

THE TIDE AS SUPPLIER: SOCIAL ENTREPRENEURSHIP IN ARTISANAL FISHERY

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Abstract: *small-scale fisheries (SSF) play a critical role in income generation, social development, environmental conservation, maintenance of tenure rights, as well as communities' culture and way of life. Beyond the traditional seafood value chain, SSF encompasses several associated activities. This study adopts a qualitative approach to document social enterprise experiences within SSF. Specifically, it explores the environmentally friendly production of handicrafts created from fishery residues, such as mollusk shells, within a framework of fair and socially equitable trade. This value chain is predominantly led by women—a group historically marginalized, particularly within fisheries. As a result, the women involved experience empowerment through income generation and skills development within their communities. The study further concludes that ongoing psychological support, as well as technical training, guidance, and the promotion of their work, is essential for sustainable impact. Finally, it is recommended that these activities be integrated into the broader fishery value chain framework.*

Keywords: *Fisheries. Social innovation. Social welfare. Craft. Shellfish gatherers.*

A MARÉ COMO MATÉRIA-PRIMA: EMPREENDEDORISMO SOCIAL NA PESCA ARTESANAL

Resumo: *as pescarias de pequena escala (PPE) desempenham um papel fundamental na geração de renda, desenvolvimento social, conservação ambiental, manutenção de direitos territoriais, além de apoiar a cultura e o modo de vida das comunidades. Para além da cadeia de produção tradicional de pescados, as PPE abrangem diversas atividades associadas. Este estudo adota uma abordagem qualitativa para documentar experiências de empreendimento social dentro das PPE. Especificamente, explora a produção ambientalmente responsável de artesanatos feitos a partir de resíduos da pesca, como conchas de moluscos, dentro de um modelo de comércio justo e socialmente equitativo. Essa cadeia de valor é predominantemente liderada por mulheres – um grupo historicamente marginalizado, especialmente na pesca. Como resultado, as mulheres envolvidas são empoderadas pela geração de renda e pelo desenvolvimento de habilidades em suas comunidades. O estudo também conclui que o apoio psicológico contínuo, juntamente com treinamento técnico, orientação e promoção do trabalho dessas mulheres, é essencial para um impacto sustentável. Por fim, recomenda-se que essas atividades sejam integradas ao contexto mais amplo da cadeia de produção da pesca artesanal.*

Palavras-chave: *Pescadoras. Inovação social. Bem-estar social. Artesanato. Marisqueiras.*

LA MAREA COMO MATERIA PRIMA: EMPRENDIMIENTO SOCIAL EN LA PESCA ARTESANAL

Resumen: *la pesca en pequeña escala (PPE) desempeña un papel fundamental en la generación de ingresos, el desarrollo social, la conservación ambiental, la preservación de los derechos de tenencia, además de apoyar la cultura y el modo*

Editora-Chefe: Sibeli Aparecida Viana  | Marlene Ossami de Moura 

Recebido em: 27/03/2024. **Aprovado em:** 21/10/2024.

DOI: <http://doi.org/10.18224/hab.v22i2.14187>



de vida de las comunidades. Más allá de la cadena de valor tradicional de productos marinos, la PPE abarca diversas actividades asociadas. Este estudio adopta un enfoque cualitativo para documentar experiencias de emprendimiento social dentro de la PPE. Específicamente, explora la producción responsable de artesanías a partir de residuos de pesca, como conchas de moluscos, dentro de un modelo de comercio justo y socialmente equitativo. Esta cadena de valor está predominantemente liderada por mujeres, un grupo históricamente marginado, especialmente en la pesca. Como resultado, las mujeres involucradas se ven empoderadas a través de la generación de ingresos y el desarrollo de habilidades en sus comunidades. El estudio también concluye que el apoyo psicológico continuo, junto con la capacitación técnica, la orientación y la promoción del trabajo de estas mujeres, es esencial para un impacto sostenible. Finalmente, se recomienda que estas actividades se integren en el contexto más amplio de la cadena de valor de la pesca.

Palabras clave: Pescadoras. Innovación social. Bienestar social. Artesanía. Mariscadoras.

Artisanal fishing is characterized by its socioeconomic, cultural and environmental importance, accounting for more than 50% of global catches and more than 90% of fishing jobs (FAO, 2020). The system depends on a healthy environment, on a production chain that presupposes work in water, as well as on land such as unloading, processing, marketing, involving a cultural relationship dependent on the territory (Campling, Havice, McCall Howard, 2012; FAO, 2015). Diegues (1983) related artisanal fishing to the structure of small commercial production. It is a promising activity from the perspective of sustainable local development (Daniels; Vencatesan, 1995).

It is estimated that small-scale fishing in Brazil has around 1 million practitioners and 3 million people who depend on the economy of this activity (Diegues, 2008) and is more present in the North and Northeast regions (Vasconcellos *et al.*, 2007). The Northeast employs around 47.5% of fishers (MPA, 2010) and this figure confirms the socioeconomic, cultural, and environmental importance of this way of life. In Pernambuco, almost the entire coastal area has small-scale fishing activities, which are of great importance for the local economy and the communities livelihood. According to the most recent official statistics, the State of Pernambuco totaled 15,019 tons from artisanal fishing production in 2009: this feat placed the state in 10th position in relation to national production (MPA, 2012).

This activity has undergone sudden changes, mainly due to anthropogenic impacts on the coastal environment (Ferreira *et al.*, 2022), with women and their estuarine practices being one of the most affected groups. In addition to the decrease in fish in natural environments (economic changes), there are changes in the lives and bodies of these women in several dimensions when their cultural practices are threatened. Illnesses and physical problems in fishing peoples are imposed by pollution and difficulty in accessing coastal and water territories (health condition), in addition to increased prejudice and abandonment

of the category due to public policies (because of the low economic condition of the sector). Specifically, the coast of Pernambuco became a focal point for government and private investments aimed at stimulating industrial economic development, particularly in the oil and gas, biopharmaceutical, and automotive sectors (Lira *et al.*, 2010; Bezerra, Bezerra, 2018), modifying socio-productive structure with impacts on traditional fishing communities, including regarding work organization (Oliveira, 2017). Therefore, it can be said that these communities are in a state of socio-environmental vulnerability (Azevedo; Pierri, 2014).

The management of the artisanal fishing sector has historically been centralized by the state, justified by the extractive nature of the activity carried out in shared territories (Hardin, 1968). However, following Ostrom (1990), who demonstrated that participatory management yields better results in 'commons' systems, community involvement in fisheries management is encouraged.

Social management is defined as a dialectical process of social organization characteristic of a democratic, intersubjective, and dialogical public sphere, guided by substantive rational action, rooted in the balance between well-understood self-interest and emancipation. In other words, it is a collective, non-hierarchical decision-making process grounded in democracy and the shared interests of participants (Cançado *et al.*, 2015).

Furthermore, communities organize themselves as a third sector in associations, fishing colonies, social movements and non-governmental organizations. According to Tenório (1998), the governance process of the third sector should be grounded not in market logic, but in the principles of community solidarity and social management.

By linking the difficulties faced in fishing to the presence of shellfish waste in a state renowned in Brazil for its creative handicraft production, institutions focused on its growth and targeted public policies have fostered social innovations within the production chain of women shellfish gatherers. This

has led to various initiatives in social entrepreneurship within the artisanal fishing sector in Pernambuco.

In this context, social innovation is a concept that aims at social change for portions of the population that need to enhance social inclusion, empowering individuals involved in processes of social marginalization, ultimately contributing to changes in power relations (André; Abreu, 2006).

Social innovation practices have as their main prerogative the resolution of society's problems, which have not yet been resolved by either State or market. They aim to ensure social inclusion and empower beneficiaries, helping them transition into a different social space (Murray; Caulier-Grice; Mulgan, 2010). Based on the great challenges presented to society, of a multidimensional and complex nature, social innovation fosters a variety of collaborative practices among diverse social, organizational, and institutional actors involved in the process and, also, the ability to plan, collectively and long-term sustainable solutions, which embody the outcomes of social innovation (Silva; Segatto; De Carli, 2019).

Often, these solutions represent social enterprises whose main objective is to provide an improvement in the quality of life for vulnerable populations at risk (those facing extreme poverty, discrimination, or threats to their safety, among other challenges). Thus, the concept of social entrepreneurship encompasses individuals who strive to identify systemic problems and develop transformative solutions to achieve their objectives. These entrepreneurs are engaged not only in the outcomes but also in the processes that drive social innovation.

According to Borzaga, Depredi and Galera (2012), the fusion of the concept of a company with the adjective 'social' has given rise to new definitions, each characterized by distinct interpretations for social enterprise concepts. The term social entrepreneur and social enterprises overlap to some extent and tend to be overlapped by the term "social enterprise". In this work and judging from the readings carried out in this subject research, it can be conceptualized as social enterprises, profit or non-profit organizations that have as their intention some social, environmental, or socio-environmental purpose and the creation of social value, which has the potential to provide well-being and transform vulnerable segments of society (Medeiros, 2018).

In general, social entrepreneurship can contribute to increasing female participation in the labor market, since from the perspective of diversity, equality, and inclusion, it can be seen as a means for the inclusion of women and other marginalized groups, especially in low-income countries, where they suffer from a lack of equal opportunities and social exclusion (Pines; Lerner; Schwartz, 2010).

In a study conducted by Estivalet, Andrade, and Costa (2018), several findings emerged regarding the relationship between social entrepreneurship and the increased participation of women in the labor market. These included female empowerment, the enhanced valuation of women within the workforce, and personal fulfillment.

Building on these initial considerations, the objective of this study is to demonstrate how the practice of social innovation within entrepreneurial craft activities, which utilize raw materials from the artisanal fishing production chain, promotes the empowerment, inclusion, and social well-being of women in traditional fishing communities.

METHODOLOGY

The results were derived from case studies (Gil, 2002) based on action research and extension projects carried out in two fishing communities in Pernambuco state, Brazil. These two experiences are described through a process of methodological triangulation, incorporating documentary research; systematic observation; and interviews. Triangulation is a technique that seeks to analyze the different aspects of the study, integrating both the objective and subjective perspectives. Given the interdisciplinary nature of this research, triangulation enhances the precision of the data (Minayo, 2008).

The decision to adopt this type of approach for the projects was grounded in the work of Berkes *et al.* (2001), which highlights the crucial role of the socioeconomic, political, and environmental context of fishing activities in supporting participatory management proposals. This approach necessitates the integration of public policies into fishing activities, with a consideration of gender and cultural dynamics within each community, while adhering to current concepts of environmental sustainability. It also encourages a dialogue surrounding fishing and artisanal craft as cultural assets. This choice is supported by numerous studies reporting the challenges faced by the fishing sector, particularly with respect to historical and current public policies that difficult the development of participatory management and governance processes.

The analysis further examines the role of the community within these governance processes. As Demo (1989) suggests:

It is possible to allow the community to take on tasks, depending on how it relates to the State. Firstly, it makes no sense for the State to return tasks that it has assigned to the community. Secondly, it is discriminatory nonsense to in-

volve community participation in the shadow of residual, compensatory, poor social policies, because they are reserved for poor people. Thirdly, if the community undertakes tasks, it needs to be compensated for the services provided, so as not to fall back into exploiting popular goodwill (Demo, 1989, p. 80).

FOSFATO COMMUNITY

The Fosfato community is located in the municipality of Abreu e Lima, close to the fishing colony in Porto Jatobá/Abreu e Lima (Z-33). Its main hydrographic system is the Timbó River, inserted in the domains of the Sub-Hydrographic Basins of the Catucá, Pilão, Bonança, Utinga and Barro Branco Rivers (IBGE, 2021). Furthermore, according to IBGE, many of the residents are fishers, but not all of them live in the neighborhood. Fisherwomen and shellfish gatherers are spread across the areas of Porto de Jatobá, the Fosfato community and Maria Farinha, using the colony as a common support point. However, residents face severe environmental issues resulting from the improper disposal of industrial waste into the Timbó River estuary. According to reports from fishers, “this waste, when in large quantities, leaves the river ‘dead’, taking away the fisher’s only source of income, which is fishing” (Interview 1, 2015)¹. According to Lira et al. (2010), for fishers, several factors have harmed fishing activity such as water pollution (91.1%), industry (44.7%), lack of basic sanitation (24.6%), decrease in natural resources (15.3%) and waste (14.7%). With a long-standing tradition in fishing and shellfishing, the area has accumulated shell deposits, which exacerbate environmental challenges in the region. In close proximity to the community, particularly on Gavao Beach, shellfish gatherers continue to collect shells, depositing the residues openly, further contributing to the degradation of the territory.

Guimarães and Leitão (2020, p. 352), says, through Mr. Manoel Vicente Rodrigues, known as “Mr. Dega” (Colony Z-33 president) that this community has a tradition in artisanal fishing. Firstly, the community was formed from five families who practiced subsistence and professional fishing and agriculture – both activities continue until these days. Likewise, they traditionally made traps for fishing, an activity that later succumbed opening space for making homemade medicines from a local tree, the Jatobá (*Hymenaea sp.*), giving the region a new name, Jatobá, which, over time, became Porto Jatobá (Jatobá harbor) due to fishing. The Jatobá Harbor Fishermen’s Association was established in 1998, being transformed into a Fisher’s Colony in 2009, so that they

could benefit from public policies. In 2020, the Z-33 Colony had an average of 400 members, of which 140 are active fishers, 64 are suspended and 33 canceled (Brasil, 2017D in Guimarães; Leitão, 2020, p. 353).

Therefore, an extension work was developed in the territory, with the Federal Rural University of Pernambuco (UFRPE) participation and 22 shellfish gatherers and fisherwomen. The University helped them in developing a craft value chain using scales and shells from the Z-33 colony through several workshops. The material went through a processing process with two washing cycles in running water in order to thaw the scales and separate the meat residues. To deodorize and disinfect, a solution of sodium hypochlorite (2.0% w/w) and water was used over a period of 12 hours, in a proportion of 100 mL of sodium hypochlorite (2.0% w/w) for 1000 ml of water, with two more washing cycles (Costa et al. 2018, p. 89). Subsequently, the scales were washed in running water to remove chemical residues followed by filtration (Santos et al. 2012, p.1). Scales with a color ranging from dull yellowish were used for red snapper (*Lutjanus analis*) and hake (*Cynoscion spp.*). To make the flowers, scales, barbecue sticks and hot glue pistols were used. Each scale was properly separated and glued together in a spiral format, forming the flower from a rounded scale base. After placing the first scale petal, alternate them one by one. For each petal, add more hot glue and so on (Costa et al., 2016, p. 5).

With the shells of shellfish bivalves (*Anomalocardia brasiliensis*) acquired from the discarded fishing process, some flowers and decorative pieces were also produced with balls made of paper and white glue. The shells were selected, classified by size and processed using a standard methodology according to experiences in using waste to make handmade pieces, such as flowers. Following, the shells were washed according to the methodology adapted from Silva et al. (2013, p. 15), with two washing cycles in running water in order to clean the shells and separate meat residues and organic matter. The production of handmade flowers from shells was constructed following the methodology described based on models used by the Fisheries Waste Management Engineering Laboratory (LEGARP/UFRPE) so that they could apply and update the techniques developed. Hot glue pistols, paper balls, toothpicks and a lot of imagination were used. The women participated in the workshops and felt free to create new pieces and continue the work presented. A brand was created so that the community could obtain a visual identity and parts, packaging material, stickers and craft material were left so that they could continue with sales and of course, increasing income during closed fishing periods or low catch seasons.

THE COMMUNITY OF SÃO LOURENÇO

In the Municipality of Goiana, 66 km far from Recife, is located the community recognized as a quilombo in 2005 by the Palmares Foundation (Decree 26 of 8/6/2005), with artisanal fishing being the community's main activity. Article 68 of the Transitional Constitutional Provisions Act of the 1988 Brazil Constitution determines that "the remainder of the quilombo communities that are occupying their lands are recognized as definitive property, and the state must recognize the respective titles". The community has approximately 3,600 inhabitants, distributed in approximately 900 families (Oliveira; Bezerra, 2021). This territory, additionally, is located in a government priority economic development area inducing large companies, such as: Brazilian Blood Derivatives and Biotechnology Company (Hemobrás), the industrial hub of Jeep/Fiat, glass industry (Vivix), and cement industry (Bezerra; Bezerra, 2018), in addition to the already historic sugar mills (Freire, 2004).

The settlement of São Lourenço began in the 16th century. With the abolition of slavery, enslaved people abandoned the sugar mills and created villages. The forests that extend from the municipality of Olinda-PE to the North, reaching the region of Goiana-PE, were widely used for escapes and the formation of quilombos. Carvalho (1991) shows that after the destruction of the main quilombo (Catucá) in 1830, small villages were formed in the coastal region, focusing on fishing and hunting as means of survival. The name of the community is related to the image of São Lourenço found in the Megaó mill and the construction of a Church in 1555. These lands were donated after the owner had promises fulfilled by the saint.

Female protagonism in the region is differentiated and marked by history. The women of Tejucupapo (a neighboring community to São Lourenço) resisted the Dutch on April 24, 1646, emerging victorious and known as the Heroines of Tejucupapo, a symbol of gender identity in the region (Bezerra, 2004).

The community is part of the Acaú-Goiana extractive Resex (Resex), a Marine Protected Area (MPA) created by IBAMA decree s/n/2007 and the Santa Cruz state Environmental Protected Area (APA) (Decree 32.488/2008). Resex is a category of MPA for Sustainable Use that is based on the conservation of natural ecosystems necessary for extractivism by traditional communities. The concept of Resex is a milestone in the environmental movement and in the creation of MPA as it was born from the articulation of rubber tappers in the Amazon, with the active participation of traditional peoples. Therefore, Resex arises from the resistance of civil society to guarantee its traditions (Cunha, 2001).

In addition to protecting ecosystems, Resex empowers the population by enabling them to collectively make decisions for their territories (Risso, 2012). In its conception, decision-making is shared in a system of co-management of the territory with the beneficiary communities, which provides an environment more engaged in the conservation of the territory in question (Allegretti, 2008).

However, there are intense conflicts over the use and occupation of these territories. A large part of the Resex arises from the demands of communities emerged through pressure suffered from industries, grabbing of public lands, agriculture, etc., which are advancing throughout the national territory, potentially decimating the culture and way of life of these people. Thus, this situation haunts traditional communities that seek, as their main way out of this scenario, the implementation of MPA such as Resex, thus being able to resist socio-environmental conflicts (Fernandes-Pinto, 2007).

RESULTS AND DISCUSSION

Engaging in seafood harvesting as a fisherwoman encompasses a range of unique aspects, including specific knowledge, continuous interaction with the environment, and a labor division shaped by the cycles of the tide and domestic responsibilities. This practice also embodies an intrinsic cultural connection. Integral to the tide-based culture is the repurposing of shells and fishing byproducts for various applications, including wall coverings, animal feed, ornamental items, clothing, and costume jewelry.

Materials such as scales, skins and shells are commonly regarded as organic waste, often posing challenges for communities due to their accumulation. However, recent methodologies for processing these materials have shown promising results, as documented by Santos *et al.* (2012).

These products have been successfully adopted in the creation of handmade items, as observed by Silva (2011, p. 26): "After processing, the scales exhibited satisfactory attributes such as appearance, color and absence of a fishy odor." This transformation provides a low-cost alternative for crafting decorative items and biojewelry that are well-regarded and valued in the current market. By treating and repurposing what was previously considered waste, these materials gain commercial value, whether in their raw form (such as cleaned scales and shells) or as processed craft items and biojewelry. This approach aligns with the principles of zero emissions or Zero Emissions Research & Initiatives (ZERI), as proposed by Gunter Pauli (1994), where waste from one process becomes input for another, thereby generating income for all participants involved.

In Pernambuco, shellfish gatherers from the communities of Igarassu and Quilombolas de São Lourenço have initiated the production of goods using raw materials derived from the fishing supply chain as a means of generating additional income. This initiative was fostered through academic training and projects. Moraes *et al.* (2014) discusses the adoption of social management within the university setting, highlighting it as a theme for interdisciplinary integration that aligns with both professional development and societal expectations. This approach enhances the effectiveness of such initiatives, as demonstrated in this context.

GROUP OF FISHERWOMEN FROM THE PHOSPHATE COMMUNITY, IGARASSU-PE

In 2011, the municipal management of Igarassu, prompted by the Federal Prosecution Office (MP), was encouraged to implement specialized waste collection for seafood byproducts generated by artisanal fishing. These byproducts had been accumulating along the tide's edge, at times obstructing fishermen and fisherwomen from launching their boats and causing significant health and environmental concerns.

The proposed solution discussed and demanded from City Hall was for the municipal government to treat and collect this waste as part of urban sanitation services. This meeting also saw the involvement of academia, which is committed to developing projects aimed at mitigating the issue. It is important to highlight that the meeting held was a demand from the fishing community itself requested by the Prosecution Office. This issue has been a problem for decades, in a community that produced, in 2006, 1,178.8 tons. of seafood according to the latest statistics (Fundação PRÓ-ZEE, 2008).

In response to this challenge, a university extension project was implemented with the Community of fisherwomen at Açude Saco in the municipality of Serra Talhada-PE, utilizing tilapia scales (*Oreochromis niloticus*) to create decorative flowers for crafts (Costa, 2016). Building on this experience, a similar course was replicated in the metropolitan region of Recife, targeting the fisherwomen of the Fosfato community in Igarassu. Here, 21 women expressed interest in taking part in workshops focused on crafting artisanal pieces using fish scales and mollusk shells. These workshops were held at the Fosfato Community Fisherwomen's Association, which already supported a group of women in a culinary project called 'Aquarium,' centered on fish-based gastronomy.

The activities involved the innovative use of fishing waste, transforming it into creative products. Typically discarded in common trash or landfills,

these wastes are also frequently deposited in places where fish extraction and processing are carried out. Moreover, most of the time these areas are in open environments. This practice introduces a new type of environmental pollution that contradicts both environmental policies and health regulations, posing risks to public health due to siltation and poor waste management, and exacerbating the impacts of unsustainable human intervention.

The scales and shells were benefited by each community. After following processes of washing and drying, the materials become ready to be used in artisanal products or for storage. Women in the community engage in each step: from collecting, washing, and processing the materials, to their storage, sorting, assembly, packaging, and sales.

The workshops have always generated an explosion of creativity, with current pieces, of different design and of course, with the "signature" of each community based on the local species explored. In this way, whoever chooses the crafts from that local community will be sure that it will be an exclusively acquired piece and thus, the brand of that community will always be remembered.

Further into the field project, in addition to making flowers and base pieces with scales and shells, natural dyes were also applied to the fish scales. The results of the application were positive, with colorful pieces and bringing the idea of a new collection to local crafts. The dyes were obtained from teas and infusions, such as green tea, *carqueja*, annatto and other dyes that are easily available locally, highlighting the harvest season, ease of finding and the quantity used, demonstrating the appreciation of the natural product that does not harm the environment.

The work carried out with the communities generated a prospect of increasing income, sparked interest in the creation of decorative pieces and new models of biojewelry, including pieces dyed with natural dyes. Regarding the types of scales, for use in crafts one can use all sizes and different types (according to the species of fish).

Fishing communities are increasingly open to exchanging knowledge and ideas through training workshops, actively contributing to the extension activities of universities and programs focused on rural fishing and environmental sustainability. These collaborative workshops create spaces where fishers and academic communities engage in mutual learning, fostering a two-way exchange that enhances both scientific understanding and traditional ecological knowledge. This partnership supports a holistic approach to sustainability, empowering communities to apply scientific insights to improve their practices, while also allowing researchers to incorporate

local expertise and experience into their sustainability frameworks.

The development of initiatives within fishing colonies has significantly contributed to the empowerment of women. This growth is not only based on generating income and reducing environmental impacts but also promoting social development among the participants. The concept of sustainability is inherently multifaceted, encompassing social, economic and environmental dimensions.

Typically, groups formed around these initiatives tend to disband once the projects conclude. This disintegration is not limited to the crafts discussed; it reflects a broader trend observed across various public and extension policies implemented within these communities. Participants often report a lack of time, financial constraints, and health issues as barriers to continued collaboration, leading to a decline in engagement and conflicts regarding the initial objectives of these initiatives.

Guimarães and Leitão (2020) highlight that, as of 2015, even policies that yielded positive outcomes had not achieved sufficient sustainability to foster lasting improvements in the fishing sector. The fishers involved often remain entrenched in social vulnerability, indicating that while these initiatives may have provided short-term benefits, they have not resulted in lasting changes that would enhance the livelihoods of those within the community. This situation underscores the need for more comprehensive strategies that ensure the sustainability of projects beyond their initial phases, promoting continuous engagement and support for women and other community members in the long term.

GROUP OF QUILOMBOLA WOMEN FROM SÃO LOURENÇO

In the quilombola and fishing community of São Lourenço, in Goiana, Pernambuco, women has traditionally engaged in the harvesting of shellfish (*Anomalocardia brasiliensis*) and other estuarine fish such as aratu (*Goniopsis cruentata*). Over the past four decades, however, the local economy has diversified, incorporating other fields of work not related to fishing. Oliveira (2017) shows these relationships that begin with second-home tourism, go through shrimp farming and recently take place along the lines of the FIAT/JEEP automobile factory.

This diversification, while providing new opportunities, has also introduced significant environmental impacts and marketing challenges for the artisanal seafood trade. Factors such as product perishability, geographical isolation, and limited access to markets have created a reliance on intermediaries, who dictate

pricing and purchasing schedules – a common issue faced by many fishing communities (Santos *et al.*, 2017). Additionally, the dependence on tourism, as observed in the southern region of Bahia, is also evident in Pernambuco.

In response to these challenges, the women of this community have found innovative ways to redefine their productive activities. Faced with these difficulties, in parallel with fishing, a group of shellfish gatherers who are now between 30- and 40-years old use shells, cowrie shells and seeds to make biojewelry and bags, as well as accessories for making clothes, as a form of supplementary income. This supplementary income-generating activity not only utilizes local raw materials but also repurposes waste generated from their fishing activities. A distinctive feature of their craftsmanship is the incorporation of traditional fishing net stitches into the weaving process, adding aesthetic, environmental, and cultural significance to their products. These items reflect historical processes of resistance, representation, and tradition.

The formation of this group coincided with the pregnancy of its leader in 2010. All members are daughters of fishermen, with some continuing to engage in fishing while others focus solely on their craft. Many of the participants have previous work experience in various fields, including education, private enterprises, and shrimp farming. One participant even attempted to live in the capital but ultimately chose to return to the community due to the income-generating opportunities available to them. The consensus among the group members is a strong preference for their current entrepreneurial endeavors, highlighting a commitment to enhancing their livelihoods while preserving their cultural heritage.

The group emerged from an academy's inquiries about training needs. After holding a Pernambuco Federal University (UFPE) Workshop, the theme (using waste for jewelry) and a first group of interested parties emerged in 2011. In addition to the University, the City Council participated. Initially, the mobilization took place through the Quilombola Association of which they are currently part but carry out the activity as a non-formalized group. The community is not only recognized as quilombola but also as part of the fishing community, organized under the Association of Artisanal Fishers, Shellfish Gatherers, and Quilombolas. According to Silva (2013, p. 23) such associations are often bolstered by strong ties of kinship, neighborhood, work and religion, a dynamic that is also evident within the analyzed group. "It ends up that sometimes we are a family collective, my mother sews and crochets, the daughters help, the husband sometimes takes part, polishing a

coconut. Sisters help to make a hammock, crochet” (Interview 2, 2023)².

The group received dedicated training and support for product development from professionals at the University, who worked closely with them over an eight-month period. Its physical structure is located within a Work Vocation Center (CVT), a project initially supported by the State, built by the fishermen themselves in a training process for bricklayers. Initially, a fish processing structure for shellfish and a kitchen were set up, which were not continued. The building was abandoned and later maintained by the City Hall, which today includes actions from bodies such as SESI, SENAI and SEBRAE, training institutions from the industries organization in Brazil. Within this organizational structure, regular training and meetings are held and a physical store for the group analyzed here is maintained.

At the outset, the women received guidance from the Interdisciplinary Center for Studies on the Imaginary-UFPE, which also developed the brand logo and business plan. Following the training period, they showcased their products at an exhibition in Recife, the state capital, considered a success by the producers:

We went to sell at an exhibition at the University project headquarters in Recife and in an hour and a half we sold more than minimum wage. We all came back happy because the work was well accepted, people liked it, wanted it, and said good things about it. Everyone was very well received in the city. Many had never even been to the city of Recife. That time was more or less the year 2011 or so, 2012 (Interview 2, 2023)³.

The organizational structure of the group is led by two women who oversee activities, administration, contacts, and sales. The other members focus on production. Depending on demand, new women have been invited to join the group over the years. Initially the group was made up of 24 women, some gave up along the way and today there is a dynamic of participation between 4 (managing group) and up to 9 people. Their work is divided between creating clothing items – an individual activity often done at home – and collective tasks like biojewelry production. Decision-making and management are collaborative, allowing them to maintain and grow the enterprise. Recently, they also began offering community tourism, an activity that arose in 2022 when tourist groups expressed interest in their biojewelry.

The income from jewelry is complementary to fishing and other economic activities carried out to a lesser extent. Revenues are allocated for purchasing materials, such as line, and are partly saved in

a revolving fund to support the group’s sustainability. Each woman’s work is remunerated based on sales and production. The shells of the 15 species⁴ of mollusks and gastropods identified from photographs provided by the interviewees, are mostly collected as waste from fishing activities, some in the beach environment or brought by fishermen. One species is purchased from fishermen who bring them from the high seas. These die during the fishing process and come to the surface inside the fishing gear used for lobster (traps).

In addition to being created in a university environment, the group has benefited from various projects over time, including cultural incentive resources. As an example, the professional who initiated the creative process and conducted the group’s first training continues to support their development, assisting with publicity, ongoing consultation, and guidance. Their latest collection was supported by C&A Institute in 2022, showing that technical support has been essential for the success of the activity.

This latest collection of ours was supported by the C&A institute. Financially they paid for the raw materials. They do not sell our product; they cannot sell any product in C&A stores that is not created and made in their factories. It works with social enterprises. The entrepreneurs were in need, the community, everything else. This type of work that the institute does has nothing to do with the company, you know? (Interview 2, 2023)⁵.

Finally, it is necessary to discuss activities that use fishing waste in relation to environmental issues. Initially, some captured species may be managed by protection instruments. In relation to biodiversity, the protection of endangered species stands out, however, several other instruments can also be discussed. At the international level, three Conventions provide the legal framework for the differentiated treatment of species considered threatened with extinction: the 1940 Washington Convention for the Protection of Flora, Fauna, and Natural Scenic Beauties of the Americas⁶; the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)⁷; and the Convention on Biological Diversity (CBD)⁸. These frameworks underscore the importance of sustainable practices in initiatives that repurpose natural materials, balancing cultural production with biodiversity conservation.

Nationally, the management and protection of threatened species are overseen by the Ministry of the Environment (MMA) and the Chico Mendes Institute for Biodiversity Conservation (ICMBio),

which maintains and publishes the National List of Threatened Species. This list is compiled using the methodology of the International Union for Conservation of Nature (IUCN). According to the 2014 assessment, 160 marine species were considered threatened, of which 74 were in the vulnerable category, 35 were endangered and 51 were critically endangered. Among all the groups assessed, the greatest threatened one is cartilaginous fish (sharks and rays) (ICMBio, 2018). While the shells utilized by the group are from species not included on this list, it remains crucial to approach shell collection responsibly. Removing shells from beach environments is generally discouraged, as they contribute to essential nutrient recycling processes in coastal ecosystems.

FINAL CONSIDERATIONS

The collective initiatives presented herein can be characterized as social enterprises, as they foster social development within the community, diversify income generation, facilitate collective action, and adapt to local governance practices implemented by the municipality and the government, as well as through Acaú-Goiana Resex. It can be asserted that these experiences embody the fundamental principles of social innovation: transforming lives and promoting well-being.

The projects under investigation originated research initiatives at universities aimed at enhancing women's income through the utilization of waste materials. These materials, while having a detrimental impact when discarded in natural environments, can be preserved for extended periods and repurposed in crafts with varying price points. Extension projects are typically proposed to or requested by fishing and/or shellfish gathering communities and, after prior acceptance, are implemented.

Promoting the processing of fish scales and mollusk shells offers an opportunity to support communities facing waste management challenges and economic needs. By organizing workshops focused on transforming these by-products into artisanal items, local and external markets can be targeted, followed by the creation of a portfolio with regional characteristics, thus keeping the regional culture alive and encouraging the creation of its own brand together with entrepreneurial guidance. Nevertheless, addressing shell waste from artisanal fishing extends beyond the production of handicrafts, as the amount of waste generated exceeds what communities can realistically use. Thus, it is essential to explore alternative applications and implement suitable disposal methods concurrently.

These income-generation programs offer a pathway for supplementary income and foster new

social practices, highlighting that families and women need to be assisted in areas such as education and health, mainly in psychological well-being. Significant disparities exist among practices, public policies and university projects designed to improve community welfare, as these often overlook individual and collective narratives related to community challenges, suffering, and violence. Although these experiences are frequently shared, they rarely contribute to project frameworks or recommendations that guide future efforts to enhance community living conditions.

Therefore, it was noticed that the different initiatives described followed different trajectories. Programs focused solely on income generation without a continuity perspective – namely, strategic planning that considers long-term sustainability and community-driven leadership – frequently did not succeed. On the other hand, those that have been articulating several projects (even beyond their original scope) demonstrated greater success, as acknowledged by both participants and the present analysis.

It was observed that communities that have proactive leadership or those exploring different growth possibilities achieved greater success in their ventures, gaining visibility through diverse engagement methods, including social media and events in different locations. Conversely, communities facing social challenges and lacking active leadership showed less improvement.

This study is limited by the need for a deeper understanding of parallel processes in the work of shellfish gatherers, as well as future external partnerships as a way of increasing their production and sales processes. These aspects were beyond this study's scope and are recommended for future research. Additionally, gender dynamics warrant further exploration, particularly in relation to interactions with male fishermen in the community. Finally, future studies should examine ecological relationships in greater depth.

NOTAS

- 1 Interview provided by A. J., interviewer Costa, W. Abreu e Lima, 2015.
- 2 Interview provided by S. C. G. S. interviewer Ferreira, B. M. P. Online, 2023.
- 3 Interview provided by S. C. G. S. interviewer Ferreira, B. M. P. Online, 2023.
- 4 *Acrosterigma magnum* (Linnaeus, 1758), *Tellina punicea* (Born, 1778), *Pitar circinata* (Born, 1778), *Cyrtopleura costata* (Linnaeus, 1758), *Tagelus plebeius* (Lightfoot, 1786), *Pecten ziczac* (Linnaeus, 1758), *Anadara cecum* (Hertlein, 1951), *Tivela mactroides* (Born, 1778), *Tivela foresti* (Fischer-Piette; Testud, 1967), *Mytella guayanensis* (Lamarck, 1819), *Anomalocardia brasiliensis* (Gmelin, 1791), *Neritina virginea* (Linnaeus, 1758), *Lithopoma*

tectum (Lightfoot, 1786), *Cerithium eburneum* (Bruguère, 1792), *Bulla striata* (Bruguère, 1792).

- 5 Interview provided by S. C. G. S. interviewer Ferreira, B. M. P. Online, 2023.
- 6 Ratified by Legislative Decree No. 3, of 1948, in force for Brazil since November 26, 1965, it was promulgated by Decree No. 58,054, of March 23, 1966.
- 7 Ratified by Brazil through Decree Law nº 54/75 and promulgated by Decree nº 76,623, of November 1975. CITES establishes protection for a group of plants and animals, through the regulation and monitoring of their international trade.
- 8 Ratified by Brazil through Legislative Decree No. 2, of February 8, 1994. It defines that countries must “recover and restore degraded ecosystems and promote the recovery of threatened species through the development and implementation of plans and other management strategies”.

REFERENCES

- ALLEGRETTI, M. A construção social de políticas públicas. Chico Mendes e o movimento dos seringueiros. *Desenvolvimento e Meio ambiente*, v. 18, p. 39-59, 2008.
- ANDRÉ, I.; ABREU, A. Dimensões e espaços da inovação social. *Finisterra*, [S. l.], v. 41, n. 81, 2006. Available in: <https://revistas.rcaap.pt/finisterra/article/view/1465>. Acesso em: 12 mar. 2024.
- AZEVEDO, N. T.; PIERRI, N. A política pesqueira no Brasil (2003-2011): a escolha pelo crescimento produtivo e o lugar da pesca artesanal. *Desenvolvimento e Meio Ambiente*, v. 32, 2014.
- BEZERRA, C. *Tejucupapo: história, teatro e cinema*. Recife: Bagaço, 2004.
- BEZERRA, J. B.; BEZERRA, A. C. V. Desenvolvimento ou crescimento econômico? Os impactos das transformações recentes no município de Goiana, Pernambuco. *Revista de Geografia*, Recife, v. 35, n. 2, p. 180-207, 2018.
- BORZAGA, C.; DEPEDRI, S.; GALERA, G. Interpreting social enterprises. *Revista de Administração*, v. 47, n.3, p.398-409, jul./set. 2012.
- CANÇADO, A. C.; PEREIRA, J. R.; TENÓRIO, F. G. Fundamentos Teóricos da Gestão Social. DRd - *Desenvolvimento Regional em Debate*, v. 5, n. 1, p. 4-19, 2015.
- CARVALHO, M. J. M. O quilombo do Catucá em Pernambuco. *Caderno CRH*, v. 4, n.15, p. 5-28, jul./dez. 1991.
- COSTA, W. M.; VIDAL-CAMPELLO, J. M. A.; VEIGA, M. C. M.; RODRIGUES, J. M. Aproveitamento de resíduos de pescado: o artesanato com escamas de peixe. *Rev. Ciência. Ext.* v. 12, n. 2, p. 8-17, 2016.
- COSTA, W. M.; VEIGA, M. C. M.; VIDAL, J. M. A.; ROCHA, M. A. Inovando artesanato com escamas de peixe: Tingimento natural e Marca. *Revista ambiente: gestão e desenvolvimento*, v. 11, n.1, p. 85-101, 2018.
- CUNHA, L. H. O. *Reservas extrativistas: uma alternativa de produção e conservação da biodiversidade*. São Paulo, NUAPUB- USP, 2001.
- DANIELS, R. J., R.; VENCATESAN, J. Traditional ecological knowledge and sustainable use of natural resources. *Current Science*, v. 69 n. 7, p. 569-570, 1995. Available in: <https://journals.unza.zm/index.php/mjlsse/article/download/162/160/>. Acesso em: 22 out. 2024.
- DEMO, P. Participação comunitária e constituição: avanços e ambiguidades. *Cadernos de Pesquisa*, São Paulo, v. 71, p. 72 - 81, nov. 1989.
- DIEGUES, A. C. S. *Pescadores, camponeses e trabalhadores do mar*. Editora Ática, 1983.
- DIEGUES, A. C. *Marine Protected Areas and Artisanal Fisheries in Brazil*. International Collective in Support of Fishworkers (ICSF). Chennai, Índia, 54p, 2008. Available in: http://www.icsf.net/images/monographs/pdf/english/issue_99/99_all.pdf. Acesso em: 22 out. 2024.
- ESTIVALETE, V. F. B.; ANDRADE, T.; COSTA, V. F. Contribuições do Empreendedorismo Social para o Aumento da Participação das Mulheres no Mercado de Trabalho. *RECADM*, v. 17, n. 2, p. 172-191, maio/ago. 2018.
- FAO (United Nations Food and Agriculture Organization). *The State of World Fisheries and Aquaculture* (SOFIA) 2020. Sustainability in action. Rome, 2020. 224p. Available in: <https://doi.org/10.4060/ca9229en>. Acesso em: 22 out. 2024.
- FERREIRA, B. M.P.; BONFIM, C. V.; RAPOSO, I. P. A.; QUINAMO, T. S.; CAMPOS, L. H. R. Socio-environmental disasters and their impacts: socioeconomic consequences of the oil spill in the northeast region of Brazil. *Anais da Academia Brasileira de Ciências*, v. 94, p. 1-22, 2022.
- FUNDAÇÃO PROZEE. Monitoramento da atividade pesqueira no litoral Nordeste– Projeto ESTATPESCA. Ministério do Meio Ambiente, Ibama, CEPENE, Tamandaré. 2008.
- FREIRE, G. *Nordeste: aspectos da influência da cana sobre a vida e a paisagem do Nordeste do Brasil*. 7. ed. São Paulo: Global, 2004.
- GIL, A. C. *Como elaborar projetos de pesquisa*. 4. ed. São Paulo: Editora Atlas, 2002.
- GUIMARÃES, S. R.; LEITÃO, M. do R. de F. A. Pesca artesanal: reflexões sobre políticas públicas na Colônia de Pescadores Z-33 em Porto Jatobá, Pernambuco. *Interações*, Campo Grande, v. 21, n. 2, p. 347-361, abr. 2020.
- HARDIN, G. The Tragedy of the Commons. *Science*, v. 162, n. 5364, p. 1243-1248, 1968.
- INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA (IBGE). Estimativa populacional 2021 IBGE. 28 de agosto de 2021. Acesso em: 19 abr. 2023.

- ICMBIO. *Livro Vermelho da Fauna Brasileira Ameaçada de Extinção*: Volume I. Brasília: Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio), 2018, 492p.
- LIRA, L.; PEDROSA, B. M.; SOUZA, M.; LEITE, C.; LEITE, A. P. *Diagnóstico socioeconômico da pesca artesanal do litoral de Pernambuco*. Recife: Instituto Oceanário de Pernambuco, 2010. 250 p. Available in: <https://pt.scribd.com/document/66272111/Volume-I-Diagnostico-Socioeconomico-da-Pesca-Artesanal-do-Litoral-dePernambuco>. Acesso em: 22 out. 2024.
- MEDEIROS, C. B. *Expansão de iniciativas de inovação social: uma proposição adaptativa para análise de percursos*. 2018. Tese (Doutorado) – Universidade Federal de Pernambuco, Programa de Pós-Graduação em Administração, Recife, PE, 2018.
- MINAYO, M. C. de S. *O Desafio do conhecimento*. São Paulo: Editora Hucitec, 2008. p. 361-363.
- MORAES, N. R.; PEREIRA, D.F.; PORTO JÚNIOR, F.G.R.; JUNIOR, S.S.B; MORALES, A.G.; NERES, J.C.I. CIGU - A Gestão Social como Tema Integrador de Ensino, Pesquisa e Extensão na Universidade Brasileira. *Anais... XIV Colóquio Internacional de Gestão Universitária*, 2014. v. 1, p. 50-64.
- MPA. *Boletim Estatístico da Pesca e Aquicultura*. Brasília: Ministério da Pesca e Aquicultura, 2012. 60 p.
- MURRAY, R.; CAULIER-GRICE, J.; MULGAN, G. *The Open Book of Social Innovation*. London: NESTA/The Young Foundation, 2010.
- OLIVEIRA, V. D. A. *De marisqueiras a operárias: Experiências de trabalho e gênero nos territórios pesqueiros de Goiana/PE- João Pessoa, UFPB/BC*, 2017.
- OLIVEIRA, J. P. G., BEZERRA, A. C. V. A reprodução da pesca artesanal no território da comunidade quilombola de São Lourenço, Goiana (PE) e sua relação com a saúde. *Pegada*, v. 22, n. 3, p. 48-68, 2021.
- OSTROM, E. *Governing the commons: the evolution of institutions for collective action*. New York: Cambridge University Press, 1990. 302p.
- PINES, A. M.; LERNER, M.; SCHWARTZ, D. Gender differences in entrepreneurship: equality, diversity and inclusion in times of global crisis. *Equality, Diversity and Inclusion: An International Journal*, v. 29, n. 2, p. 186-198, 2010.
- RISSO, L. C. A Importância das reservas extrativistas para a discussão mundial de conservação da natureza. *Geografia e Pesquisa*, v. 6, n. 1, 2012.
- SANTOS, G; VEIGA, M. C. M.; MELO JÚNIOR, C. A. F.; ARAÚJO, T. M. L.; COSTA, W. M.; VIDAL, J. M. A.; SANTOS, J. F.; SILVA, S. G. Beneficiamento de escamas de pescado do Mercado de São José, Recife-Pernambuco. *Aquaciência*, Palmas. Anais. Palmas: UFRPE, p. 01. 2012.
- SILVA, A. P. G. Aproveitamento de resíduos de tilápia como alternativa para o desenvolvimento sustentável da comunidade do Açude Saco I, Serra Talhada- PE. 2011. 36 p. *Monografia* (Graduação em Engenharia de Pesca), Unidade acadêmica de Serra Talhada, Universidade Federal Rural de Pernambuco, 2011.
- SILVA, I. C. R. S. Marisqueira e quilombola é tudo a mesma coisa: um estudo sobre as formas de mobilização política: o caso da povoação de São Lourenço-Goiana-Pernambuco. *Dissertação* (Mestrado em Antropologia) - Universidade Federal de Pernambuco, Recife, Pernambuco, 2013.
- SILVA, R. L. M., SEGATTO, A. P., DE CARLI, E. Do Reconhecimento do Problema Social à Escalabilidade: uma Análise do Processo de Desenvolvimento da Inovação Social. *Anais. XLIII Encontro da ANPAD – EnANPAD*, São Paulo, 2019.
- TENÓRIO, F. G. (org.). Gestão social: uma perspectiva conceitual. *Rev. Adm. Pública*, Rio de Janeiro, v. 32, n. 5, p. 7-23, 1998.
- VASCONCELLOS, M.; DIEGUES, A.C.; SALES, R. Limites e possibilidades na gestão da pesca artesanal costeira. In: COSTA, A. (org.). *Nas redes da pesca artesanal*, p. 15-84, 2007, IBAMA / PNUD, Brasília, DF, Portugal. ISBN: 9788573002515

THANKS

The authors would like to thank the groups of fisherwomen and their leaders for their work participation in the communities of Fosfato and São Lourenço. To UFRPE and Fundaj for financing fieldwork.

CONTRIBUTION OF EACH AUTHOR

Beatriz Mesquita was responsible for conceptualization, project administration; formal analysis; investigation; methodology; field research; Writing – original draft; Writing – review & editing; Weruska Melo was responsible for formal analysis; investigation; methodology; field research; Writing – original draft and formatting the article; Carolina Beltrão de Medeiros was responsible for Writing – original draft; Writing – review & editing and formatting the article; Jasilma Amorim was responsible for Investigation; Supervision in field research; Cecilia Gouveia was responsible for Investigation; Supervision in field research.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

ETHIC STATEMENTS

The study is under the formal authorization approval number of Ethic Committee CAAE 61409222.8.0000.9030, nevertheless it can be deemed unnecessary in accordance with National Resolution 510/2016. It also has the Chico Mendes Institute for Biodiversity Conservation (ICMBio) authorization, the regulatory body for Protected Areas in Brazil. The Biodiversity Information and Authorization System (Sisbio) number is 89916.

FINANCING

The study was financed by the Joaquim Nabuco Foundation (Fundaj/MEC) and the Federal Rural University of Pernambuco (UFRPE/MEC).

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