production | Sales price | References |
|---|---|---|---|---|
| **Piauí State** | | | | |
| Cajueiro da Praia (Barra Grande) | Marisco | No data | R$ 7.00–10.00 | [17] |
| | Sururu | 315 kg/month (all community) | R$ 4.00–7.00 | |
| **Rio Grande do Norte** | | | | |
| Ponta do Tubarão Sustainable Development Reserve | Búzio | 1–5 kg (mollusc meat/day/person) (mean: 3.2 kg) | R$ 2.50–6.00 (mean: R$ 3.53) | [11] |
| Arês (Patané and Camucim) | Lilius | 5–20 kg (day/person; manual gathering)<br>5–8 sacks of 2–3 kg (fishing with net) | R$ 5.00/kg of mollusc meat (to middleman)<br>R$ 7.00/kg of mollusc meat (to buyer) | [18] |
| | Ostra | No data | R$ 15.00–17.00/kg | |
| **Paraíba State** | | | | |
| Estuaries of the Mamanguape and Paraiba do Norte Rivers | Ostra gaiteira | Extensively exploited | R$ 4.00–5.00/kg of mollusc meat | [13] |
| | Ostra de mergulho | Hard to gathering | R$ 15.00/100 units | |
| | Marisco | Extensively exploited | R$ 1.00–1.50/kg of mollusc meat | |
| | Sururu | Extensively exploited | R$ 1.50–2.00/kg of mollusc meat | |
| | Sururu de croa | Eventually exploited | R$ 1.00/kg of mollusc meat | |
| | Unha de velho | Extensively exploited | R$ 1.00–1.50/kg of mollusc meat | |
| **Pernambuco State** | | | | |
| Igarassu (Coroa do Avião, Ramalho and Mangue Seco) | Marisco | 230 sacks of 60 kg (all community) | R$ 2.00–5.00/kg of mollusc meat | [14] |
| Recife (Pina Basin) | Marisco | 6.29 kg (mollusc meat/day/person; mean) | R$ 3.77/kg of mollusc meat (to middleman; mean)<br>R$ 5.00/kg of mollusc meat (to buyer; mean) | [12] |
| | Sururu | 7.38 kg (mollusc meat/day/person; mean) | R$ 4.37/kg of mollusc meat (to middleman; mean)<br>R$ 5.06/kg of mollusc meat (to buyer; mean) | |
| | Ostra | 2.22 kg (mollusc meat/day/person; mean) | R$ 4.43/kg of mollusc meat (to middleman; mean)<br>R$ 7.35/kg of mollusc meat (to buyer; mean) | |
| | Unha de velho | 4.90 kg (mollusc meat/day/person; mean) | R$ 4.12/kg of mollusc meat (to middleman; mean)<br>R$ 4.71/kg of mollusc meat (to buyer; mean) | |

| Sites in northeastern Brazil of mollusk gathering | Common name | Molluscs production | Sales price | References |
|---|---|---|---|---|
| Recife (Pina Basin) | Marisco | 1–10 kg (mollusc meat/day/person) | US$ 1.56–4.38/kg of mollusc meat (to middleman)<br>US$ 1.25–3.75/kg of mollusk meat (to buyer) | [35] |
| | Sururu | 1–14 kg (mollusc meat/day/person) | US$ 1.56–3.75/kg of mollusc meat (to middleman)<br>US$ 1.87–4.38/kg of mollusc meat (to buyer) | |
| | Unha de velho | 1–5 kg (mollusc meat/day/person) | US$ 1.88–2.50/kg of mollusc meat (to middleman)<br>US$ 2.50–5.00/kg of mollusc meat (to buyer) | |
| | Ostra | 0.5–10 kg (mollusc meat/day/person) | US$ 1.88–6.25/kg of mollusc meat (to middleman)<br>US$ 3.13–6.25/kg of mollusc meat (to buyer) | |
| Suape | Marisco | 185.70–459 kg/month (all community)<br>(mean: 316.2 kg*)<br>*with shell | No data | Reported by the authors |
| Sirinhaém and Tamandaré | Marisco | 2 kg (mollusc meat/person/day) | No data | [28] |
| **Bahia State** | | | | |
| Todos os Santos Bay | Bebe-fumo | No data | R$ 4.00–10.00/kg of mollusc meat | [29] |

*R$: Real (BRL).*

**Table 2.**
*Production of mollusc species of commercial importance and sales prices, in mainly sites in northeastern Brazil where molluscs are gathered, and authors cited in present study.*

of the meat is a slow, tiring process that can cause injuries to hands. Therefore, the preparation process is quite taxing for these women, as it involves physical effort in everything from the transporting the molluscs to the removal of the meat.

After preparation, the molluscs are packaged, weighed and sold either directly to the consumer or through middlemen (freelancers or representatives of fish markets), who may be individuals from the community itself or merchants from other locations. Fisherwomen with freezers have the option of freezing the molluscs with no need for immediate sale, as occurs with those who do not have storage conditions. This favors the direct sales of the product, since a lack of storage capacity requires selling to middlemen. Like the rest of the productive activity, commercialization is performed informally. A large part of the produce is sold, but it is also common for the fisherwomen and their families to consume the product.

The mollusc production and the sales price are showed in **Table 2**.

Besides selling the meat from the molluscs, the shells are used in many communities for craftwork. Among marine macrofauna, molluscs are often used in

zoo-craftwork in the state of Pernambuco [41]. This activity has been consolidated as a new source of work and income and these craftspersons are found in the traditional craft markets in the city of Recife, Pernambuco [41]. In the community of Brasília Teimosa, the artisanal fishers have knowledge of the use of catches for the creation of zoo-craftwork, but report that they do not make these products themselves.

The raw material used for the creation of zoo-craftwork may pose the threat of further pressure on fish stocks. However, on the coast of the state of Paraíba [42] and in Brasília Teimosa [43], the market force that exerts pressure on fishing resources is food consumption. Thus, the zoo-craftwork in these places is made from catches used for culinary purposes or incidental catches and therefore does not place additional pressure on these resources [43].

Besides their traditional knowledge about their activity and the struggle for labor rights, the mollusc gatherers also report problems involving pollution and environmental degradation. Since they work in coastal areas, they are affected by the environmental problems that terrestrial water bodies have in Brazil. Regardless of the community, the fisherwomen list various impacts and environmental pressures, such as the destruction of mangrove areas, a lack of adequate organization and monitoring of the activity, trash dumping and the release of sewage, which affect the quality of local biodiversity and the river populations that survive on these resources [8]. Moreover, the installation of ports and large chemical and petrochemical plants in areas of considerable biological productivity affect fishing productivity, as observed by the authors in the 1990s in the area of Suape in the state of Pernambuco and in Mundau Lagoon in the state of Alagoas [44]. The impacts caused by the construction of the port in the area of Suape include the obstruction and/or extinction of natural nurseries for various species, the landfill of fishing grounds and areas of mangrove as well as a change in the type of sediment.

## 3. Conclusions

Women have been seeking room in fishing activities in terms of both socioeconomic aspects and the recognition of their work spaces. It is necessary to understand the relations that are established between men and women as well as relations between the need for economic production and social reproduction. As mollusc gathering is a predominantly female activity, the importance of gender in fishing activities must be recognized. However, the recognition and appreciation of these fisherwomen will only be possible when there is egalitarian representativeness of these laborers in the entities of social representation of the class of fishers, with their effective participation in fishing colonies, federations and confederations so that they can have the opportunity to discuss their needs and seek the rights and social protections inherent to their activities.

Moreover, the scope of their acquired and recognized traditional knowledge on mollusc gathering and their perceptions regarding the environmental changes involved in their activities are of extreme importance to the planning of environmental management strategies for estuarine areas as well as public policies to protect the environment and these fishing populations in an egalitarian manner.

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