

Characterization of the Artisanal Fishery and Its Socio-Economic Aspects in the Central Atlantic Coast of Morocco, Agadir

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ABSTRACT

The present study investigated the artisanal fishery in Agadir region along the central Atlantic coast of Morocco by analyzing the fishing activities, resources and landings, the characteristics of fishing gears and fleet, and socio-economic data. In order to provide a baseline information for a proper management of this sector, data were collected from November 2022 to July 2023 through face-to-face interviews with fishermen. The interviewees were all men with an average age of 43.7 years old, low educational level and an average fishing experience of 25 years. Fishing is the sole source of income for all the fishermen in the area. The fishing activity is multi-specific, with a total biomass of 1,806.4 tons in 2021 across the five studied landing sites, consisting of 94 different species and utilizing 10 different types of fishing gear. Among these, the trammel net is the most commonly used gear, while the octopus jig is seasonally used, corresponding to periods of biological recovery.

INTRODUCTION

Artisanal fisheries are traditional practices that rely on a minimal capital investment. They are typically characterized by a fleet of numerous small vessels with low tonnage, employing various fishing gears and techniques year-round (**Farrugio *et al.*, 1993**). These fisheries primarily use passive gears, though not exclusively, and their methods vary according to seasonality and species occurrence. Despite the wide variety of species caught (**Matić-Skoko *et al.*, 2011**), the overall catch is generally low (**Guyader *et al.*, 2013**). Moreover, it is estimated that 90% of fishers worldwide are involved in artisanal fishery (**Berkes, 2001, Béné, 2006, Kelleher *et al.*, 2012**), with 97% of these fishers coming from developing countries (**Kelleher *et al.*, 2012**).

Artisanal fishery represents a high economic value noticeable at the significant contributions in economic growth, food security, and poverty alleviation (**Béné *et al.*,**

2007). Additionally, it provides substantial employment opportunities for local communities, either directly or indirectly, at sea or ashore (Farrugio *et al.*, 1993). However, since most artisanal fisheries lack adequate data, it is challenging to quantify their socio-economic contributions (Gillett & Lightfoot, 2001; Zeller *et al.*, 2006; Andrew & Béné, 2007).

Furthermore, the importance of artisanal fishery is evident having weak impacts on the environment compared to large-scale fisheries since the fuel consumption by artisanal fisheries is considered low owing to the passive gears they use and the shorter duration of fishing trips (Pauly, 2006; Van Marlen, 2009). In addition to their lower impacts on habitats, artisanal fisheries known for less to no catch destined to fishmeal and oil and for less bycatch and discards compared to large-scale fisheries (Pauly, 2006; Jacquet & Pauly, 2008).

Morocco occupies a strategic geographical location in North Africa, with a coastline over 3500km running along both the Mediterranean Sea and the Atlantic Ocean. The Moroccan Atlantic Ocean of 3000km features an important marine biodiversity with more than 7100 species (Franchimont & Saadaoui, 2001) and is characterized by a predominance of artisanal fishing along the Atlantic coast, with more than 17,000 artisanal boats (Department of marine fishery, 2021). The sector of artisanal fishery in Morocco is generally facing problems when it comes to management due to its geographical dispersion, the diversity of its structure, and the difficulty of controlling most of its production (Ramos-Esplá *et al.*, 2004). Even though the high coverage and the important economic value this fishery represents, it economically and socially remains a major challenge (Oumarous *et al.*, 2016). Several reports and studies examined the artisanal fishing sectors along the coast of the Moroccan Atlantic (Baddy & Guénette 2002; Oumarous *et al.*, 2016). However, most studies specific to Morocco do not show a clear link between artisanal fishing and the socio-economic characteristics of fisheries on the Moroccan Atlantic coast (Malouli Idrissi *et al.*, 2001; Najih *et al.*, 2015; Derdabi & Aksissou, 2021).

The port of Agadir is one of the main ports in Morocco in terms of landings (83,000t/ 2021) and production (371 million USD/ 2021). The coastal and artisanal fishing sector significantly contributes to national fishery production each year. In the port of Agadir alone, landings reached over 34,200 tons, while the broader Agadir region reported more than 36,000 tons in total landings (Department of Marine Fishery, 2021). Artisanal fleet in Agadir port represents the most numerous in terms of number of fishers involved and boats compared to the other landings sites in Agadir region, with more than 700 boats divided into two types of boats based on fishing gears used. Multi-gear boats and those using a single fishing gear, such as the purse-seine known as “Swilkat,” are particularly active along the Moroccan central Atlantic coasts. This fishery is significant for its production of small pelagic species, contributing to over half of the national

landings (Oumarous *et al.*, 2016). However, the lack of data in this region impedes the development of sustainable management strategies. This data gap also limits the recognition of artisanal fisheries' value and their potential contributions to poverty reduction and food security in the Agadir region.

To develop effective management strategies, it is crucial to gather information on the socio-economic status of this fishery and the fishing gears and techniques used. Identifying socio-economic variables in artisanal fisheries is key to optimizing resource exploitation and providing a framework for sustainable management. Understanding the social structure, including values, norms, and cultures of fishermen in the Agadir region, and assessing their contributions to livelihoods is essential. Collecting basic data on fishermen (such as age, education level, crew composition, and experience), fishing gear characteristics, techniques, catch composition, fleet structure, and the costs and revenues of fishing activities is a vital first step for an effective management. Regarding the limited number of scientific studies on socio-economic status of artisanal fisheries, and the lack of data about the central Atlantic coast of Agadir region, this study aimed to a) describe the socio-economic status of artisanal fishery in Agadir port and some fishing villages along Agadir coast, b) describe the characteristics and techniques of fishing gears used along the central Atlantic coast of Agadir and c) provide a baseline information to improve artisanal fisheries management and bring sustainable development.

MATERIALS AND METHODS

1. Study area

The study was carried out between November 2021 and July 2022 at the port of Agadir besides the fishing villages of four landing sites: Imourane, Taghazout, Imi Ouaddar, and Tiguert, which are located along the coast of Agadir, in the central Atlantic of Morocco (Fig. 1).

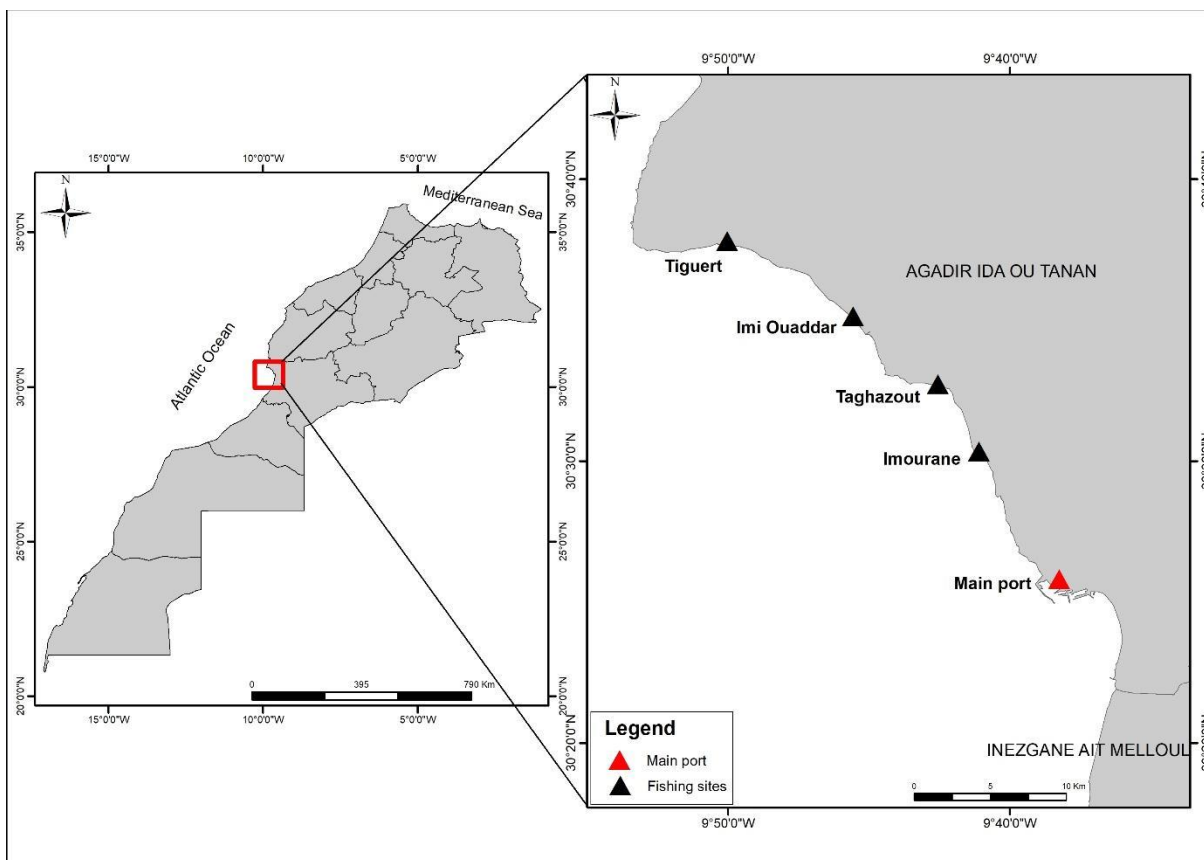


Fig. 1. Location of the study area showing the main port and the fishing sites in Agadir region

2. Data collection

Data were collected through face-to-face interviews with fishermen and field surveys, the interviews took place at the port and the landing sites for the four fishing villages. A total of 170 fishers were interviewed and were distributed as follows: Imourane (n=25), Taghazout (n=25), Imi Ouaddar (n=25), Tiguert (n=25), and the main port (n=70). The survey interviews were anonymously conducted.

One crew member was interviewed per boat, mainly the captain. In 90% of cases the boat owner is the captain, for the remaining 10%, the captain is not the boat owner.

The questionnaire included two sections: a) socio-economic aspects such as age, years of experience, crew members, educational level, social coverage, etc., b) fishing activity such as fishing gears (characteristics, seasonality), fishing grounds, duration of fishing trips, boat characteristics (length, gross tonnage, engine power KW), fishing effort, bait used, and target species.

Data on catch composition, quantities, and number of boats at each landing site were obtained from the delegation of marine fishery (DPM) and the national office of fishery (ONP).

3. Data analyses

Fishing effort was estimated as the number of fishing trips per boat per month for each site. Data collected from fisher's interviews were analyzed using basic descriptive statistics, frequency, and percentages. Statistical tests were performed by IBM SPSS Statistics 20.0.

RESULTS AND DISCUSSION

1. Socio-economic profile of fishermen

1.1. Social aspects

In the study area, the average age of the fishermen community at Agadir port is 42.8 ± 10.6 , for Imourane, 27.3 ± 10.4 , for Taghazout, 45.04 ± 8.2 , for Imi Ouaddar, 42.9 ± 8.2 and finally for Tiguert, it is estimated at 41.8 ± 9.4 (Table 1). All the fishermen are locals and could easily reach the fishing sites, except for the fishermen at the main port, they are generally living in and around the city.

Among all the 170 fishermen interviewed, the majority of them (45.9%) had attended primary schools, while 31.8% never went to school (Fig. 2). Since this job does not require a high level of knowledge, most fishermen gained the experience of fishing from their parents or through working.

In the same vein, most of the fishermen were married (93.5%) with an average number of 2.4 children. The study showed that the years of fishing experience ranged from 4 to 51 years, with an average of 24.04 ± 10.7 at the port, 29.5 ± 11.4 for Imourane, 25.2 ± 7.9 for Taghazout, 22.08 ± 7.2 for Imi Ouaddar, and 25.9 ± 8.7 for Tiguert (Table 1).

Table 1. Social profile of artisanal fishers in the study area. Data represented as maximum, minimum and average (\pm s.d)

Site	No. of fishers interviewed	Parameter	Age (years)	Fishing experience (years)	Number of crew	Number of children
Agadir port	70	Max	67	51	7	7
		Min	24	4	2	0
		Average	42.8 ± 10.6	24.04 ± 10.7	3.67 \pm	2.4 \pm
Imourane	25	Max	63	44	3	5
		Min	27	8	2	0
		Average	27.3 ± 10.4	29.5 ± 7.9	2.5 \pm	2.16 \pm
Taghazout	25	Max	58	38	3	5
		Min	30	10	2	0
		Average	45.04 ± 8.2	25.2 ± 7.9	2.3 \pm	2.6 \pm
Imi Ouaddar	25	Max	60	35	4	5
		Min	27	8	2	0
		Average	42.9 ± 8.2	22.08 ± 7.2	2.7 \pm	2.6 \pm
Tiguert	25	Max	63	41	4	4
		Min	26	8	2	0
		Average	41.8 ± 9.4	25.9 ± 8.7	2.5 \pm	2.2 \pm

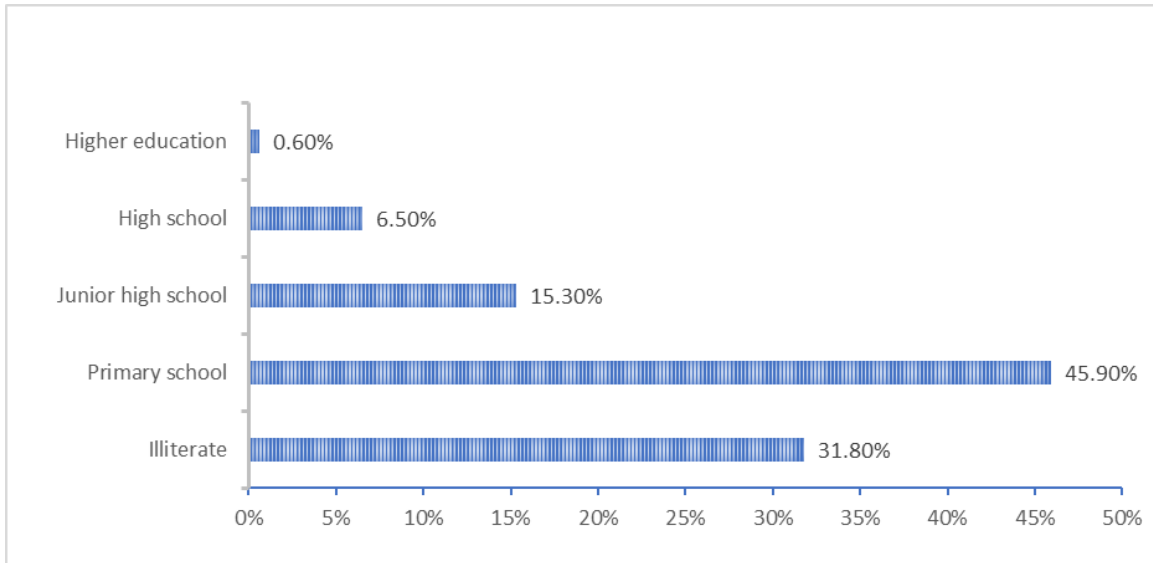


Fig. 2. Percentage of educational level of fishermen in the study area

Number of fishers per boat ranges between 2 and 4, with an average of 2.5 fishers per boat, the number of crew depends specially on the fishing gear practiced, such as purse-seine which requires up to 7 fishers per boat. Usually, the boat owner is not always a part of the crew.

For all the five sites studied, fishers interviewed were men, it was noticed that women do not take part in any fishing activities, whether in fishing or sealing. Some interviewees mentioned that some fishermen's wives contribute to nets sewing from home. But their contribution remains low since there are men practicing this job at the landing sites.

All interviewees were covered by the national social security system. A large fraction of them received training about maritime safety and use of fishing gear, especially the youngest (those with less experience years).

1.2. Economic aspects

At all fishing sites studied, the amount of salary paid to the fishermen is structured by a profit-sharing system which consists of 50% for the boat owner and 50% for the crew. After considering the common costs, the rest is divided between the crew members and the boat owner. The fisher's salary per trip is estimated to range between 10 USD and 695 USD, with an average of 214.6 USD per trip. Generally, the amount depends on the commercial value of species caught and on the number of fishing trips per month.

Mainly, common costs are related to lubricant, fuel, bait for boats operating longlines, octopus jigs, traps, and handlines. Ice and food depend on the length of the fishing trip. Common costs were estimated to range between 14.9 USD and 298 USD per

trip. Mainly dominated by fuel and bait costs, ice is mostly used by boats at the port owing to the long time spent fishing. According to fishermen, those costs are shared between the owner of the boat and fishermen.

Fixed costs in artisanal fisheries are annual expenses that include maintenance for engines, boats, and gear, as well as insurance and fishing licenses. Those fixed costs were estimated to range between 496 USD and 3974 USD, costs per boat in the study area, and it is divided as follows: 2981 USD for gears maintenance, boat maintenance with 397 USD, 198 USD for engine maintenance, insurance with 26 USD/fisher, and fishing license costs with 29 USD.

Insurance, taxes, and fishing license are the same for all boats at all the five studied sites. The taxes are not considered in Tiguert where there is no market, fishers sell their catches directly to the consumers or by the intermediate of their association.

From the interviews, all fishers interviewed confirmed that fishing is their only source of income, they do not practice any other profession except fishing. Some fishers mentioned activities to increase their income, which are primarily in relation with the fishing sector (e.g., nets sewing and squid hand-jig line trading). However, it is quite obvious that artisanal fishery is a significant source of income for fishermen, playing an economically important role.

2. Fleet characteristics

Currently, the artisanal fishing fleet of the study area is composed of 1030 wooden boats operating from the port and the four fishing villages. The important number is present at the port with 738 boats, 100 in Tiguert, 82 in Taghazout, 69 in Imi Ouaddar and 41 in Imourane, respectively.

The fleet interviewed represent 16.5% of the entire artisanal fleet in the region. Boats, in general, are of a small size ranging between 4,90 and 6.50m in length (average 5.21 ± 0.26), equipped with an engine power of 15 to 20HP (average 16.07 ± 1.46) and a gross tonnage between 0.5 and 4 (average 1.92 ± 0.84). Bigger boats were recorded only at the port in addition to common small-sized boats, which have, on average, bigger length (of 5.70 to 7m), storage capacity (of 3 to 4T), crew (5 to 7) and engine power (of 18 and 20HP) (Table 2).

Table 2. Characteristics of the interviewed fishing fleet (GT: gross tonnage; LOA: overall length, KW: engine power, and the average length of fishing trips in hours). Data represented as maximum, minimum and average (\pm s.d)

Site	Number of active boats	Number of boats interviewed	Parameter	LOA (m)	GT (t)	KW (hp)	Trip length (hours)
Agadir port	738	70	Max	7	4	20	24 h to 78 h
			Min	3.60	1.5	15	
			Average	5.54 \pm 0.44	2.89 \pm 0.49	14.35 \pm 1.40	
Imourane	41	25	Max	5.20	3	15	16 h
			Min	4.95	1	15	
			Average	5.05 \pm 0.07	1.98 \pm 0.65	15 \pm 0	
Taghazout	82	25	Max	5.50	2	18	16 h
			Min	5	1	15	
			Average	5.10 \pm 0.16	1.34 \pm 0.42	15.60 \pm 1.22	
Imi Ouaddar	69	25	Max	5.50	2	18	16 h
			Min	5	1	15	
			Average	5.16 \pm 0.19	1.52 \pm 1.46	16.08 \pm 0.50	
Tiguert	100	25	Max	5.50	1.5	18	24 h
			Min	4.90	0.5	15	
			Average	5.06 \pm 0.15	1 \pm 0.20	15.48 \pm 1.12	

The characteristics of the artisanal fleet surveyed are identical to the fleet studied in the Moroccan Mediterranean artisanal fisheries by **Malouli Idrissi *et al.* (2001), Najih**

et al. (2015) and **Derdabi and Aksissou (2021)**, who showed a homogeneity in fleet characteristics. The same characteristics were also described in other Mediterranean artisanal fisheries (**Caminas *et al.*, 1991; Griffiths *et al.*, 2007; Matić-Skoko *et al.*, 2011; Guyader *et al.*, 2013; Falautano *et al.*, 2018**).

Boat dimensions in artisanal fisheries vary based on the type of fishing gear used. For instance, purse-seine boats like the "Swilkat" require larger boats with higher storage capacities and more powerful engines (18 to 20HP) to accommodate the additional demands of handling the gear and crew. No remarkable differences have been observed in the dimensions of the multi-gear boats at the 5 studied sites.

In the Agadir port area, the duration of fishing trips varies significantly based on the type of fishing gear and the distance to the fishing grounds. Boats using gear such as squid hand-jig lines, octopus jigs, hand-lines, and bottom traps have generally shorter trips because these fishing zones are closer to shore, often within 1 mile. In contrast, boats employing trammel nets, set gillnets, purse-seines, driftnets ("Bonitar"), and bottom and drifting longlines typically undertake longer trips. These boats travel further from the coast up to 60 miles, resulting in extended travel times to reach their fishing zones.

Based on the responses of fishermen interviewed (170 boats), and for each site, the fishing effort was estimated as the number of fishing trips per boat.

Fishing effort was estimated at 42,840 trips in the study area as the average annually, with 252 trips per year as the estimated average number of fishing trips per boat.

The average number estimated of fishing trips per boat per month in the study area was 21, with 17.8 at the port, 22.7 in Imourane, 23.2 in Taghazout, 22 in Imi Ouaddar and 23.4 in Tiguert.

3. Fishery resources and fishing gears

The catch is multi-species, and 94 species were recorded in the study area for 2021 (80 species of fish, 8 mollusks cephalopods, 1 mollusk bivalve, and 5 crustaceans), of which only 5 are common to the five landing sites (*Auxis thazard*, *Conger conger*, *Loligo vulgaris*, *Octopus vulgaris*, *Sepia officinalis*), with *L. vulgaris* and *O. vulgaris* representing the most important species in terms of volume.

In 2021, the total fish catch recorded at the Agadir port was 1,325.2 tons. This includes 94.1 tons from Taghazout, 18.6 tons from Imourane, and 368.5 tons from Imi Ouaddar and Tiguert. These figures were obtained from the National Office of Fishery (ONP).

Small pelagic species were only recorded at the port with the most significant catches due to the presence of boats only employing the purse-seine, with 415.3t for *Scomber colias*, 31.3t for *Trachurus trachurus*, 27.2t for *Sardina pilchardus*, and 0.3t for *Engraulis encrasicolus*.

Species with the highest captures at the port are *S. colias* (415.4t), *O. vulgaris* (330.6t), *L. vulgaris* (101.2t), *C. conger* (89.5t), *Dicologlossa cuneata* (60.2t), *A. thazard* (38.3t), *T. trachurus* (31.3t) and *S. pilchardus* (27.2t), respectively. While *O. vulgaris* and *L. vulgaris* are the most significant species in terms of catch in the other landing sites: Taghazout (83t/ 2 t), Imourane (6t/ 11 t), and Imi ouaddar & Tiguert (346t/ 3 t).

The catch composition and landings differ by sites and months relying on the fishing gears used, weather conditions, species occurrence, and the technical problems of the engine and the boat.

Fishery in the study area is quite diversified in terms of fishing gears, as the case in the Moroccan Mediterranean (**Malouli Idrissi et al., 2001; Najih et al., 2015; Derdabi & Aksissou, 2021**). Additionally, it is diversified in other coastal Mediterranean fisheries (**Farrugio et al., 1993; Colloca et al., 2004; Battaglia et al., 2010; Matić-Skoko et al., 2011**). A total of 10 different fishing methods were identified: The squid hand-jig line, purse-seine, set gillnet, trammel net, driftnet “bonitar”, bottom longline, drifting longline, octopus jig, bottom trap and handline. Moreover, they were examined and a description of the characteristics, mode of operation, species targeted, fishing periods and the number of crew required were all identified for each gear (Table 3).

Not all those fishing gears were recorded to be used at all the five sites studied. For instance, the bottom traps are only frequent in Taghazout and Tiguert, while the driftnets, known as the “bonitar”, are occasionally used at the port, in Taghazout and Tiguert. The other gears are employed in all the study areas.

One of the most used gears among the others in the study area are the trammel nets and set gillnets, similarly to numerous Mediterranean regions (**Colloca et al., 2004; García-Rodríguez et al., 2006; Battaglia et al., 2010; Matić-Skoko et al., 2011**). We can categorize two types of trammel nets targeting different species at different depths: One targets the teleostean, and the other targets the crustaceans, which are also targeted by the bottom traps (Table 3).

The use of bottom longlines and driftnet longlines depends on the availability of the targeted species. Other gears that occurred in the study area are the driftnets or the so-called “bonitar”, only recorded to be used sporadically by few boats, as well as the bottom traps.

Another fishing gear recorded in the study area are the purse-seines targeting the small pelagic species throughout the year, only employed by special boats in the port. Unlike the Moroccan Mediterranean fisheries where the use of purse-seine is infrequent (Malouli Idrissi *et al.*, 2001), or even not occurring (Derdabi & Aksissou, 2021). This can be explained by the occurrence of small pelagic species that result in abundance in the central Atlantic area (Oumarous *et al.*, 2016).

The fishing operation involves one to two boats, one is carrying the fishing gear and the crew, and the other one carries the catch, as mentioned by Oumarous *et al.* (2016). One boat is the most operated at the port, whereas the involvement of the second boat depends on the abundance of species targeted.

We can distinguish between two forms of purse-seines, with differences in length and width. A small purse-seine is used when there are rocks and at a low depth, while the large purse-seine is used at a high depth in the sandy coastal area.

Table 3. Description of the characteristics, mode of operation, species targeted, fishing periods and the number of crew required for each gear

Gear	Target species	Gear descriptions & method of operation	Bait	Fishing period	Crew number
Trammel net	Cuttlefish, Sole, Atlantic wreckfish, Brill, Blackbellied angler, Bogue, Great barracuda, Turbot, St Pierre	Three-layered nets: the first one with small meshes of 35-40-50mm, fitted among two others of a large mesh size of 150mm. The gear is attached to the seabed, maintained vertically on the bottom by weights and on the top by floats. With 2 to 4m high and the length varies between 120 to 1000m according to the number of pieces the trammel is composed of (one piece is about 60m long).	None	Throughout the year	3 to 4
Trammel net	Common spiny lobster, European lobster, Pink spiny lobster	Three-layered nets: the first one with small mesh of 55-60-70mm, fitted among two others with a large mesh size of 200mm. The gear is attached to the seabed, maintained vertically on the bottom by weights and on the top by floats. It is 1m high, and the length varies between 120 to 1000m according to the number of pieces the trammel is	None	February- to October	3 to 4

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		composed of (one piece is about 60m long).			
Set Gillnet	Whiting, European seabass, Large-eye dentex, Canary dentex	This gear is a single layered gill net of 5m of depth and 1000m long. Made of mono-filament fibers for a low-visibility, and anchored to sea bottom. The mesh used ranges between 35-60mm.	None	Throughout the year	2 to 3
Driftnet "Bonitar"	Bullet tuna, Albacore, Frigate tuna	Gill net of almost 1000m, freely drift with the current close to the surface by floats on top and weights, which keep the gear vertical in the water.	None	September-October-November	3 to 4
Bottom Longline	Blackspot seabream, Black seabream, European conger, Rubberlip grunt, Blackmouth catshark	Longline composed of a principal line of 200 to 240mm in diameter, from which descend the branch lines of 90-100mm, each with a single baited hook. Total hooks numbers range between 3000 and 4000, the sizes are no 0,3; 0,4; 0,7 and 0,8. The gear is set on the seabed by lead or stones. The fishing operation is short, generally doesn't exceed 3 to 4 hours.	Chub mackerel, Octopus, Squid, Sardine	Throughout the year	3 to 4
Drifting Longline	Atlantic bonito, Bullet tuna, Swordfish	Longline composed of a principal line of 4mm with a length of 3000 to 4000m, suspended by the floats. From which descend the branch lines of 200mm, each with a single baited hook. Total hooks numbers range between 2400 to 3000. Hooks size is no 0,1. The fishing operation is short, generally doesn't exceed 4 hours.	Chub Mackerel, Sardine	May to October	3 to 4
Purse-seine	Sardine, European Anchovy, Atlantic chub mackerel, Atlantic horse	A surrounding net with a longer float-line than the lead-line which is equipped with metal rings into which a rope is inserted to close the net. Mesh sizes are generally small, about 9mm.	None	Throughout the year	5 to 7

mackerel					
Octopus jig	Octopus	This gear is composed of hooks attached as a crown fixed on a cylindrical piece of lead tied up to a line of 50-300m.	Sardine and all sort of fish scraps and waste	Throughout the year except for the biological rest period	1 to 2
Squid hand-jig line	European squid	This gear is composed of hooks attached as a crown fixed on a cylindrical piece of lead of blinking colors and tied up to a line of 50-300 m.	None	Throughout the year	1 to 2
Bottom Traps	Common spiny lobster, European lobster, Pink spiny lobster, Crabs	The gear is set on the sea bed, its location is indicated by a float on the surface, anchored to the pot by a line. The traps are connected by a ground line.	Sardine and all sort of fish scraps and waste	February- to October	1 to 2
Handline	European seabass, Spotted seabass, Bogue, Sand steenbras	A line of 30-200 m long, generally 2 to 4 hooks are used. Hook size is type no 0,3; 0,4; 0,5 and 0,6.	Sardine and all sort of fish scraps and waste	Throughout the year	1

According to fishermen, catches are made throughout the year with a high productivity during summer from July to December due to the adequate weather conditions and the high abundance of species, as well as during the allowed fishing periods of the octopus *O. vulgaris*.

In the fishing operations at the Agadir port, many boats use a combination of fishing gears during a single trip, although not all fishermen engage in this practice due to financial constraints. Typically, one or two types of fishing gears are employed during each trip to optimize catch and adapt to varying conditions.

The alternation of fishing gears by fishermen is influenced by various factors including the biological recovery periods of species, regulatory compliance, weather conditions, and their fishing experience. This strategy helps them adapt to the presence and abundance of targeted species (Battaglia et al., 2010; Matić-Skoko et al., 2011). Fig. (3) illustrates the relative frequency (%) of each gear used in the study area, highlighting how fishermen select gears based on these factors.

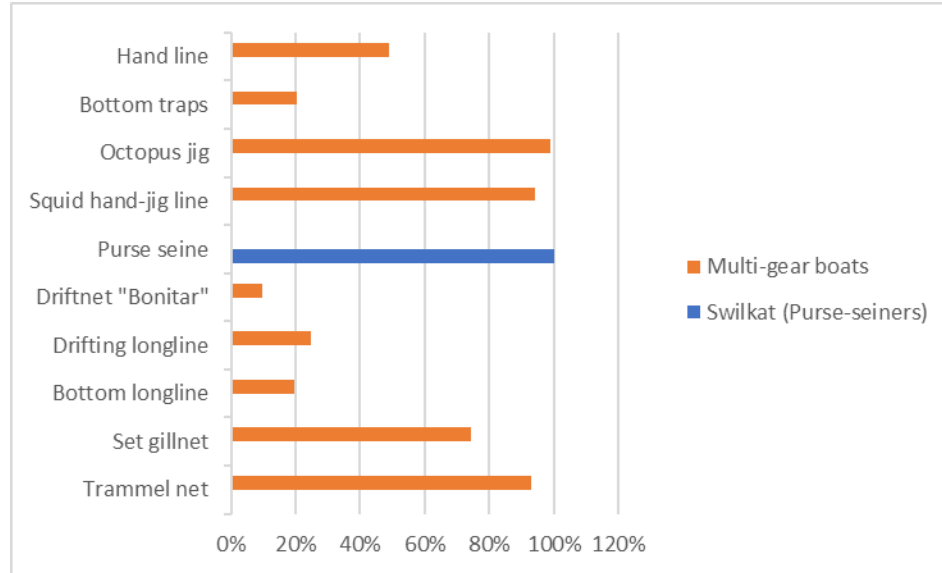


Fig. 3. Percent use of each fishing gear in the study area

Fig. (3) illustrates that the trammel net is one of the most used gears with an average of 92.8% of the fishing operations since it provides a high varied catch. Along with the trammel net, the squid hand-jig line is common in the study area owing to the occurrence of the targeted species (the European squid *L. vulgaris*) throughout the year. Another gear widely used in the study area is the set gillnet, on average in 75% of fishing trips.

The octopus jig records the highest percentage in terms of use on average in 98.7% of the fishing operations during the allowed periods, even though it is defined by the biological recovery periods of the octopus *O. vulgaris*. Generally, there are two seasons when this gear is allowed to be exploited: July-August and September-December.

The use of the driftnet in the study area is influenced by many factors: the difficulty of manipulation, the occurrence, and the seasonality of the targeted species, which makes the use of this gear in the study area infrequent, only few fishermen were recorded to use it.

The Purse-seine is used by specific boats called “Swilkat”, that employ only this gear throughout the year targeting the pelagic species.

CONCLUSION

This study examined the artisanal fisheries and their socio-economic situation in Agadir region along the central Atlantic coast of Morocco, through the evaluation and the assessment of the landings and fishery resources, the characteristics of the fleet and

fishing gears, as well as the fishing effort. To ensure an appropriate management of this fishery, the knowledge of those parameters is crucial.

From the outcome of this survey, useful data were obtained on the current activity of the artisanal fishery in Agadir region along the central Atlantic coast of Morocco. This fishery is a primordial activity in the region representing an important contribution to the region's total landings with high commercial value of targeted species. In addition, it contributes directly and indirectly in the employment of the people in the region. It is worthy to mention its contribution in developing and preserving the coastal communities as well as its significance culture and tradition. However, numerous possible factors may menace the sector's sustainable development, such as the high rate of illiteracy and the low number of fishermen who took advantage of the marine training courses.

The establishment of managed landing points (PDA) in Taghazout and Tiguert is essential for enhancing the quality of life for fishermen in these communities. These facilities would improve the trade of their catches, particularly for fishermen in Tiguert, who currently must transport their catch to the Imi Ouaddar market. Additionally, such improvements would provide access to social coverage and retirement benefits for the fishermen. This could subsequently reduce the costs of fish products commercialization.

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