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Tagelus adansonii, a Bivalve with Unknown Potential in the Mangrove Ecosystems of Senegal

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Abstract

Shell molluscs are an important resource for island and coastal populations around the world. In Senegal, these resources constitute a significant contribution to the economy, food and cultural practices of the populations. The species commonly exploited are few in number, only about ten, whereas Senegal has a great diversity of shell molluscs that are still little known and exploited, including *Tagelus adansonii*. This is a bivalve of the solecurtidae family, the only species of the genus found on the West African coast. The study showed that this species is not widely exploited and not well known, especially among young farmers. The exploitation for

self-consumption was practised in the past, but currently this species is more of an accessory catch. Its nutritional and taste qualities have also been demonstrated. The species is available and has been found in all four sites sampled, but is most abundant in Joal-Fadiouth and the Saloum estuary. The areas where densities are zero correspond to the hyper-salted environment, or exposed to silting and erosion. Moreover, its size is greater in the Senegal River Delta where the salinity is lower. Thus the physico-chemical parameters of the environment affect the distribution, growth and even survival of this species.

The majority of the people interviewed have a low level of education, and their awareness of the potential of *T. adansonii* will certainly open up prospects for diversifying the range of resources exploited and thus their economic contribution.

Keywords: *Tagelus adansonii*, ecosystems, mangrove, Senegal, bivalve, potential.

1. Introduction

The species *Tagelus adansonii*, of the class bivalves, is identified with nearly seventeen other species worldwide according to the global biodiversity information facility (gbif). It is prominently located on the eastern Atlantic coast between Mauritania and Angola. Successive studies on the continent have provided answers on the growth, biology, distribution, reproduction and ecology of several bivalve species (Farias, 2008; Ansa and Allison 2008; Anonymous 1; Diouf et al., 2016; Diouf et al., 2017; Diouf et al., 2021). In addition, new questions, particularly those involving the potential of several lesser-known bivalves, arise (Diouf et al., 2022). In Senegal, *Tagelus adansonii* is one of the lesser known mollusc populations that colonise mangrove ecosystems. Mangrove oysters (*Crassostrea tulipa*), bloody cockles (*Senilia senilis*), and gastropods (*Pugilina morio*, *Murex spp*. and *Cymbium spp*.) are the main resources exploited by women who control most of the exploitation chains in the interface ecosystems. However, the bivalves *Crassostrea tulipa* and *Senilia senilis* remain the most exploited resources.

The exploitation of shell molluscs (bivalves and gastropods) plays an important role in the economy of rural women. In several localities, their exploitation constitutes an important source of animal protein and the primary source of income for women (Anonymous 2; Dog 2004; Badji, 2015; Diatta, 2018) Thus, while the socio-economic potential of some of these molluscs, mainly the two bivalves *Crassostrea tulipa* and *Senilia senilis*, is clearly perceptible in the northern and southern regions at the mouth of the Senegal River, in the Saloum estuary, on Fadiouth Island and on the Casamance River, as stipulated in the work of Badji 2015 and Diatta 2012, 2018, this is not the case for *Tagelus adansonii*. It remains poorly exploited compared to other molluscs. Yet it is a species that leaves a delicious taste in the mouth. Decades of drought with its corollaries of salinisation of the water, change in pH, etc., have profoundly affected the marine environment, putting the survival of many of these bivalve species on hold. The abundance and densities of *Tagelus adansonii* appear to be increasingly low and variable depending on the area (Diouf et al., 2022). In the recent past, it was usually collected to accompany everyday dishes. Moreover, its interest in some traditional rites of indigenous communities in Guinea Bissau is

reported by Anonymous 1. Thus, in the current generalized context of scarcity of fisheries resources, information on the geographical distribution of *Tagelus adansonii*, its food and economic potential would constitute a means of valorising it. This study therefore highlights the degree of knowledge of *Tagelus adansonii* by the populations, the different uses to which it is put and its gustatory virtues in the regions where it exists. It has also enabled a description of the profile of women shellfish harvesters.

2. Methodology

2.1 Présentation of the study area

The study sites are located on the Atlantic coast of Senegal. More specifically, they are located in the ocean-continent interface zone, characterised by the complexity of their functioning and the richness of the ecosystems in place. Thus, from north to south, we distinguish

-The area of the mouth of the Senegal River in the extreme north of Senegal in the Saint Louis region. The continental and marine waters mix here, creating favourable conditions for the development of bivalves.

-The central zone, in the regions of Thiès and Fatick, with a Sahelian climate, is home to the Joal-Fadiouth lagoon and the Saloum estuary.

-The southern zone, in the Ziguinchor region, includes the sites of the Casamance estuary, which are characterised by a more humid climate. The map below gives an overview of the study area (Figure 1).

2.2 Methodological approach

This study required two methodologies, one for the socio-economic and cultural aspects, the other for the bio-ecological aspects.

2.2.1 Socio-economic and cultural aspects

The sample comprised 22 localities, 8 of which were in the Saloum estuary, 1 on the Little Coast, 4 on the Senegal River and 9 in Casamance (Figure 1). In Casamance, the surveys also covered the commune of Ziguinchor, particularly the neighbourhoods of Cobitène and Belfort, where the population size is larger (Table 1). The choice of study locations was made taking into account the coverage of the mangrove in the various rivers selected for the bioecological study of the *Tagelus adansonii* species. The stations were chosen from downstream to upstream for the Joal-Fadiouth lagoon and the Casamance and Saloum estuaries. In the Senegal River delta, the samples were taken at the mouth of the river, where there are a few relics of mangroves. Thus, for a structured grid of the study area, two parameters are taken into account. These are the proximity and position of the said stations in relation to the various watercourses of the study, located within the limit of the mangrove ecosystem. This work made it possible to verify the presence or otherwise of *Tagelus adansonii*.

The participatory research method (PRM) is the main investigative tool of this work. It is essentially based on a quantitative approach. To this end, data was collected mainly by means of a questionnaire from the women who dominate shellfish fishing. Indeed, the distribution of marine resource exploitation activities shows that fishing is for men and the harvesting of shell molluscs (gastropods and bivalves) is generally reserved for women. However, given the negligible exploitation of *Tagelus adansonii* and a number of constraints including unfamiliarity with the species, men were deliberately included in the sample. Respondents were selected at random. For this purpose, concession data from the 2013 general population census (RGPHAE) were used to determine the sample size. A rate of 10% was applied, resulting in a sample size of 201 interviewees distributed by village (Table 1). The sample is made up of 29% men and 71% women. Of these, 53% are fish and shellfish (gastropods and bivalves) processors, with a total of 142 women. The aim of the questionnaire was to characterise the different shellfish exploited and to see whether *Tagelus adansonii* is known and is one of the species harvested. In fact, questions relating to its consumption, appreciation of taste, marketing and the period of exploitation were also addressed. This gave a good knowledge of its use, but above all a confirmation of its existence in places where it has not been found and the reasons for its disappearance.

2.2.2 Bioecological aspects

On the four selected sites, 34 mudflats were sampled (Figure 1). The collection protocol adopted for the present study was inspired by those of Hennache (2005), Farias (2008) and Bordeyne et al, (2009). For each mudflat, 09 quadrats of 0.5 x 0.5 m were randomly placed. In each quadrat all individuals present were extracted with a trowel and/or by hand. The entire surface of the quadrat was probed to a depth of 50 cm. The *Tagelus adansonii* individuals collected in each quadrat were measured and weighed using a caliper and a 0.01g precision electronic balance respectively. The parameters of the environment were also collected, in particular the salinity thanks to a refractometer (ATC), the type of substrate was also determined after a visual examination of its composition.

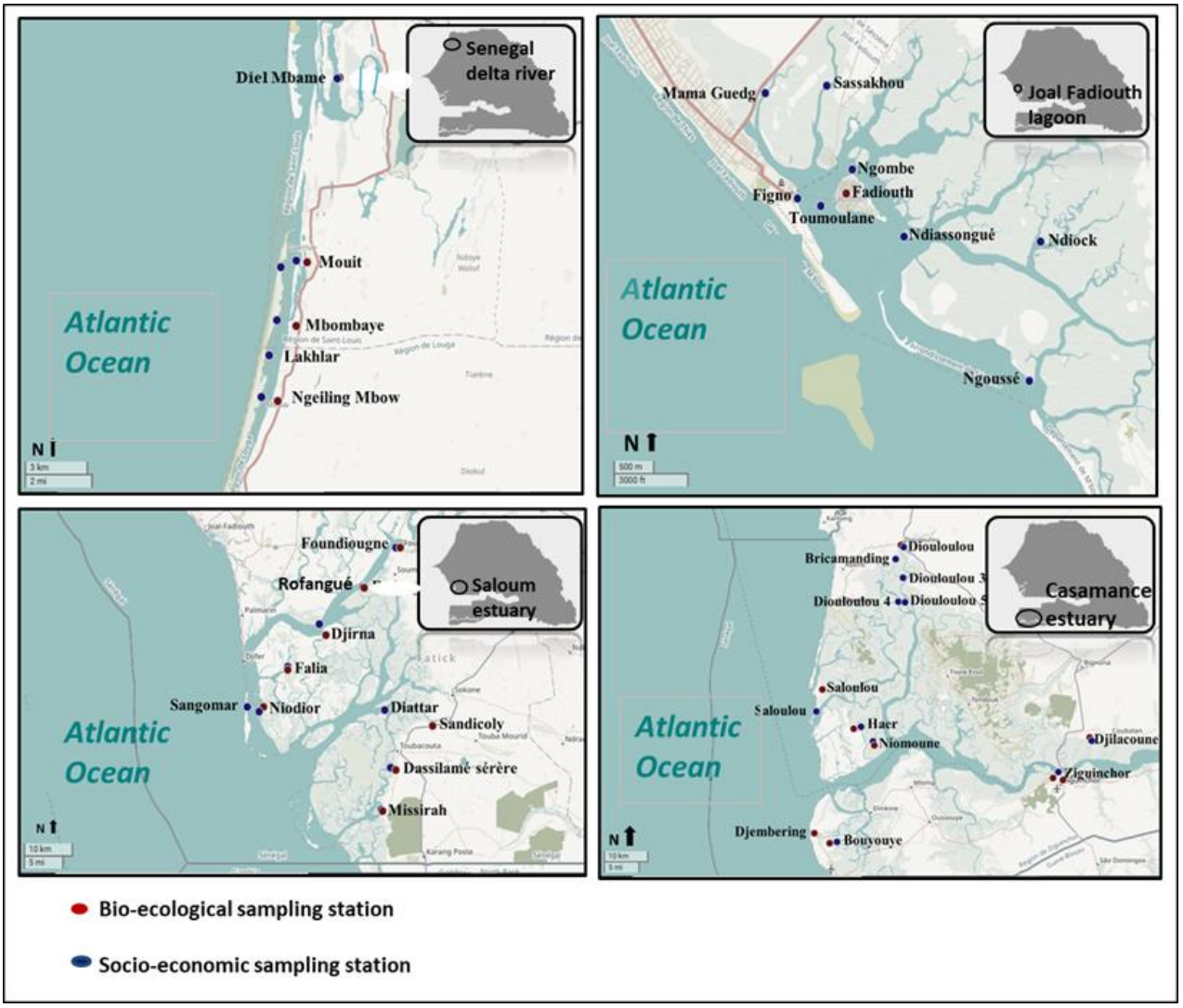


Figure 1. Locations of sampled sites

Table 1. Survey sample

Coastal zone	Administrative municipalities	Villages/neighbourhoods in the sample	Number of concessions	Sample rate	Sample size
Senegal delta river	Ndiebene gandiole	Mouit	162	10%	16
		Mboumbaye	31		3
		Ngeiling Mbow	31		3
		Diel Mbame	82		8
Joal-Fadiouth lagoon	Joal-Fadiouth	Fadiouth	157		15
Saloum estuary	Dionewar	Falia	52		5
		Niodior	199		20
	Djirnda	Rofangué	31		3
		Djirnda	164		16
	Foundiougne	Thiamène	141		14
		Missirah	156		18
		Dassilamé sérère	54		5
		Sandicoly	71		7
Casamance estuary	Diouloulou	Santhiaba	73		7
		Doumassou	120		12
	Kafountine	Niomoune	44		4
		Saloulou	29		3
	Ziguinchor	Cobitène	99		10
		Belfort	80		8
		Djilacoune	128		13
	Djembéring	Bouyouye	32		3
		Djembéring	78		8
TOTAL			2014		**201**

(Source: Diouf et al., 2023)

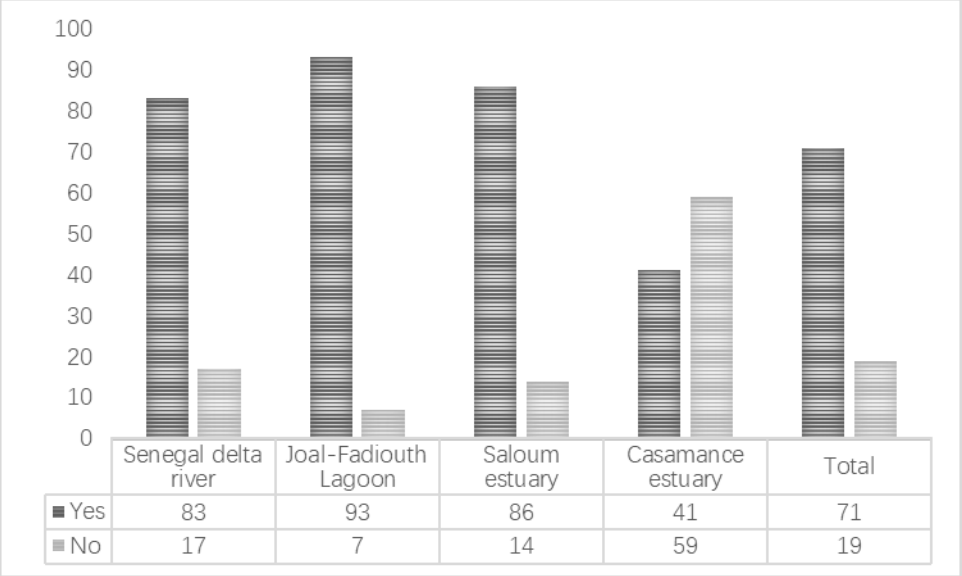
3. Results

The species *Tagelus adansonii* shares the same living environment as the bloody cockles *Senilia senilis*. However, compared to *Senilia senilis*, it remains a resource that is not very well exploited by women who collect shell molluscs (bivalves and gastropods). *Tagelus* catches are incidental, random or made by children who collect them for snacks. Moreover, the transformation processes are identical to those of the oyster and the ark.

The results are organised around the description of the socio-demographic profile of the operators, the knowledge and abundance of the species and its economic potential.

3.1 Socio-demographic characteristics

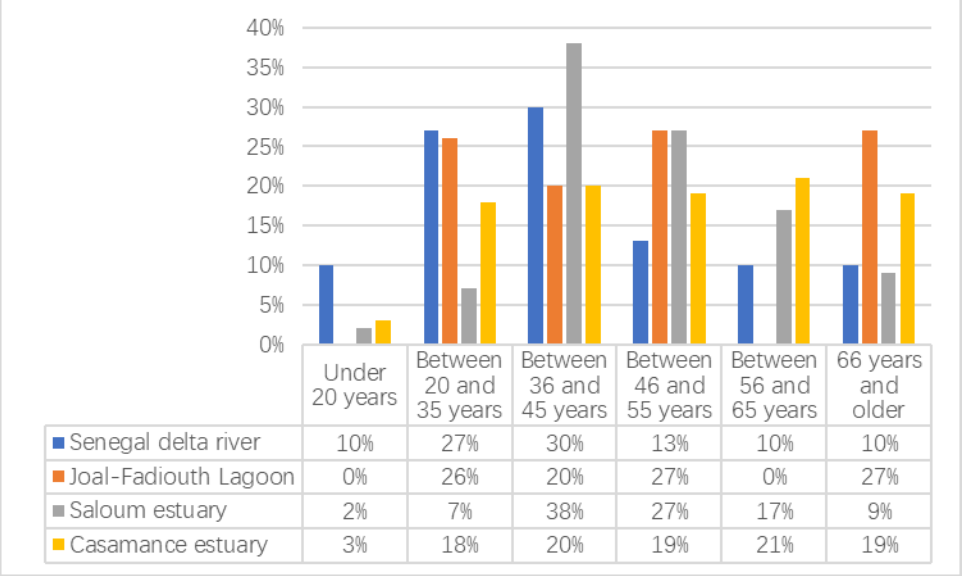
The respondents were 71% female and 29% male. On average, 71% of the respondents were indigenous (Figure 2). The foreigners interviewed were mainly long-term residents. The average age of the respondents is 33 years. The 36-45 age group is the most representative, with a higher proportion (38%) in the Saloum (Figure 3).



	Senegal delta river	Joal-Fadiouth Lagoon	Saloum estuary	Casamance estuary	Total
Yes	83	93	86	41	71
No	17	7	14	59	19

Figure 2. Origin of respondents by locality

(Source: Diouf et al., 2023)



	Under 20 years	Between 20 and 35 years	Between 36 and 45 years	Between 46 and 55 years	Between 56 and 65 years	66 years and older
Senegal delta river	10%	27%	30%	13%	10%	10%
Joal-Fadiouth Lagoon	0%	26%	20%	27%	0%	27%
Saloum estuary	2%	7%	38%	27%	17%	9%
Casamance estuary	3%	18%	20%	19%	21%	19%

Figure 3. Age distribution of respondents by locality

(Source: Diouf et al., 2023)

With regard to marital status, married status is dominant in the various localities. The Saloum estuary area has the highest rate of married people (91%). Joal-Fadiouth has the highest rate of single people (47%) and widows (13%) (Figure 4).

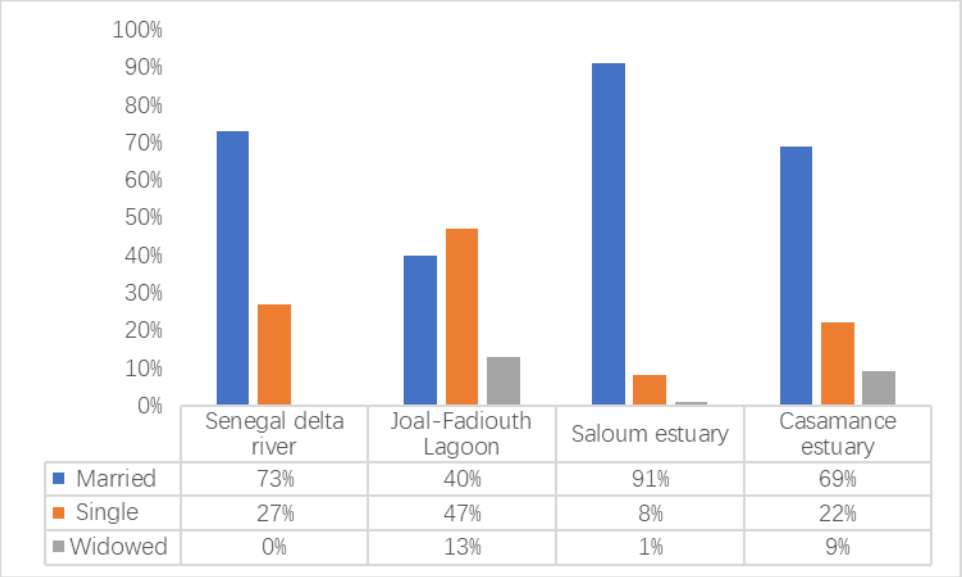
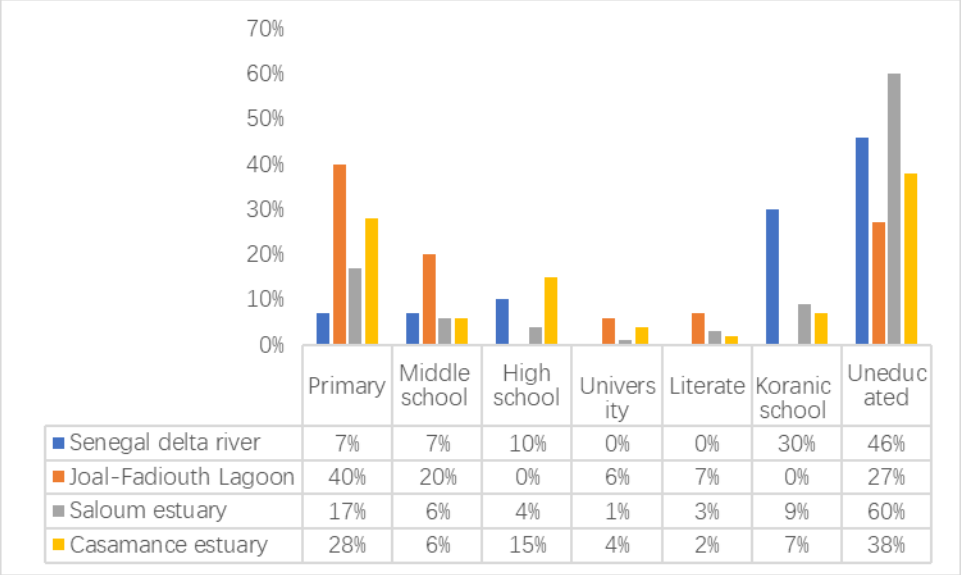


Figure 4. Marital status

(Source: Field surveys 2019)

Figure 5 shows a rapid decrease in the school enrolment rate inversely related to the level of education. Thus, with the exception of Joal-Fadiouth (40%), no other zone exceeds 28% of people having attended primary school. Similarly, no more than 20% (Joal-Fadiouth) of respondents had attended secondary school, 15% (Casamance) and no more than 6% (Joal-Fadiouth) had reached high school and university. On the other hand, there is a high proportion of non-educated people (between 27% in Joal-Fadiouth and 60% in Saloum).



	Primary	Middle school	High school	University	Literate	Koranic school	Uneducated
Senegal delta river	7%	7%	10%	0%	0%	30%	46%
Joal-Fadiouth Lagoon	40%	20%	0%	6%	7%	0%	27%
Saloum estuary	17%	6%	4%	1%	3%	9%	60%
Casamance estuary	28%	6%	15%	4%	2%	7%	38%

Figure 5. Education level of respondents

(Source: Field surveys 2019)

The Serer ethnic group is the most representative with 42% of the population. This group is located mainly in the Saloum estuary and Joal-Fadiouth. The Diola represent 25% of the sample and constitute the overwhelming majority of the population of Lower Casamance (Figure 6). Other ethnic groups are also present, such as the Wolof (15%), the Mandingo (8%), etc.

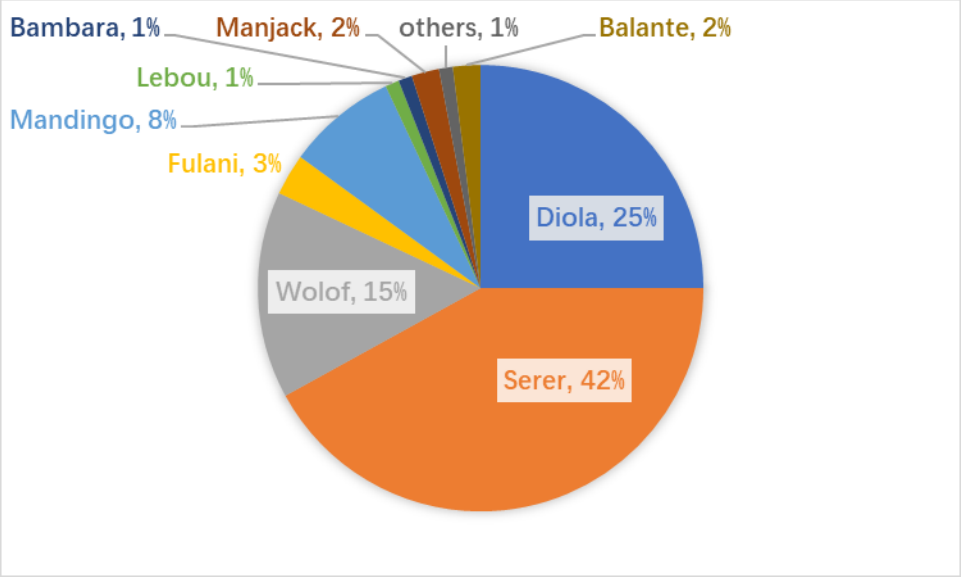


Figure 6. Ethnic distribution

(Source: Diouf et al., 2023)

3.2 Tagelus adansonii: a poorly known resource

The analysis of Table 2 reveals that the *Tagelus adansonii* species is still very much in the memory of the populations. In fact, with the exception of the Saloum estuary area (46%), more than 50% of the populations in the various study sites claim to know the species and were able to give the vernacular names of the species presented in Table 3. On the other hand, the ability to visually identify the species is very low. In fact, in all areas, only 15% of individuals were able to identify the species. It is in the Saloum estuary that the proportion of people "not knowing" *Tagelus* is the highest, with 39% of the sample.

Figure 6 shows that recollection is most vivid among people in the over-50 age group (between 42% and 67%) and decreases with age (27% at most) for the 20-33 age group.)

Table 2. Knowledge of *Tagelus*

Geographical areas	**% Respondents**		
	Knowing the name	**Able to identify**	**Don't know *Tagelus***
Senegal delta river	60%	13%	27%
Joal-Fadiouth lagoon	80%	0%	20%
Saloum estuary	46%	15%	39%
Casamance estuary	60%	9%	31%

(Source: Field surveys 2019)

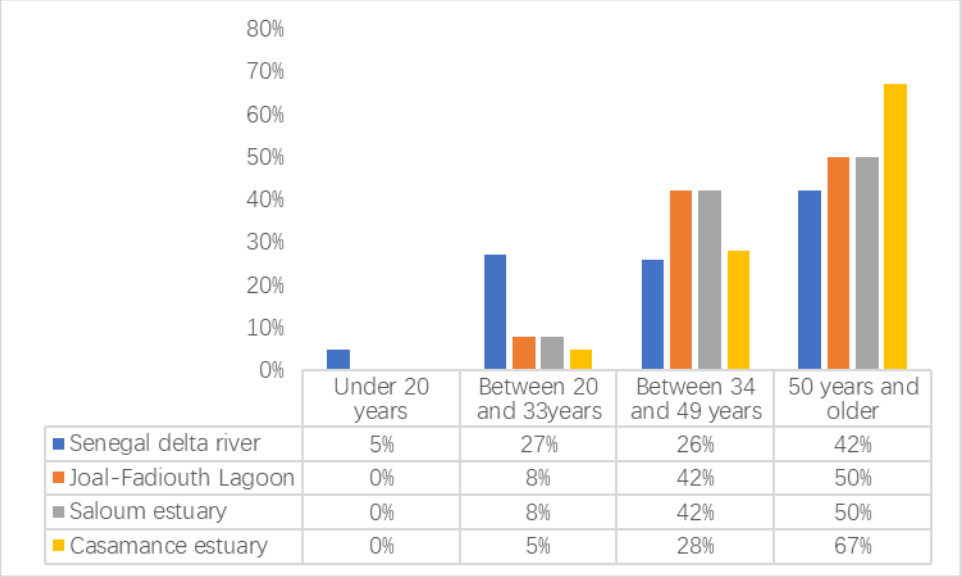


Figure 7. Age of those who know *Tagelus* in % (Source: field surveys 2019)

Table 3. Local names for *Tagelus adansonii*

NAMES	PHONETIC	LOCALITIES	AREA
Khor sébet	[Xɔr Sebet]	Mouit, Mboumbaye, Diel [Mujit], [Mbʊmbaj], [ɟɛl] Mbame, Ngeiling Mbow	Saint Louis (Senegal)
Éñéla (singulier) ou Siñélaye/ Sigñéla (pluriel)	[Eñelɐ] [Siñelɐj] / [Siñelɐ]	Cobitene, Santhiaba, [Kɔbɪtɛn], [Sacaba] Saloulou, Niomoune, [Salʊlʊ], [ɲomun] Djilacoune [ɟɪlakʊn]	Casamance (Senegal)
Élossaye	[Elosɐj]	Cobitene, Bouyouye [Kɔbɪtɛn], [Buyuj]	Casamance (Senegal)
Piankène	[Pɪjankɛn]	Saloulou [Salʊlʊ]	Casamance (Senegal)
Boucinkénio	[Bʊcɪnkɛn]	Doumassou [Dumɐsu]	Casamance (Senegal)
Babourendi	[Babʊrɛndɪ]	Missirah [Mɪsɪra]	Saloum island (Senegal)
I ndool- tool	[ɪndɔ:l-tɔ:l]	Dassilamé,Rofangué, Djirna [Dasɪlamɛ] [Rɔfangɛ], [ɟɪrna]	Saloum island (Senegal)
Gniéssane	[ɲɪjɛsan]	Niodior [ɲɔɟɔr]	Saloum island (Senegal)
Tendor	[Tɛndɔr]	Joal-Fadiouth [ʒɔal-Faɟʊt]	Fadiouth island
Ligron	[Lɪgrɔn]	Guinea Bissau [Gine-Bɪsaʊ]	Ziguinchor / Guinea Bissau

(Source: field surveys 2019)

3.3 Geographical ranges and population densities of Tagelus adansonii in the different estuaries

Tagelus was found in all four study sites with the exception of areas where environmental changes have led to its disappearance (Figure 8). Its abundance varied from site to site.

The highest density was noted in Joal-Fadiouth (Ngoussé) with 120±73.89 individuals/m². The highest density in the Saloum estuary (Dassilamé sérère) is 65.78±32.38 individuals/m². In Casamance it is 56±44.48 individuals/m² (Bouyouye) and finally in the Senegal Delta it is 26.22±15.80 individuals/m² (Lakhlar) (figure 8). The smallest average sizes are noted in Joal-Fadiouth with 40.43±4.3 and 41.08±7.09mm respectively in Ngombel and Ngoussé. The largest average size is noted in Joal-Fadiouth with 55.45±6.26mm at Figno and in the Saloum estuary with 54.07±6.5mm at Missirah (Table 4).

Overall, densities are higher in the Joal-Fadiouth lagoon and Saloum estuary areas. They are lower at the extremes, particularly in the Senegal river delta and the Saloum estuary. Also, *Tagelus* is absent from certain sites in the above-mentioned areas (Figure 8). The size of the individuals follows the same logic. Salinity follows a north-south gradient from 17 (‰) in the Senegal river delta to 54 (‰) in Casamance estuary (Table 4).

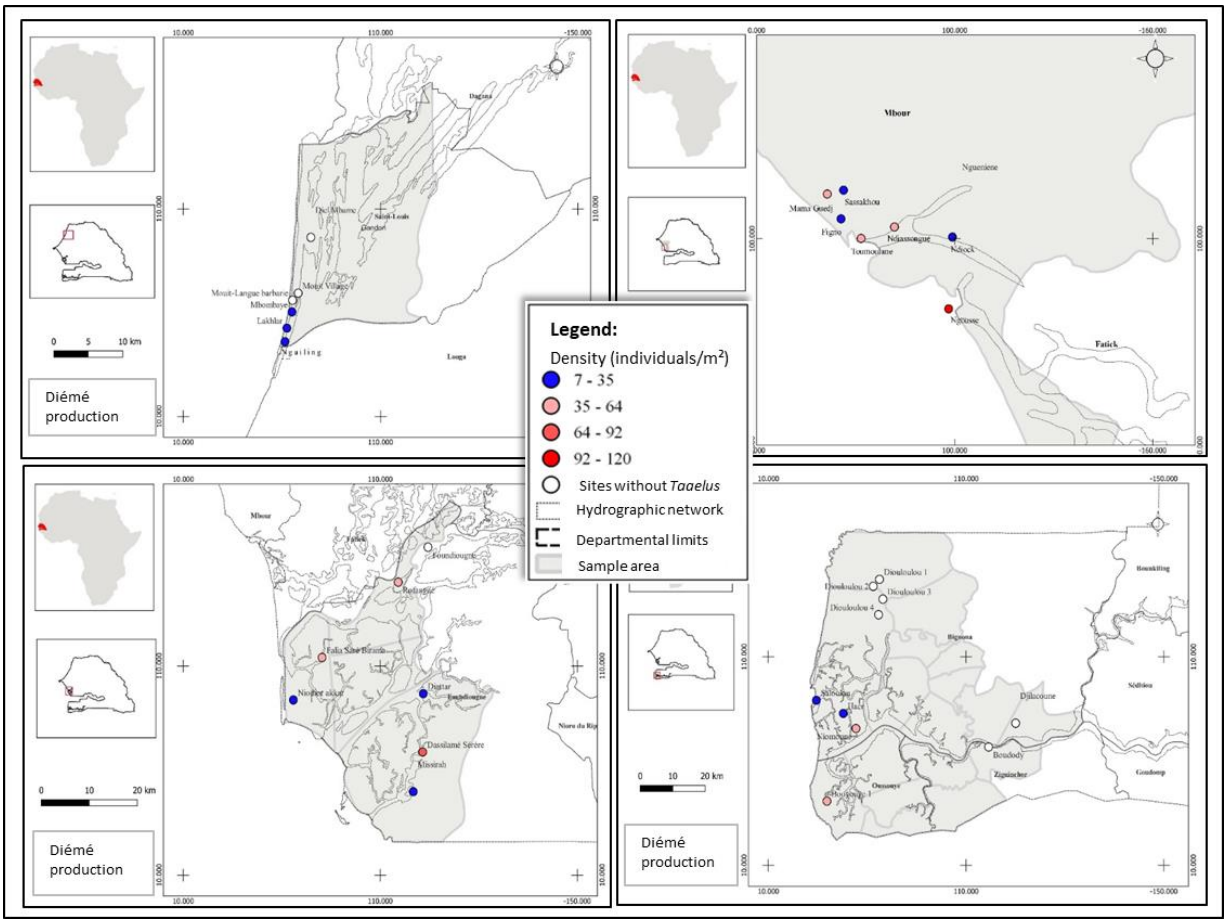


Figure 8. *Tagelus* population density distribution by zone

Table 4. Salinity, density and size of individuals by area

Sites/Parameters

Sites/Parameters	**Senegal river delta**	**Joal-Fadiouth Lagoon**	**Saloum Estuary**	**Casamance Estuary**
Salinity (‰)	17	31	32	54
Density (individuals/m²)	10	40	22	13
Size (mm)	31	48	42	17

(Source: Diouf et al., 2023)

3.4 Food value of T. adansonii

The food value of *T. adansonii* is very appreciable compared to the two bivalves most exploited by women, *S. senilis* and *C. tulipa*. Table 5 highlights the interest of *Tagelus* with a lipid contribution that is almost similar to that of oysters (Tagelus adansonii: 3.9%, Crassostrea tulipa: 4%). The protein content is equally important with 66.9% against 55.81% for *S. senilis* and 3% for *C. tulipa* (table 5).

Table 5. Comparison of the feed value of two exploited bivalves compared to *T. adansonii*

Species / Products	Water	Fat	Protein	Carbohydrate	Salts
Senilia senilis dry	---	6.61%	55.81%	28.59%	5.96%
Crassostrea tulipa fresh	87%	4%	3%	5%	1%
Tagelus adansonii dry	---	3.9%	66.92%	---	----

(Source: Udo et al., 2022; Marche Marchad 1969 and Fall et al., 2021)

3.5 Taste quality of T. adansonii

Compared to the bloody cockles (Figure 9a) and the oysters (Figure 9b), *Tagelus* has a high potential in terms of taste and texture. In terms of taste, 32% of the population say that *Tagelus* is "better", 27% that it is "as good" as the bloody cockles, and only 18% favour the bloody cockles and the Oysters.

Regarding texture, 65% of respondents said that *Tagelus* had a softer flesh than other bivalves, 24% thought that the texture was comparable. These values show that people appreciate *Tagelus* more and 24% say that the taste is comparable. The same is true for the cooking time of *Tagelus,* which is significantly faster than other molluscs according to 54%. The opinions on cooking time show that 33% of the processors consider the cooking time of *Tagelus* to be shorter. On the other hand, 6% said the opposite (Figure 10).

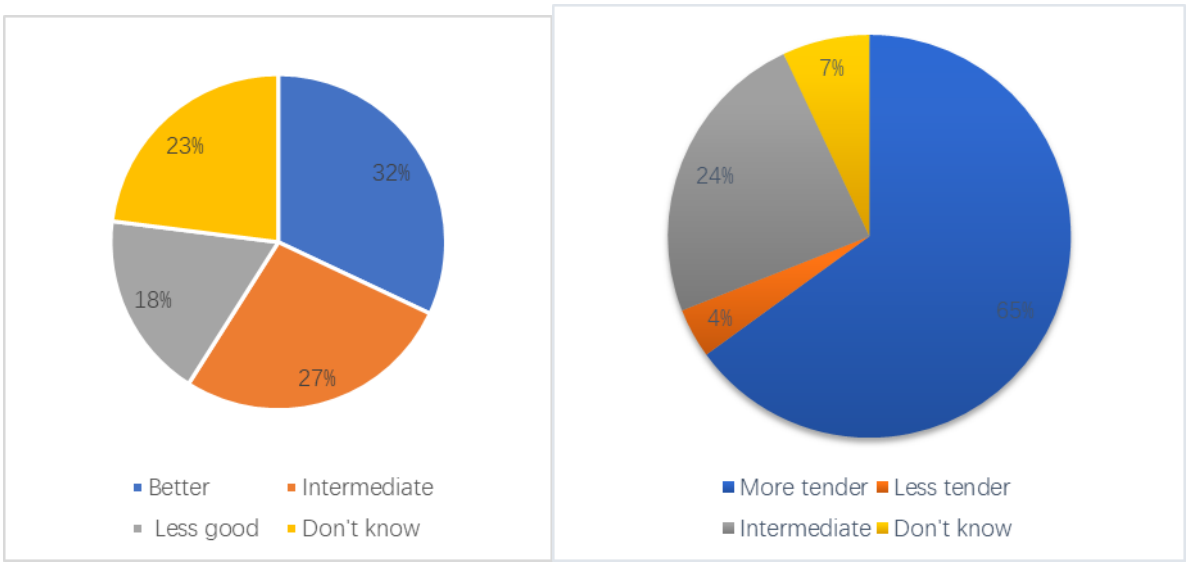


Figure 9: Comparative taste (a) and texture (b) assessment of Tagelus compared to arch and oyster

(Source: Diouf et al., 2023)

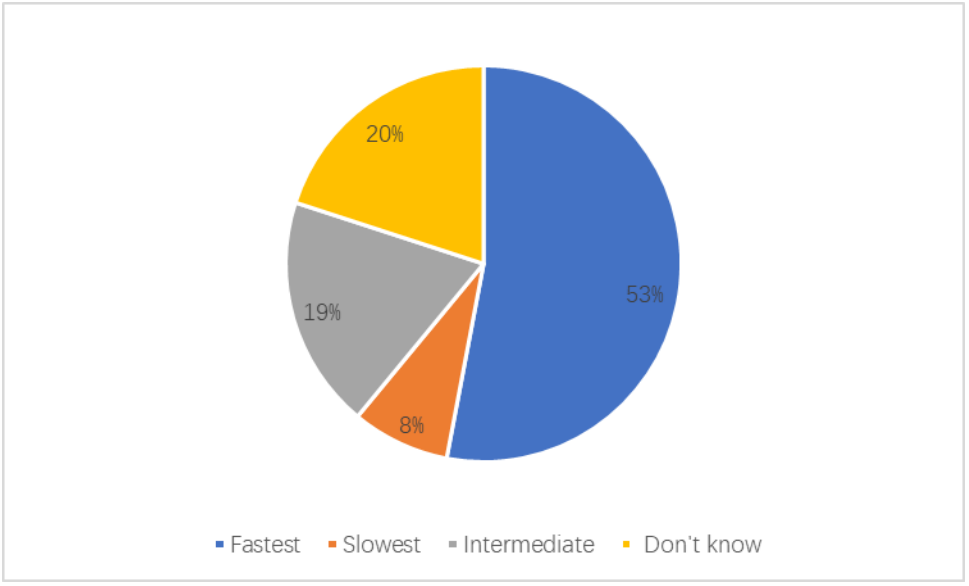


Figure 10. Cooking time of Tagelus compared to arch and oyster

(Source: Diouf et al., 2023)

4. Discussion

The exploitation of shell molluscs plays and still plays an important socio-economic role, mainly for women, who are perpetuating a two thousand year old tradition (Cormier-Salem 1987; Dog 2004). In the mangrove ecosystems of Senegal, bivalve molluscs play an important role. Gastropods (cymbiums, murex and melongenes) and bivalves (mangrove oysters and bloody cockles) constitute a significant part of the animal protein consumed in the coastal zone (Ndour, 2011; Anonymous 2). In this context, the low exploitation of *Tagelus* seems to be an anomaly given its potential.

In line with our initial idea, *Tagelus* exploitation is a marginal activity practiced mainly by women. They constitute 71% of the farmers. In West Africa, harvesting and processing activities are managed by women, who account for 80% of farmers (USAID, 2021; Anonymous 1, 2013). This social category is marked by illiteracy (26% to 60%), lack of specific training and lack of significant income. This low level of training explains, on the one hand, the difficulty for women to grasp the full potential of *Tagelus* and, on the other hand, the strong presence of women in this activity since it remains accessible without specific training. The training of women processors will open up new perspectives and diversify the range of resources exploited.

In all four study areas, the presence of *T. adansonii* is attested except for those located further inland. The species is abundant in Joal-Fadiouth and in the Saloum estuary. This characteristic is weaker in Casamance and in the Senegal river delta. *Tagelus* is sensitive to the nature of the substrate and to variations in environmental conditions. Indeed, sandy soils are more favourable to the proliferation of the species. The sandy sites located near the sea have the highest densities of between 20 and 40 individuals/m². Lomovasky et al, (2018) also noted high densities (61 individuals/m²) in tidal flats. These substrates have less mechanical resistance, are more aerated and better drained. Consequently, densities are higher on sandy substrates as Foret (2018) attests. Muddy soils do not allow high densities because of the high mechanical constraints and the abundance of suspended particles that hinder the respiration of individuals (Baron and Clavier 1992; Barillé et al., 1997). Therefore, the modification of hydro-sedimentary conditions in the Senegal river delta (St Louis breach) and in the Saloum estuary (Sangomar breach) have negatively affected the development of *Tagelus* as a result of strong coastal erosion highlighted by several researchers (Camara 2008; Sy et al., 2013; Ba et al., 2022).

High salinity affects the size of some species and sometimes constitutes a lethal factor when it exceeds 50‰ (Albaret 1987). Moreover *Tagelus* is absent from the sites of Diouloulou 1, 2, 3, 4, Djilacoune and Boudody in Casamance due to excess salinity. On the other hand, the absence of the species at the Diel Mbame, Mouit Village and Mouit sites in the Senegal river delta could be explained by changes in the substrate. The size of individuals is larger at the Joal-Fadiouth (48 mm on average) and Senegal river delta (42 mm on average) sites with a mean salinity between 31‰ and 32‰. Close values in (51 mm on average) are found in The Gambia at sites close to the coast by Diouf et al., (2016) where the relatively low salinity varies little during the year. Indeed, with the rainfall deficit of the 1970s (Dacosta., 1986; Diémé, 2018), salinities above 80 ‰ (Albaret, 1987; Pages et al., 1987, p198) are recorded in the upstream of senegalese rivers,

particularly in Casamance. Many plant and animal species have disappeared or are dwarfed (Marius, 1979; Albaret, 1987). The hypersalinity of water and soil linked to climatic deterioration limits the size of species. However, with the improvement of rainfall conditions (Diémé, 2018) and the decrease in salinity returning to lower values or close to those of the ocean (35 ‰), the density and size of individuals could increase in Casamance and in the Senegal river delta. The presence of the species is attested in several regions of Africa, particularly in Senegal (Diouf et al., 2017). However, *Tagelus* is not of great commercial importance to farmers. Moreover, among the 8 most exploited molluscs on the West African coast, *Tagelus* comes in 5th position, far behind the bloody cockles and the oyster (USAD, 2021). This lack of interest is not accidental in the Senegalese context. Indeed, knowledge of the species tends to fade among young farmers. This reflects a lack of knowledge of the resource and its real potential. However, the species has an interesting potential in the same way as other shellfish species in terms of taste and nutritional quality. Indeed, the contribution of fish to meeting animal protein requirements is increasingly declining (Dème et al., 2020). This resource is essential for the 2/3 of the Senegalese population, who derive most of their animal protein from fish. The effects of climate change, pollution and overexploitation are having a negative impact on the archipelago and oyster populations, which constitute a complementary source of animal protein. In the long term, the food balance of the populations is threatened. In our opinion, the current ecological awareness calls for a diversification of resources by integrating new species that are not widely exploited. Thus, *Tagelus* should join the species usually exploited to reduce the pressure on the shellfish resource. It is an alternative or substitute for other declining seafood products. From this point of view, *Tagelus* has a good profile. In this respect, the people claim that the taste and nutritional qualities are close to those of the bloody cockles and the oyster. From a food point of view, the comparison of the taste of *T. adansonii* with the bloody cockles and the oyster shows a positive appreciation of the taste of *Tagelus.* The work of Marche-Marchad (1969), Cosel and Gofas (2019) nutritional qualities of *Tagelus* is in line with our results obtained in the field. In view of this food potential, it would be appropriate to promote the product and co-products of this species by organising a whole sector to make it accessible to the population, as suggested by USAID (2021) and Resseguier (2016). *Tagelus* can strengthen the food and nutritional security of the population (USAID, 2021).

The cooking time is also a considerable advantage because in these Sahelian regions on the coast, wood from the mangrove is often the only alternative. This ecosystem has been undermined by anthropogenic and natural factors (Dièye et al., 2022). Having a resource that consumes less energy is a step towards preserving the balance of the environment.

Finally, *Tagelus* can provide additional income for farmers. There is no price for the processed or unprocessed product in the Senegalese market. Products such as bloody cockles or oyster have a market with well established prices. In some West African countries (Ghana, Togo, Nigeria, etc.), a kilogram of oyster fetches $1.10 (USAID, 2021). By analogy, *Tagelus* can bring in as much and thus contribute to the household economy especially since the species is abundant in some sites

in Casamance, Saloum estuary and Joal-Fadiouth (Diouf et al., 2022).

5. Conclusion

Food availability is becoming increasingly scarce. The pressure on marine resources is very high and on the verge of collapse. The article suggests that people must therefore consider other possibilities for diversifying sources of supply. *Tagelus* meets all the criteria to serve as a relay or substitute for the marine species preferred by women processors.

The *Tagelus* species is not well known to the younger generations. Its exploitation is random and carried out by women and children. These social categories are the most vulnerable in terms of education and income. The article suggests better training of stakeholders in order to equip them to exploit lesser-known species. In the long term, the exploitation of *Tagelus* will be a source of employment for the categories of the population with the lowest levels of training.

The study also highlights the abundance of the resource in the various estuaries of Senegal. The species presents nutritional and gustatory qualities that are quite similar to those of the bloody cockles and the oyster. It is rich in protein and the texture is similar to that of the bloody cockles. It can therefore be substituted or used as a complement in this context of declining availability of animal proteins. It also appears from this study that the preparation processes are the same as for other bivalves. *Tagelus* has the advantage of being less fuel-intensive. It thus contributes to the reduction of pressure on mangrove and coastal ecosystems.

One of the weaknesses of *Tagelus* is that it is not marketed. There is no market for this product and therefore no price. Analysis of the prices applied to other bivalves is a relevant indication of the commercial potential of *Tagelus*. It can be an important source of income for the population. This situation requires the creation of a complete industry and the modernisation of processing and the valorisation of production in the domestic and even foreign markets.

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