

Kingdom of Morocco



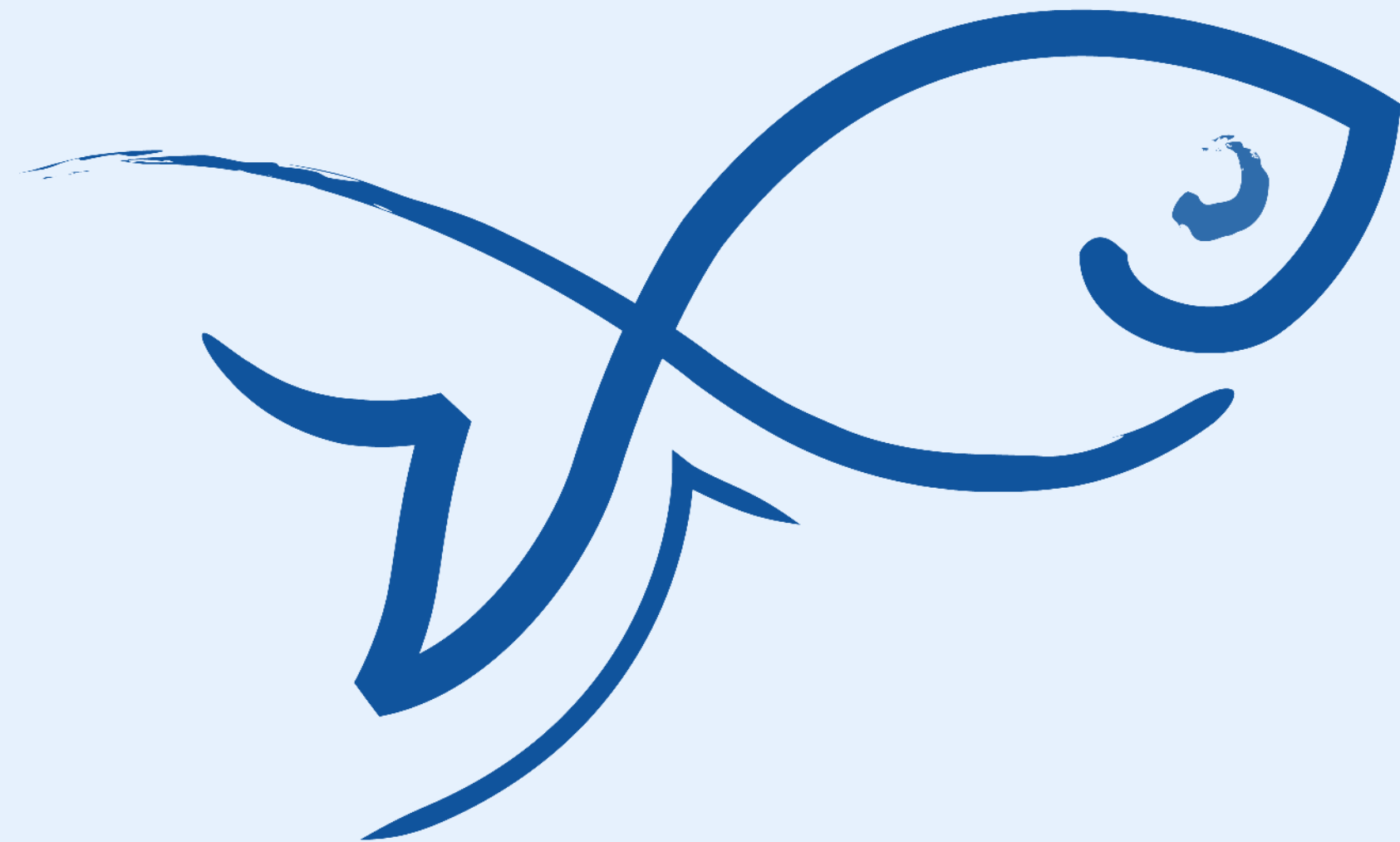
Ministry of Agriculture
and Maritime Fisheries



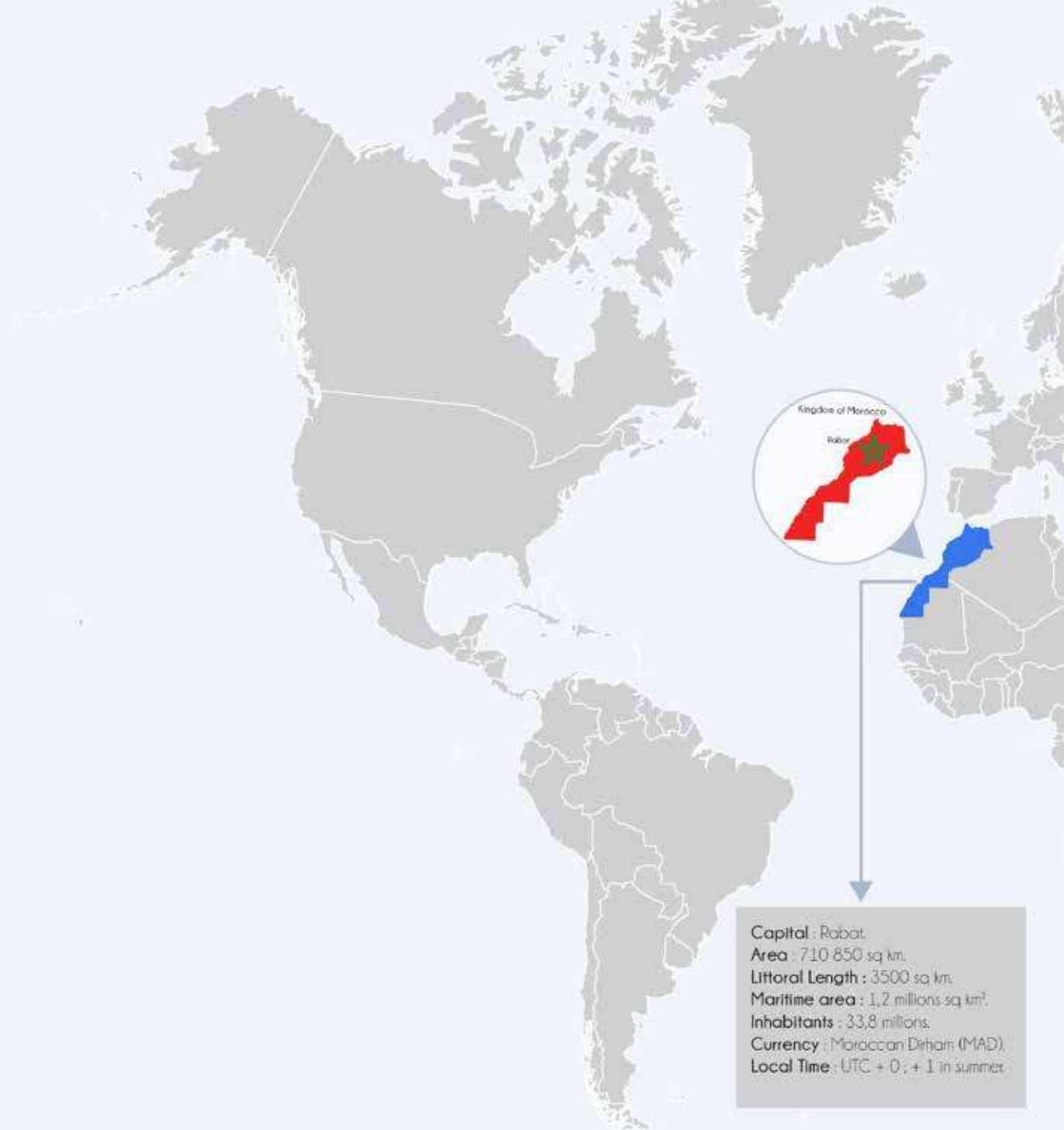
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Moroccan
sea food
Buyer's Guide







Capital : Rabat.
Area : 710 850 sq km.
Littoral Length : 3500 sq km.
Maritime area : 1,2 millions sq km.
Inhabitants : 33,8 millions.
Currency : Moroccan Dirham (MAD).
Local Time : UTC + 0 ; + 1 in summer.







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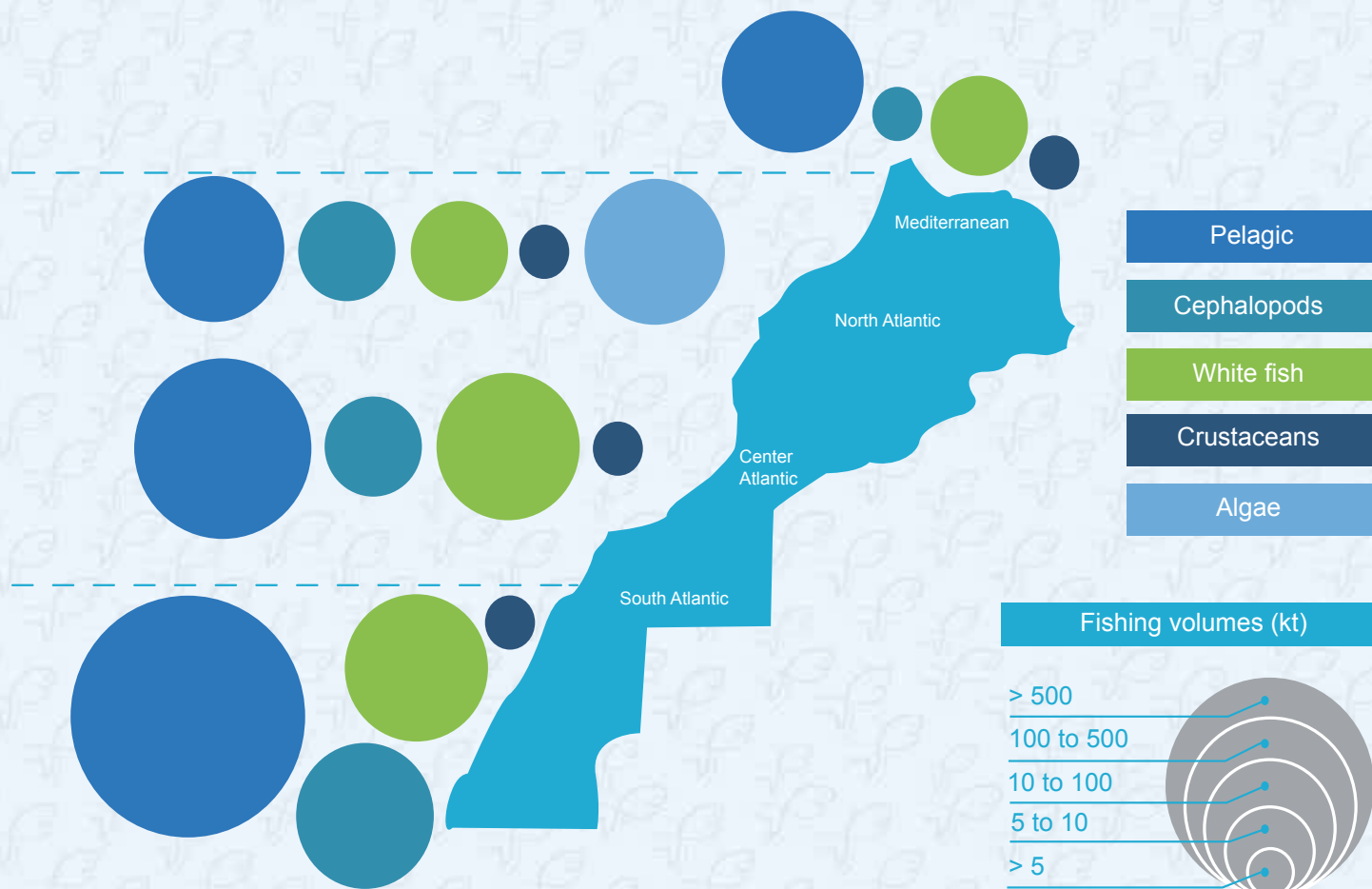
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Fish wealth

A national patrimony

With over 3 500 km of coastline and a strategic location, the crossroads of cold currents combined with the Canary Upwelling, Morocco presents a rare diversity of marine environments for a wide variety of fish, molluscs, crustaceans and shellfish.



➤ A strategic geographical position

» The Mediterranean asset: the exceptional ecosystem

Morocco's Mediterranean coast is exceptional in more than one way. It houses not only a rich and varied aquatic heritage, but also physical and biological environments of great value. Many conditions are gathered for the productivity of its marine ecosystems.

No wonder that, as we know that the surface waters of this coast are classified among the richest in oligotrophic nutrients. Characterized by significant tides that maintain the biological process of recycling nutrients such as nitrogen and phosphorus, wildlife and the Moroccan Mediterranean marine flora offer a wide diversity of species.

» Atlantic advantage: the influence of the Upwelling

The Moroccan Atlantic coast has a considerable advantage: it is subject to the influence of coastal upwelling (English term for the upwelling of deep cold waters rich in nutrients to the surface of the ocean). Thus, when brought to the surface, the nutrients feed phytoplankton, which also uses the dissolved carbon dioxide for photosynthesis.

This has a direct positive impact on the abundance and distribution of fish stocks. The trade winds strongly influence the flow upwelling. This is reflected in turn on the abundance and availability of fishery resources.

Area 1: between 32.2 and 35.6 ° N

The upwelling in this area is low (average intensity is about 1.19 ° C). This area is subject to less intense Coastal winds and more often facing the continent. However, in this zone, the upwelling shows strong seasonality, with very low activity during the cold season.

Area 2: between 28 and 32 ° N

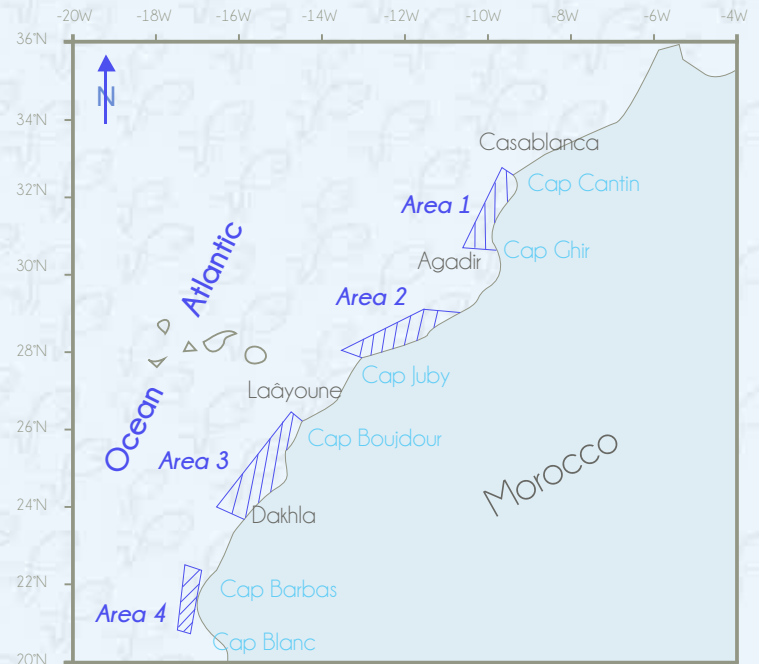
The index of upwelling in the area is higher compared to the first area (average value to 2.2°C) with low activity in March followed by a maximum activity between June and September and can be extended to October.

Area 3: between 25. 5° N and 28° N

The intensity of the indicator increases slightly compared to the previous zone (average intensity around 2.8°C). Zone 3 has an ascending activity from April to September and there is minimal enough net activity in the months of November and March. However, this minimum activity remains high and comparable to zones 1 and 2, which gives the upwelling in this area a permanent feature.

Area 4: between 21 ° N and 25.5 ° N

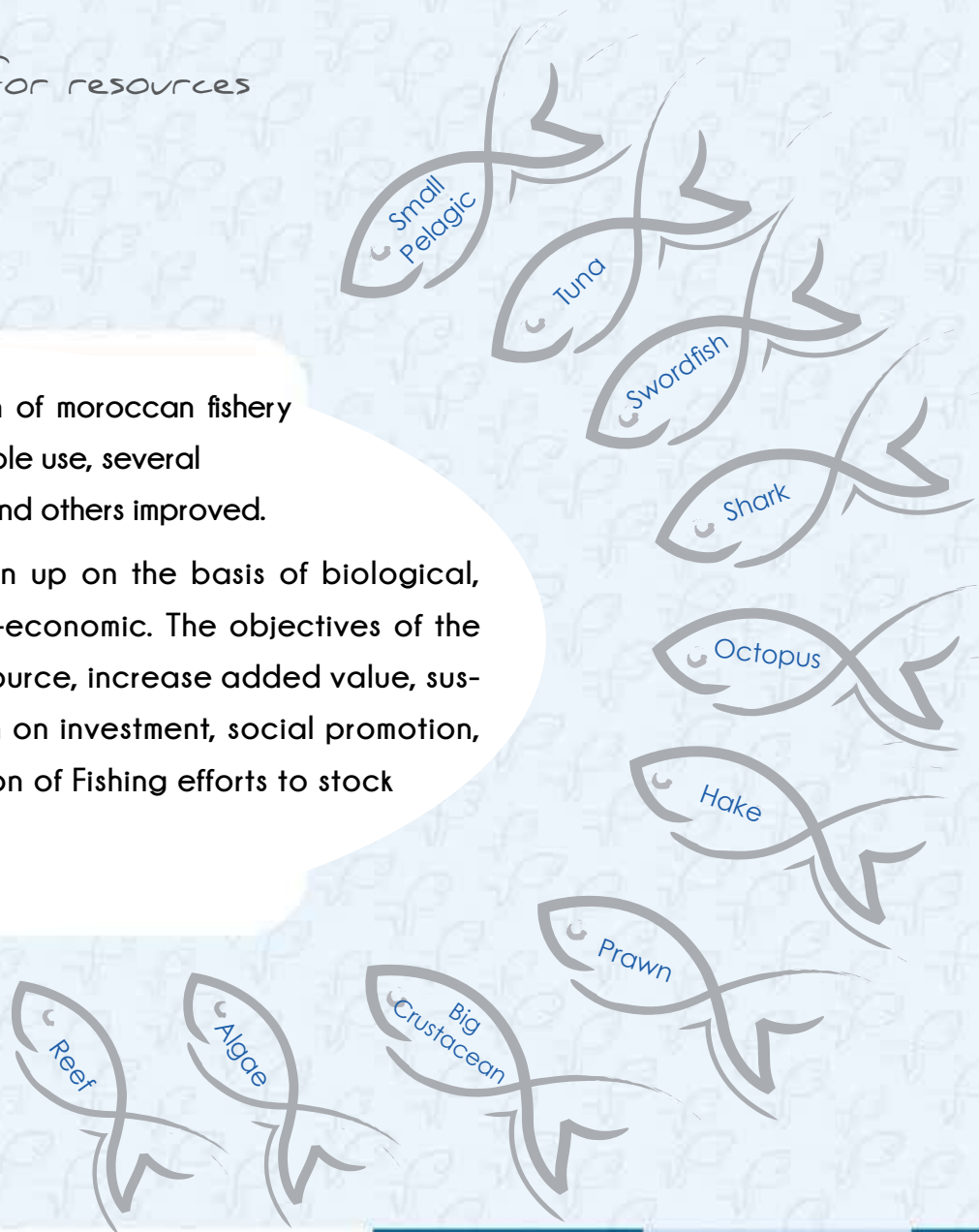
This area is the site of the meeting of the Waters Central Waters North Atlantic and Central South Atlantic. The index of upwelling in this region is the highest in all areas (average of 3.5° C). It has a bimodal distribution with a secondary peak in May-June and a main peak in September-October.



➤ Management plans for resources sustainable management

As part of the policy of conservation of moroccan fishery resources and to ensure their sustainable use, several development plans were developed and others improved.

These development plans are drawn up on the basis of biological, environmental, technical and socio-economic. The objectives of the plans are set up to preserve the resource, increase added value, sustainability of the business, the return on investment, social promotion, improving knowledge and adaptation of Fishing efforts to stock status.



➤ A suitable logistics and supporting figures

Morocco currently enjoys a worldwide reputation which ranks the kingdom among the greatest countries in maritime fishing. This honourable position was made possible thanks to its powerful fishing fleet as well as its port and commercial infrastructure distributed along its coastline, this without forgetting its enhancement industry that has made innovation and competitiveness its credo.

Fishing Fleet :

- Artisanal : 15 594 boats.
- Coastal : 1 725 coastal vessels.
- Offshore : 303 offshore vessels.

Infrastructure :

- Port :
 - 22 fishing ports,
 - 40 points built (including 30 landing points equipped, 6 fishing villages and 4 under construction sites).
- Commercial :
 - 10 wholesale Markets (3 of which are being studied at the city of Inezgane, Tangiers and Tetouan),
 - 62 wholesale fish market (including 11 of new generation),
 - 9 Grading Counters of the Industrial Fish.

Valuation Industry :

Land treating	393 units	Fresh	47	Semi-conserving	36
		Freezing	186	Flour & oil	21
		Conserving	47	Other	56
Freezing in sea	303 units				

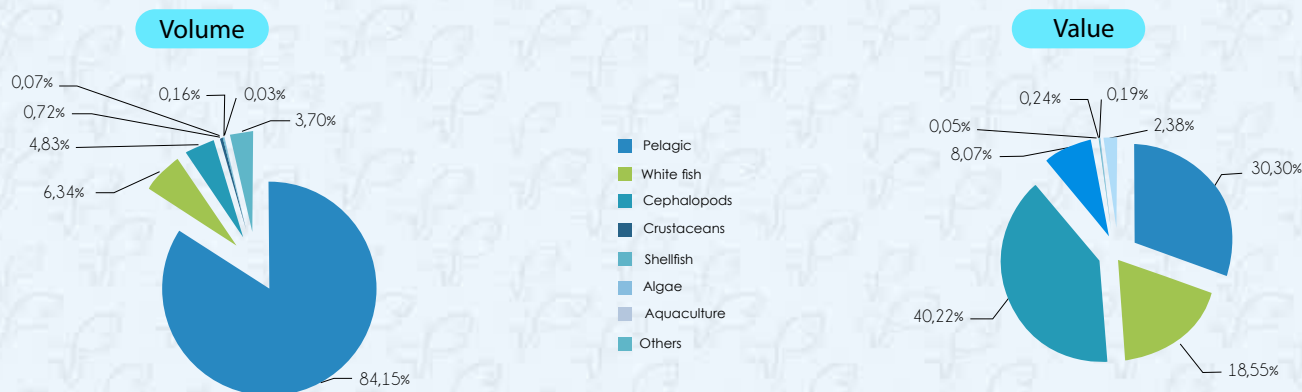
Reference year : 2014

► Diversified production and large export potential

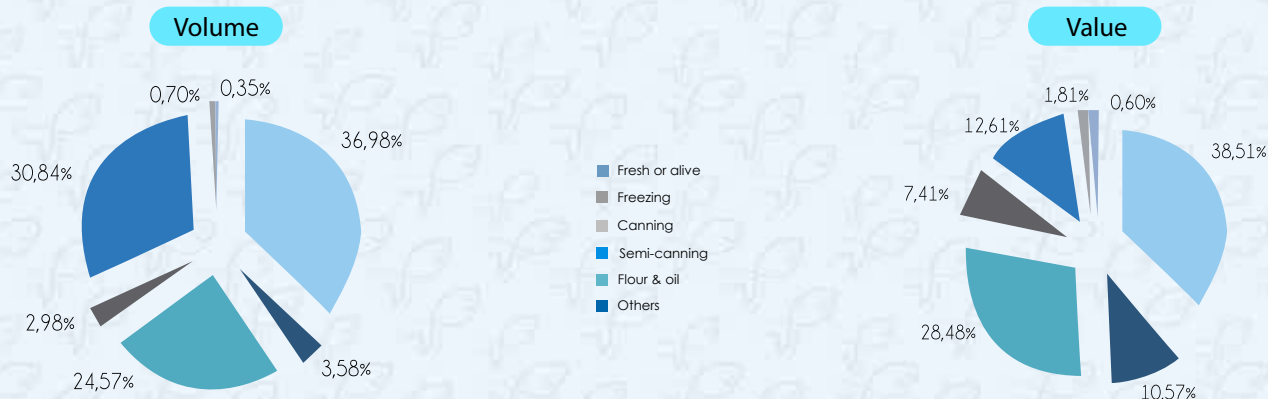
All the professionals are unanimous: the Moroccan coast are among the richest in the world! With over a million km of exclusive economic zone, the Kingdom is among the leading producers of sea-food in the world.



Moroccan fish production is around 1.7 million tons, worth more than 10 billion dirhams, distributed as follows:



As the largest exporter of sardines, including the *Sardina pilchardus* (Walbaum, 1792), Morocco has a great potential to export seafood products on an international level. Morocco's exports of seafood are around 590 300 tons, with a turnover of 17 billion dirhams, distributed as follows :



Reference year : 2014

➤ A country of a thousand and one species

The kingdom of Morocco is so proud of its fish resource which includes around a hundred species that can be commercialised, divided into six major categories :

- PELAGIC,
- WHITE FISH,
- CEPHALOPODS,
- CRUSTACEANS,
- SHELLFISH,
- ALGAE.

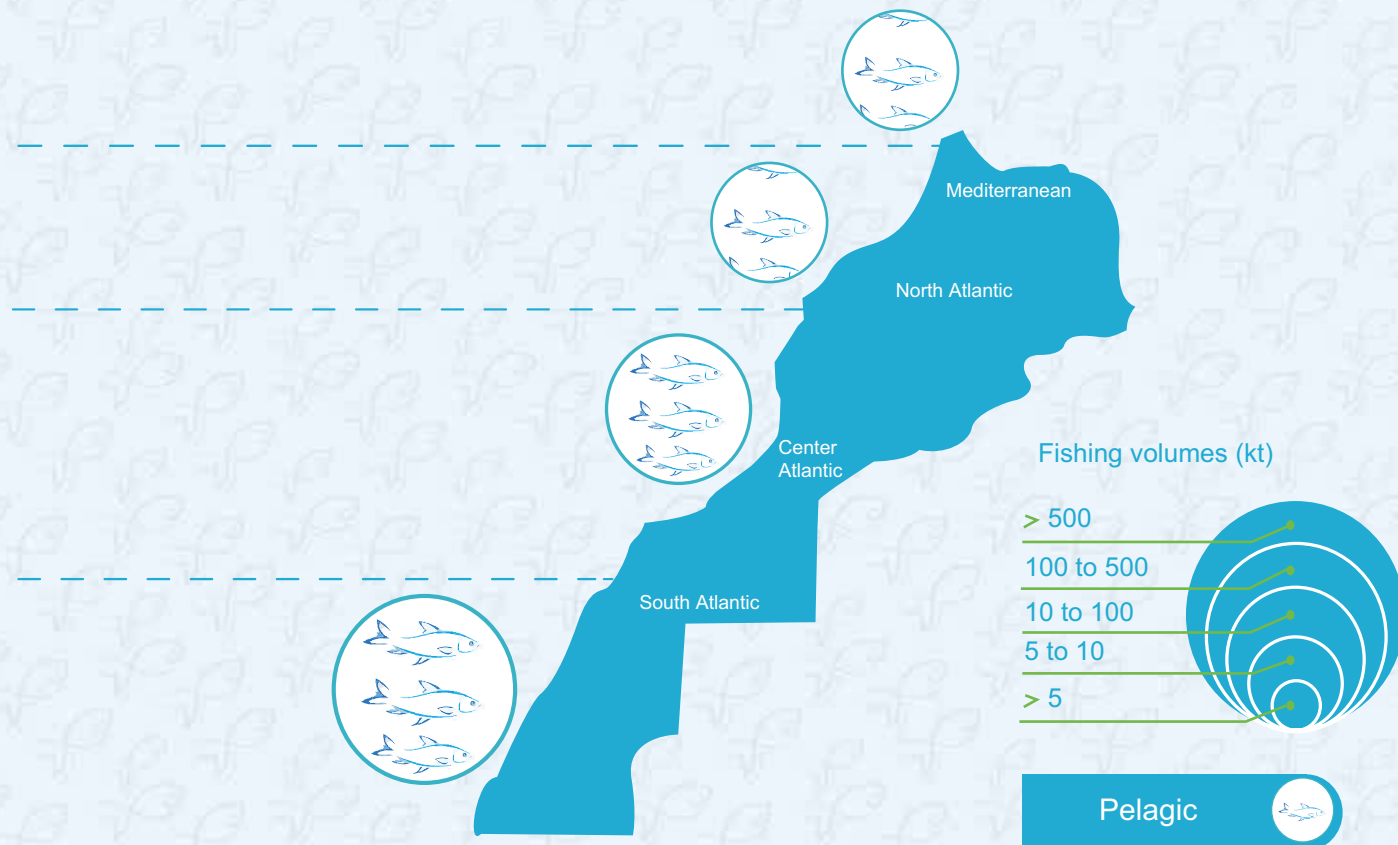




Pelagic

Abundant, sustainable and nutrient

Sardine, Anchovy, Mackerel, Tuna, Swordfish, ... in their highly protected marine environment of the 3 500 km of Moroccan coasts, the species called «pelagic» express both the authenticity and typicality of Morocco's national species and also a very significant resource.

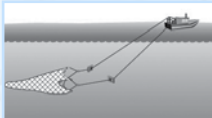


➤ Fishing techniques for all pelagic

The fishing techniques used for this type of fish are :



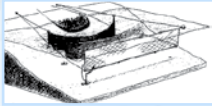
Semi-pelagic trawl : this type is designed to run a certain distance above the bottom. In comparison with the bottom trawl, the semi-pelagic trawl is characterized by a more or less big part of its rigging which is not in contact with the bottom (fork, panels or bead) so that it becomes sometimes possible to pass the trawl slightly above the bottom.



pelagic trawl : The pelagic trawl is a towed net which evolves into the deep water between the surface and bottom, without being in contact with it. As for bottom trawling, there are simple pelagic trawls towed by a single vessel and pair trawls towed by two trawlers



Gill net : The right gill net is a rectangular fishing net propped vertically in water. Floats are attached to the upper part. The lower part is weighted to maintain the threads in vertical position.



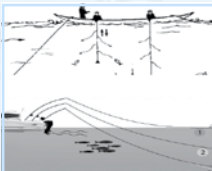
Beach seine : This is a vertical net, rectangular wet arc by a boat starting from the shore to return to after bypassing the shoal. The seine shore hauling is done using two long arms.



Purse seine : It is a rectangular net which is used to surround a shoal of fish, and closed at its base by a slider. Thus, the fish is trapped inside the net that takes a cylindrical shape and then tapered. The fish is hauled aboard with a landing net called brailer.



Longline : This is a long line which includes a main line on which are fixed numerous hooks through branch lines of variable length and spacing depending on the species sought and type of long lining.



The lines : Handheld : Generally in monofilament and is held directly by hand, weighted at the bottom and used for fishing close to the bottom or mid-water: mounted on one or two canes.

Trolling : Simple line provided with natural or artificial bait (lure) and dragged by a boat near the surface or at a certain depth.



Trap : Fixed gear anchored to the bottom usually containing a guide net that leads bluefin tuna in an enclosure or series of enclosures where they are kept until they are killed.

► Plan for resources preservation

In order to preserve the pelagic fish resources and ensure their sustainability, several plans have been put to use.

Development plan for small pelagic

Development plans of small pelagic were designed on the basis of biological, environmental, technical and socio-economic data. The objectives of these plans are the preservation of this resource through rational exploitation of this fishery and increased its valuation.

The management plan for small pelagic fisheries concerns three fisheries in three areas: The North-Mediterranean, The Atlantic Centre and The Atlantic South.





Tuna fishing management plan

The development plan of the tuna fishery aims at a sustainable, fair and responsible exploitation of this species, and is part of Morocco's commitments vis-à-vis the provisions of the International Commission for the Conservation of Atlantic Tunas (ICCAT).

Morocco is a crossing point for bluefin tuna during its Atlantic spawning migration to the Mediterranean sea and on its return from the Mediterranean to the Atlantic (trophic migration). This plan reinforces the application tracking system of national and international management measures (ICCAT).

Swordfish management plan

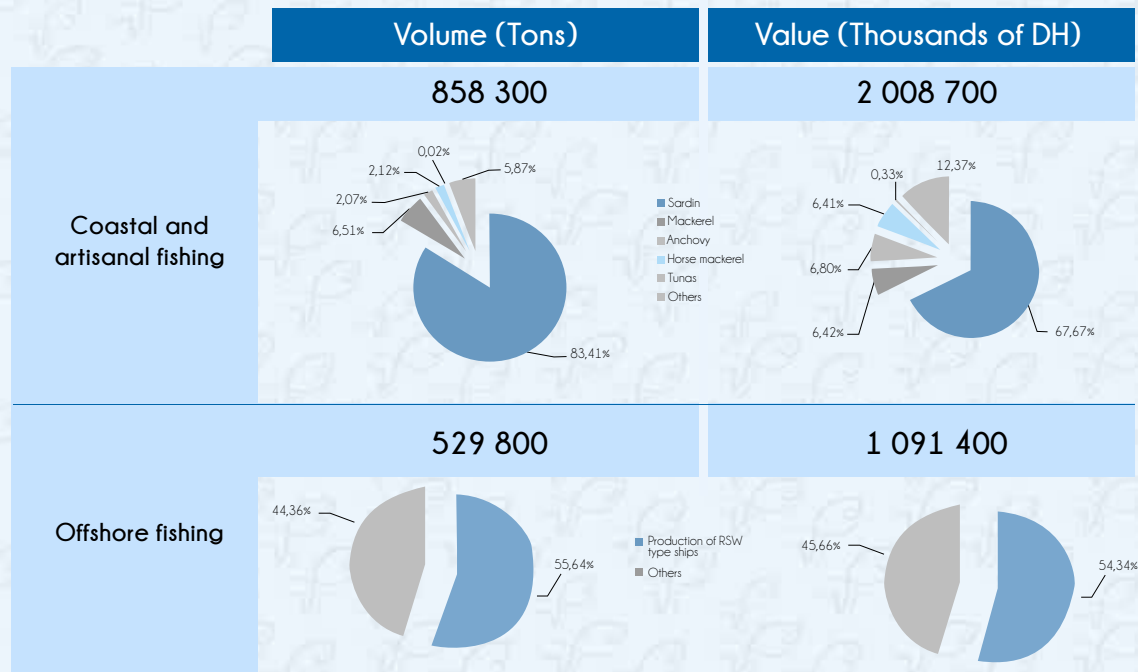
The swordfish in the Mediterranean and Atlantic Management Plan defines management measures to comply with Morocco's commitments vis-à-vis the International Commission for the Conservation of Atlantic Tunas (ICCAT) and guarantee maximizing socio-economic benefits from the exploitation of this resource.

Shark fishing conservation plan

The management plan for the fishery for sharks aims the preservation of these species. The established management measures concern the conservation and management of these shark species, monitoring of fishing activities of vessels targeting these species and the establishment of commercial traceability of liver oil and shark fins.

➤ A great production

The production of pelagic is about 1.4 million tons, worth 3.1 billion dirhams, close to 85% of the national fisheries production, distributed as follows:



Reference year : 2014



► Pelagic valued in different ways

Whether processed either at sea aboard ships transformers or in shore plants, the Moroccan pelagic are found in diverse preparations that lead to very varied finished products and quality.

The pelagic processing units, approved by the Department of Marine Fisheries, integrate the HACCP (Hazard Analysis Critical Control Point) system in their manufacturing process.

These units adopt standardized practices that ensure quality in accordance with the specifications of their clients. They ensure maximum value from the fishing of pelagic to ensure high quality products.



TYPE	SPECIES	PREPARATION	PRODUCT
Fresh	Sardine, mackerel, anchovy, tuna, bonito, swordfish, mullet, scad, sword, small sardine	whole, fillet, prepared (cleaned, headed, gutted, tailed)	
Conserved	Sardine, mackerel, anchovy, tuna	Whole, skinless, boneless, dumpling, pellets, fillet, chopped up, crumb, emulsion,	Natural, with olive oil and/ or sauce of mustard, and/ or with garlic, and/ or with hot pepper or pepper. With soya oil and Tabasco. With vegetal oil and/ or lemon, spices, and/ or vegetables. With tomato sauce, without salt and with water, or with spiced water, tain with hot sauce, escabeche with water and vinegar, not skinned with tomato and cream, with brine, with spicy oil, with spicy tomato sauce, with ketchup sauce, French fries, marinated
Semi conserved	Sardine, anchovy	Whole, fillet, chunks, kebab, terrine	French fries, marinated naturally or in oil or vinegar, spiced with vegetal or olive oil, elongated vacuum or with olive or vegetal oil, rolled with stuffed olives, or with spiced sauce, or with olive or vegetal oil, with salt or herbs, in brine in barrel
Frozen	Sardine, mackerel, anchovy, tuna, swordfish, mullet, sword, small sardine	whole, fillet, marinated, beheaded,	
Others	dried, salted or in brine, flour and oil, charcuterie, cooked dish, liver and eggs.		

➤ A diversity pelagic fish

The pelagics are considered as a considerable sea resource, given the diversity of the listed species. Tasty pleasure and conviviality, culinary tradition and modernity, simplicity and quick preparation, natural authenticity... Many features displayed by small and big Moroccan pelagics



Sardine :

Sardina pilchardus

With a silver and slender body along with a white belly, this small pelagic size varies from 15 to 20cm.

Sardine is a gregarious fish that form large shoals near shore, not really deep, around 15 to 55m deep.

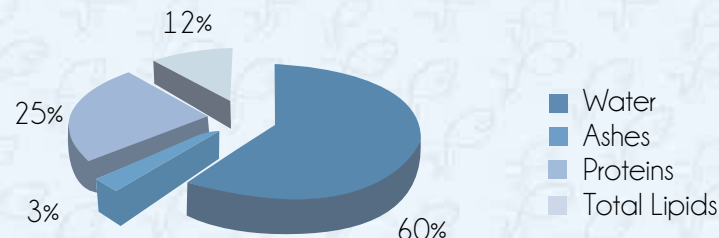
The health side:

This is one of the best sources of omega 3, rich in interesting micro nutrients for health: calcium, selenium, phosphorus, vitamin D and group B.

The nutrition side :

For 100g of Sardine

Energy intake : 208 Kcal





European anchovy : *Engraulis encrasicolus*

Locally called Lanchouba, the anchovy has an elongated and slender body. The back is blue-green, flank and belly are silver and blue-gray stripe sometimes extends between the back and flanks. The anchovy fish lives in shoals in mid-shallow waters. Its behaviour is similar to that of the sardine.

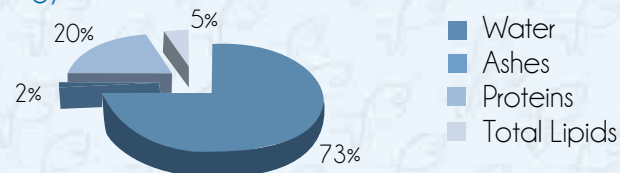
The health side :

real «health-food» widely provided in Omega 3, minerals and trace elements, the Moroccan anchovy provides valuable vitamins in non-negligible quantity, and protein of a high nutritional value.

The nutritional side :

For 100g of Anchovy

Energy intake : 131 Kcal



Chub mackerel : *Scomber colias*

Locally called Kabaila, the mackerel is distinguished by a blue stripes streaked body and a white belly. It has a common size of 18 to 30cm. This species is gregarious and form shoals of fish of the same size. It is «epipelagic» or «meso-demersal» (demersal means fish living near bottoms): it lives indeed in deep waters in winter and near the coast in spring.

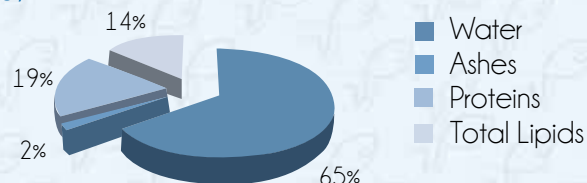
The health side :

Highly valued for its flesh, the Moroccan mackerel is rich in B vitamins and vitamin D, as well as in several minerals such as selenium, iron and iodine; it is also, of course, a source of omega-3 fatty acids.

The nutritional side:

For 100g of Mackerel

Energy intake : 205 Kcal





Atlantic bluefin tuna : *Thunnus thynnus*

Large pelagic fish characterized by the red colour of its flesh. This is one the largest species of tuna. It has a common length of 50 to 1m50, but can grow up to 3m; its weight in adulthood is of the order of 400 kg.

Bluefin tuna is a spike and mesopelagic species. Young tuna are held in warm waters, adults penetrate into cold water to feed.

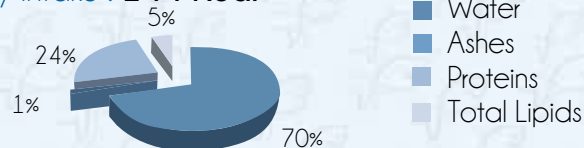
The health side :

Less fat than what is generally believed, low in calories, Moroccan bluefin tuna contains the famous Omega 3 which play an important role in preventing cardiovascular disease and some cancers.

The nutritional side :

For 100g of Bluefin tuna

Energy intake : 144 Kcal



Swordfish : *Xiphias gladius*

It is a highly migratory large pelagic, remarkable for its large flattened rostrum. In adulthood, it can weigh hundreds of kilos and measure over 4m50, its common size is 80cm to 3m50. The swordfish is an oceanic species, spike and mesopelagic, of 0 to 800m depth. It usually lives alone, but can be found sometimes in small groups. It migrates between temperate and cold waters (nursery areas) and hot water (spawning areas).

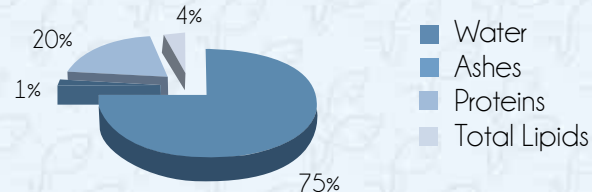
The health side :

Moroccan swordfish, low in calories, is a rich source of minerals such as phosphorus, iron, potassium and phosphorus, and various vitamins, especially B12, B6.

The nutritional side :

For 100g of Swordfish

Energy intake : 121 Kcal





➤ How to detect the freshness of the Moroccan pelagic?

A pelagic fresh is recognizable though :

The smell : odour resembling the sea and algae.

The overall look :

- No stains without damage,
- Bright colours,
- Round eye clear and transparent,
- Ebrilliant Scales and do not stand by themselves,
- Dos dark and light belly and a bright metallic luster,
- Firm body and soft flesh and elastic,
- Skin shiny and slippery to the touch.

➤ The minimal commercial size :

Sardine	30 to 45 Units / kg according to zones
Anchovies	60 units / kg
Mackerel	20 units / kg
Horse mackerel	14cm
Small sardine	20cm
Bluefin tuna	30 Kg
Swordfish	in the Mediterranean 90cm and 25 kg or 125cm in Atlantic
Common saber	50cm



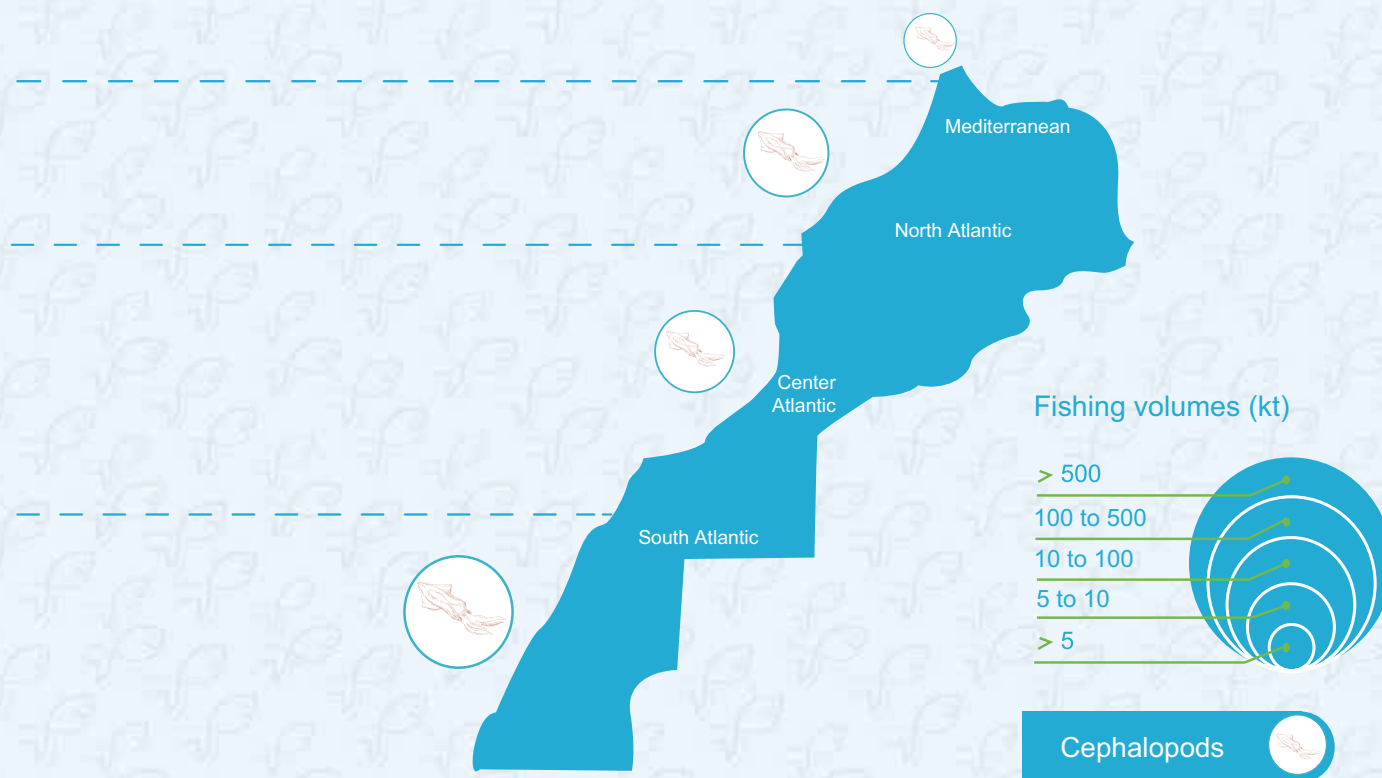
Cephalopods ...

Natural and healthy, a world-class food.

Packed with tons of flavours and full of originality, cephalopods are among flagship species of the Moroccan fishing heritage.

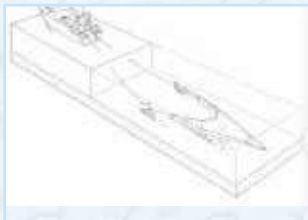
The term cephalopod refers to highly evolved species of molluscs, they are characterized by their intelligence and their ability to adapt to the environment.

The main species of cephalopods in the Moroccan seas are the octopus, the squid and cuttlefish; Octopuses have 8 tentacles of the same length, the squid and cuttlefish have 10 (8 short and 2 very long).

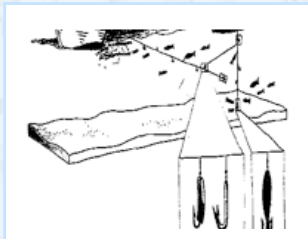


➤ Tailor made Fishing Techniques

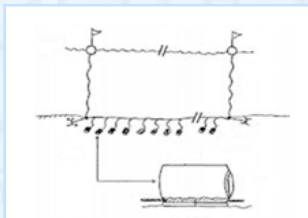
Fishing gear targetting these species are bottom trawl, lures, octopus pots and lures lines.



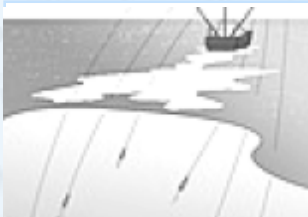
Bottom trawling : It is a cone-shaped net towed by a ship. It is connected to the boat by steel cables called warps. Otter boards located in front of the trawl allow its horizontal opening. Cables called arms link the trawl panels.



ligs (kerracha) : fishing gear used in fishing for octopus, formed from a rigid line on which fixed several hooks. these hooks should not be placed exclusively at the end of the line in ring forming a grapple.



Octopus pot : (Ghourraf) it is a cylindrical machine open at both ends and placed on file on the seabed to trap octopus.



Lures lines : this fishing techniques uses lures on a vertical line being stirred up and down by hand. It is used at night and it is efficient to capture squids which are attracted by lights and reflections.

► Plan for resources preservation

The management plan of octopus fishery aims at preserving and recovering the stock of octopus, consolidating the investments made in the fishery to a level ensuring the profitability and sustainability of stakeholders, and maximizing socio-economic benefits that emerged from this fishery.



The Octopus fishery development plan for the south of Sidi Lghazi

The current management system of the octopus fishery is organized in two fishing seasons, «winter and summer» and two periods of fishing for widespread throughout national coastline (spring and fall).

The exploitable overall quota is fixed for each fishing year following the National Institute of Fisheries Research (INRH) surveys and divided into three segments (artisanal, coastal and offshore fishing) targeting this resource in accordance with the scale laid down in the 2004 matrix.





The 2004 Matrix is a platform for development, management and operation. It defines for each segment, the technical measures for this fishery, fishing effort, fishing grounds. The management measures, the country resumed conditions (overall TAC «Total Allowable Catches», quota per segment, fishing area, authorized gear ..) and periods of fishing judgment in the management unit of the fishery are established after review of the INRH.

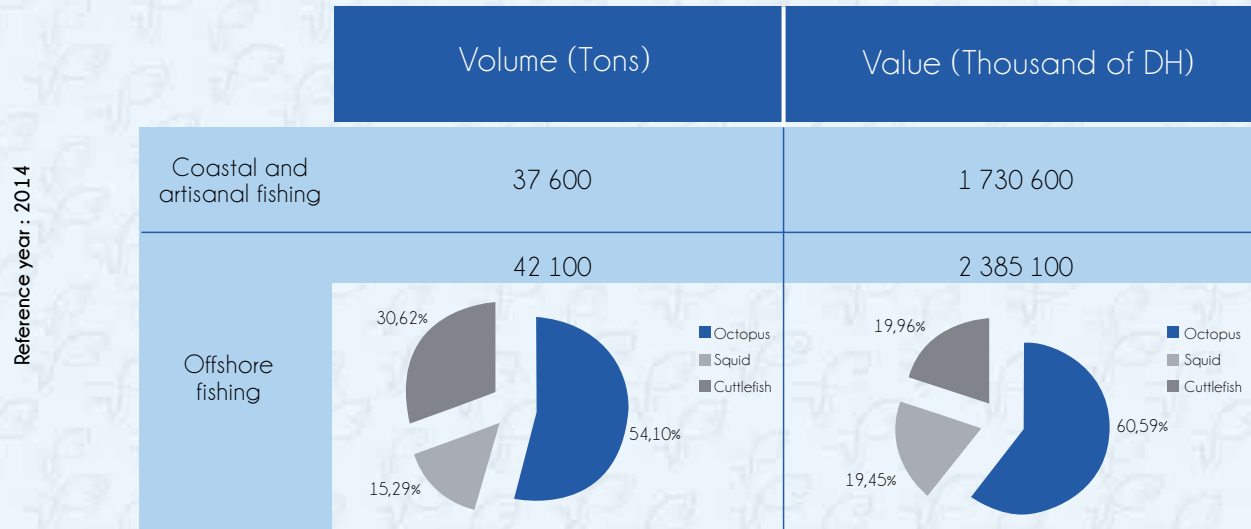


The Octopus fishery development for the north of Sidi Lghazi

To enable an efficient organization of the octopus fishing activity, and to ensure a sustainable and rational exploitation of the octopus fishery in the north of Sidi Lghazi and to fight against the illicit circuits, the Department of Marine Fisheries has launched since 2010 a set of management measures, including the determination of octopus catch limits per maritime district and stopping fishing along the national coastline. These measures were accompanied by other provisions to fight illegal fishing.

➤ A worthwhile production

Morocco's production of cephalopods attains 80 000 tons, which represents more than 4 billion dirhams, almost 43% of the overall value of the national fisheries production that is distributed as follows:



➤ Moroccan Cephalopods valued

The valuation of cephalopods in the Kingdom of Morocco consists of different ways, such as freezing, which is the main activity, in addition to fresh packaging and the cooking or marinating-based packaging.

The major concern of Moroccan manufacturers is to provide a high quality product meeting the customers demands, including the preservation of the product's safety and its organoleptic and nutritional qualities.

To provide a product of high quality meeting customer requirements, along with preserving the safety of the product and its sensorial and nutritional quality, the Moroccan industrial exploitation of cephalopods relies on processes and production techniques at the cutting edge of progress that meet the highest standards of quality and safety. They are all licensed by the Department of Maritime Fisheries and are subject to monitoring and regular follow up. All these units adopt HACCP (Hazard Analysis and Critical Control Point) to assess and control hazards that threaten food safety.

TYPE	SPECIES	PREPARATION
Fresh	Octopus, squid, cuttlefish	Whole, prepared (cleaned, cut out)
Preserved	Octopus, squid	Marinated, cooked
Frozen	Octopus, squid, cuttlefish	Whole, prepared (cleaned, cut out)



➤ A variety of cephalopods

By being iconic products of the Moroccan cephalopods diversity, species like the octopus, the squid and the cuttlefish in particular, express both the authenticity and typicality of Moroccan fisheries resources.



Common octopus : *Octopus vulgaris*

It is the most advanced species of molluscs. The octopus has a soft body, globular tapering slightly at the junction with the head. It is covered with mucus, devoid of internal fin and shell. It has arms attached to the head, located around the mouth and has two rows of suckers. The town mantle length is 10 to 23cm. It is a coastal benthic species, which can go down to 100m depth. It lives in solitude in rocky and sandy bottoms.

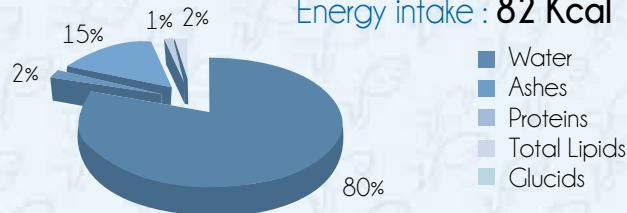
The health side :

The Moroccan octopus is very good for the body's good shape, it is very rich in protein while being low in fat. It is thus recommended as part of a reduced calorie diet or, more generally, for light and balanced meals.

The Nutritional side :

For 100g of Octopus

Energy intake : 82 Kcal





European squid : *Loligo vulgaris*

This cephalopod has an elongated body with case and sharp at its rear end, with two lateral fins, and has a thin inner bone, which looks like a nib. The octopus mantle's size is 15 to 25cm. Its head, although distinct, is crowned with 10 arms, muscled and have suckers, two of which are larger for prey capture. The squid is a semi-pelagic species, performing seasonal vertical migrations between 20 to 250m depth.

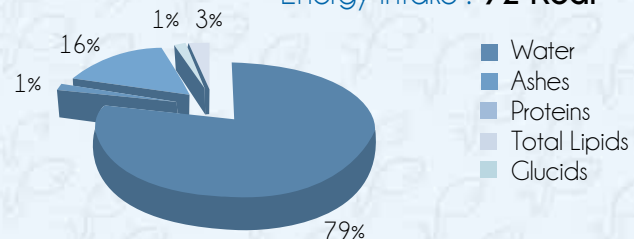
The health side :

It provides many nutrients, as well as a significant source of protein, iron, vitamin D and omega-3 fatty acids, necessary for the balance of our health.

The nutrition side :

For 100g of Squid

Energy intake : 92 Kcal



➤ How to detect the freshness of the Moroccan cephalopod?

A cephalopod fresh is recognizable though :

The smell : Pleasant reminiscent of the sea.

The overall look :

- Translucent flesh and firm to the touch,
- Brilliant color, pearl white,
- Resistant Tentacles,
- Thick body,
- Arm with a pearly, firm appearance.

➤ The minimal commercial size :

Octopus	400 g / 1 non-eviscerated octopus 300 g / 1 eviscerated octopus
Squid	11cm length of the eyes to the end of the caudal fin
Cuttlefish	100 g / 1 non-eviscerated squid

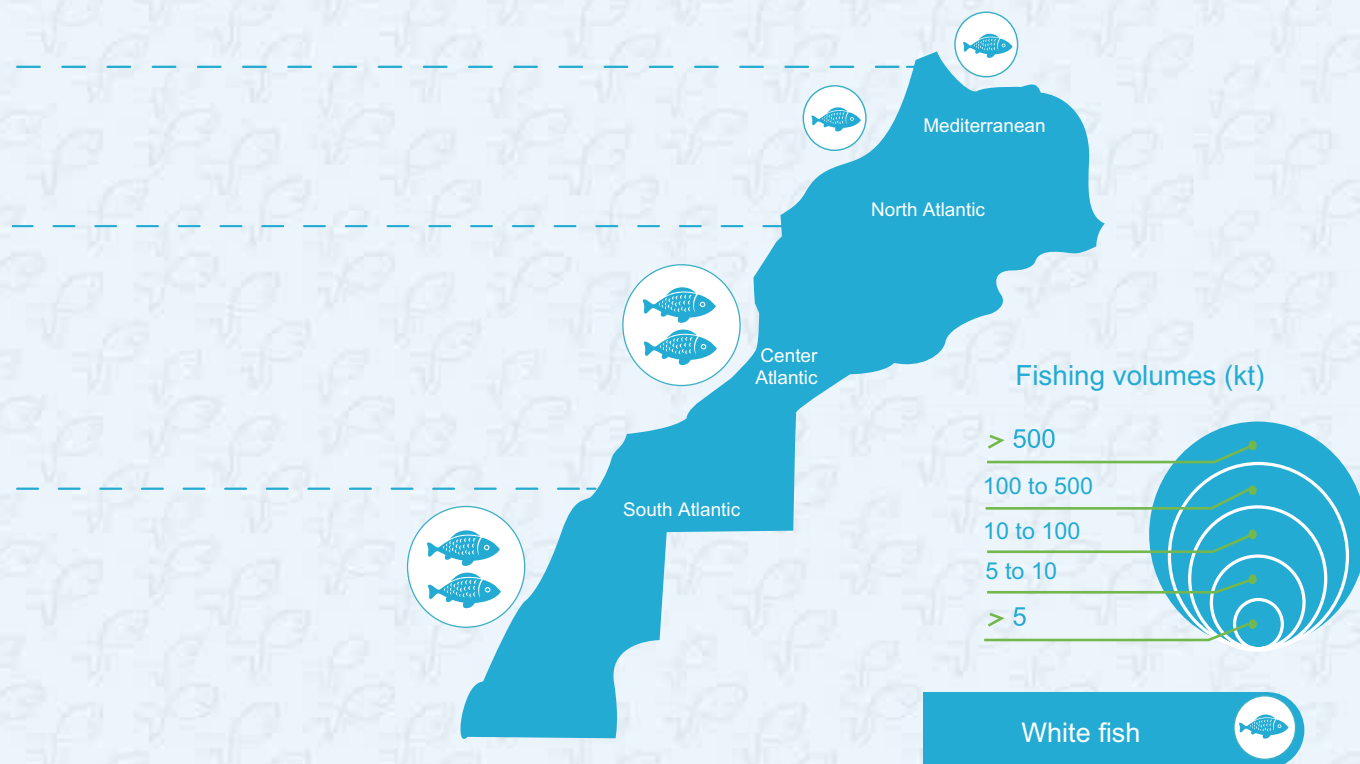
A photograph of three whole fish, likely sea bream, arranged on a white surface. The fish in the foreground is dark grey with a prominent dark spot on its side. The fish in the middle is reddish-pink with a lighter spot on its side. The fish in the background is dark grey. Fresh green herbs are visible in the top left corner.

White fish

A diverse species, a multitude of flavours

White fish, which is an iconic product of the national fisheries, and living in the Moroccan coasts, is appreciated a lot on the market of fresh fish.

The term “white fish” is a common designation for many species of demersal fish. The most traded species in Morocco are bream, sole, pandora, hake and John dory.

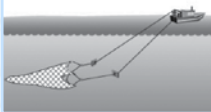


► Fishing Techniques adapted to all species

Fishing techniques used are targeting these species :



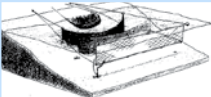
Bottom trawling : It is a cone-shaped net towed by a ship. It is connected to the boat by steel cables called warps. Otter boards located in front of the trawl allow its horizontal opening. Cables called arms link the trawl panels.



Semi-pelagic trawl : trawl designed to operate at a distance from the bottom. In comparison with the bottom trawling, it is characterized by a more or less large part of its rigging which is not in contact with the bottom (forks, panels or bead) so that it is sometimes possible to get the trawl slightly above the bottom.



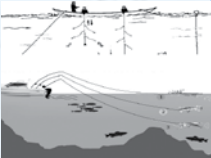
Gill net : The right mesh net is a rectangular fishing net propped vertically on the bottom or kept at a distance from it, using grappling hooks or weights sufficient weight to maintain the gear in place. It is reported to the surface by buoys connected to tether (strings).



Beach seine : This is a vertical net, rectangular pulled as an arc by a boat leaving the shore to return to it after bypassing the shoal. The seine shore hauling is done using two long arms.



Longline : This is a long line which comprises a mother line on which numerous hooks are fixed through branch lines of variable length and spacing depending on the targeted species and the type of long lining.



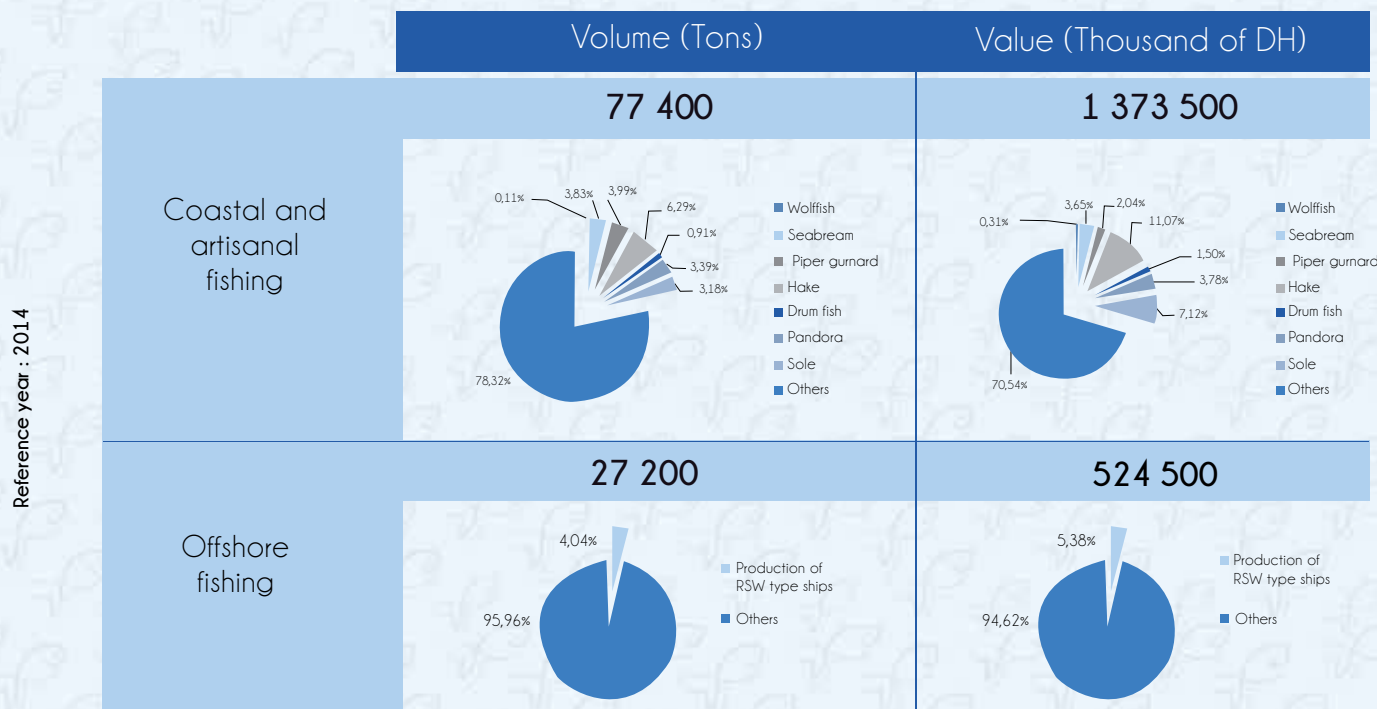
Lines : Handheld : Generally in monofilament and is held directly by hand, weighted at the bottom and used for fishing close to the bottom or mid-water: mounted on one or two canes.
Trolling : Simple line provided with natural or artificial bait (lure) and dragged by a boat near the surface or at a certain depth.

► Management and Sustainability

Implemented since 2015, January the 1st, the development plan for hake species fishery proposes measures about hake spawning and recruitment areas, through the setting up of cantonment sites, management units...

➤ A diversified production

The production of white fish is around 105 000 tons, and it's worth almost 1.9 billion dirhams, nearly 19% of the total value of the national fish production, distributed as follows:



➤ Moroccan whitefish valued

With a good quality and diversified raw material, the Moroccan whitefish valuating companies give great importance to the valuation process, from the receipt to the packaging of finished products, meeting the highest standards in safety and materials of security.

The whitefish valuation industry includes the activities of packaging fresh fish and freezing, to which are added few firms producing salted fish, dried fish or in brine.

TYPE	SPECIES	PREPARATION
Fresh or frozen	Saint pierre / Dent / Hake Sar / Sea Bream / Sole Pageot / Gurnard / red Scorpion fish / Monkfish / Conger / Bug Corb / Lean / Ray Rouget / Ombrine/ pagre/ Marbled / Bar / Turbot Whiting - Lotte / Kingklip Tabardillo / Croaker / Eel/ etc.	Alive Whole Fillet Prepared (cleaned, head cut off, eviscerated, stalk removed, ...)
Others		Dried, salted or in brine delicatessen Cooked dishes

➤ A variety of white fish

Growing in a protected marine environment, Moroccan fish have white flesh of fine texture, a wide range of flavours and a natural taste that transport you instantly to the Atlantic and Mediterranean seas of Morocco; a real treat!



European Hake : *Merluccius merluccius*

With its very slim shape, large head and relatively large eye, it has two dorsal fins that include only soft rays. The back is bluish gray, the sides lighter and the belly silvery white. It has a common size of 12 to 60cm and up to 130cm. It is a demersal species found in depths of 70 to 370m, up to 800m in the Mediterranean sea, and well known on the edges of the continental slope.

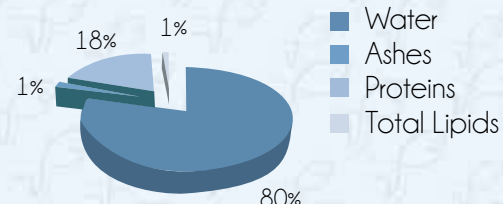
The health side :

Source of high quality protein, the Moroccan hake contains all nine essential amino acids for the human body. These proteins play a key role in the formation of digestive enzymes, hormones and tissues, such as skin and bones.

The nutritional side :

For 100g of Hake

Energy intake : 90 Kcal



Common Pandora : *Pagellus erythrinus*

Well appreciated on the local market. Its body is moderately high and laterally compressed, its common size is 20 to 50cm, with some specimen reaching the size of 90cm. The head is quite large and rather pointed with well developed pectoral fins. The back and sides are pink to reddish, the head has got purple reflections, the belly is white. During breeding, the body is iridescent with blue pigments.

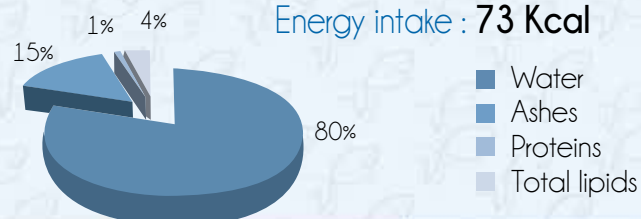
The health side :

Source of protein and rich in iron, Moroccan pandora is an excellent source of energy and digests very well.

The nutritional side :

For 100g of Pandora

Energy intake : 73 Kcal





Gilthead seabream : *Sparus aurata*

The royal Sea-bream has a silver-gray body, high and laterally compressed with a large black spot behind the lateral line and a golden band between the eyes (hence the nickname «Beauty with golden eyebrows»). This species becomes a female after a male life in the beginning, it is 20 to 50cm long, and may reach 75cm maximum.

It is a demersal, living on sea-grass depths, sandy and rocky depths and in areas of breakers. The habitat of adults is near the coast and up to 200m depth, and juveniles up to 30m.

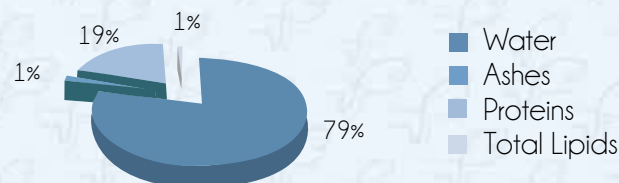
The health side :

Rich in minerals, the Moroccan sea bream is a good source of B vitamins, including B12. It also brings the vitamin E antioxidant. Its flesh is particularly well endowed with minerals and trace elements: potassium, phosphorus, iron, calcium.

The nutritional side :

For 100g of Gilthead seabream

Energy intake : 76 Kcal



Common sole : *Solea vulgaris*

It is a queen among flatfish. With a flat, elongated and oval body, its eyes are located on one side, which is a brown face with dark spots and bright spots, spread all over the body. The blind side is white. Its common size is 15 to 45cm and can reach 70 cm.

It is a «benthic» species (moving on the seabed) found in sandy and muddy bottoms. It lives in coastal waters, up to over 200m depth where their colour makes them difficult to detect.

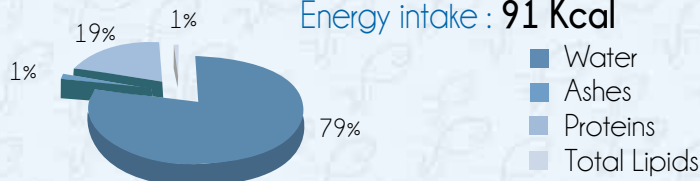
The health side :

Moroccan sole has a lean meat rich in vitamins and minerals essential to our well-being. This fish contains a significant amount of omega-3 fatty acids and protein.

The nutritional side :

For 100g of Sole

Energy intake : 91 Kcal





John dory : *Zeus faber*

The John dory, a noble fish whose body is high and strongly compressed laterally, has a common length between 10 and 50cm and maximum up to 68cm. The body is gray brown with golden hues and a large black spot encircled adorning the mid flanks. The dorsal and caudal fins are equipped with a double row of bony shapes on their base.

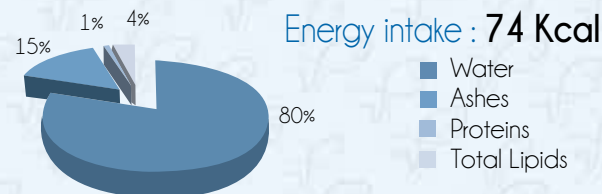
This is a species that lives alone or in small groups for juveniles. It attended the coastal waters of northern Morocco and can go down to 400m.

The health side :

One of the best sources of protein: This Moroccan fish contains all nine essential amino acids our body.

The nutritional side :

For 100g of John dory



European seabass : *Dicentrarchus labrax*

It is also called common Bar, Wolf, Darii, Lahrach or Bouchouk. It is a species of the Moronidae family. It has an elongated body, slightly compressed, silvery on the sides and silver-gray to bluish on the back.

Characterized by two distinct dorsal fins, the first is equipped with spines, while its forked tail fin and its head are covered on the top and side by scales called cycloids.

Its common size is 20 to 55cm and maximum up to 100cm.

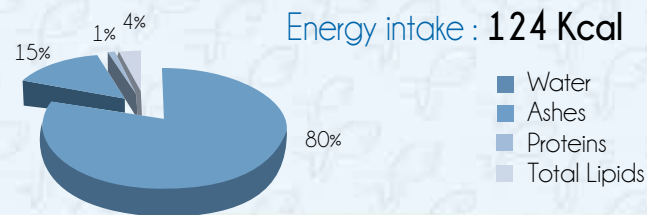
This is a fish that lives in coastal waters to about 200m depth, it often enters estuaries and rivers sometimes back.

The health side :

Moroccan bar is a lean fish, but brings beneficial fatty acids to health. Rich in protein, it offers good levels of vitamins, minerals and trace elements.

The nutritional side :

For 100g of European seabass





Red scorpion fish : *Scorpaena scrofa*

Also called Capon, this species, like other lionfish has a stocky body, large head, covered with many strips of skin. The eyes are big, its mouth is very wide and the tail has three dark stripes.

This species is characterized by the presence of skin flaps under the lower jaw and a black spot on the dorsal fin.

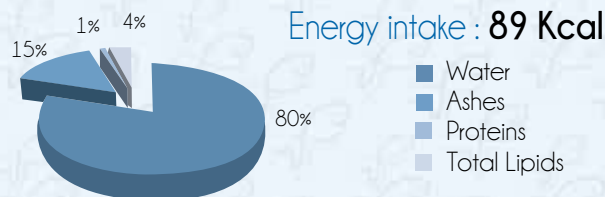
The back and sides are orange red with big plates of different shades that provides excellent camouflage. The red scorpion fish can reach up to 66 cm, its common size is 20 to 30 cm. It is a benthic species of rocky or muddy bottoms of the continental shelf and Posidonia meadows. It lives on the surface to 370 m depth but is most abundant between 20 and 100 m.

The Health side :

The Health side: A concentration of vitamin D, which is particularly essential for healthy bones and teeth, this Moroccan fish with tasty, firm flesh, is also an excellent representative of marine protein.

The nutritional side :

For 100g of Red Scorpion Fish



Undulate ray : *Raja undulata*

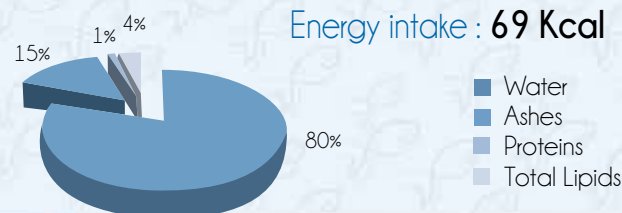
Locally called Raya, it has a lozenge body with slightly sinuous front edges and ends of rather rounded wings. The muzzle is short and obtuse. The body is extended by a long, thin, pointed tail which has two dorsal fins at one end and a reduced caudal fin. This species is brown to greenish and is characterized by the presence of dark lines lined with small white dots and the presence of two bright eyespots rimmed white quite close. It is a benthic species that lives on the surface to a depth of 300m on sandy bottoms. Its common size is 40cm to 60cm and 100cm maximum.

The Health side :

Moroccan ray essentially provides proteins. It contains little fat. The latter have a majority of polyunsaturated fatty acids and monounsaturated. It brings large amounts of micronutrients including vitamins B12 and B3.

The nutritional side :

For 100g of Undulate ray



➤ How to select your Moroccan white fish

To fully enjoy the fresh white fish, you must check :

The smell : Pleasant reminiscent of the sea and no foul odour.

The overall look :

- Steep Corps shiny and slightly moist,
- Flesh firm and elastic to the touch,
- Viscous, shiny surface,
- Clear, bright and sparkling eyes with black and opaque pupils,
- Bright red or pink Gill, moist and shiny, but not slimy or spotted,
- Brilliant and highly adherent Scales (some white fish do not have scales; Ex: Hake),
- Abdomen not distended and no presence of greenish spots.

➤ The minimal commercial size :

Hake	20cm	Red mullet	11cm
Common pandora	14cm	Dentex	12cm
Gilthead seabream	15cm	Porgy	14cm
Sole	14cm	Annular seabream	14cm
Seabass	17cm	Langue	14cm
White seabream	14cm	Turbot	23cm
Conger	55cm	Gurnard	14cm
Mullet	14cm		

Crustaceans

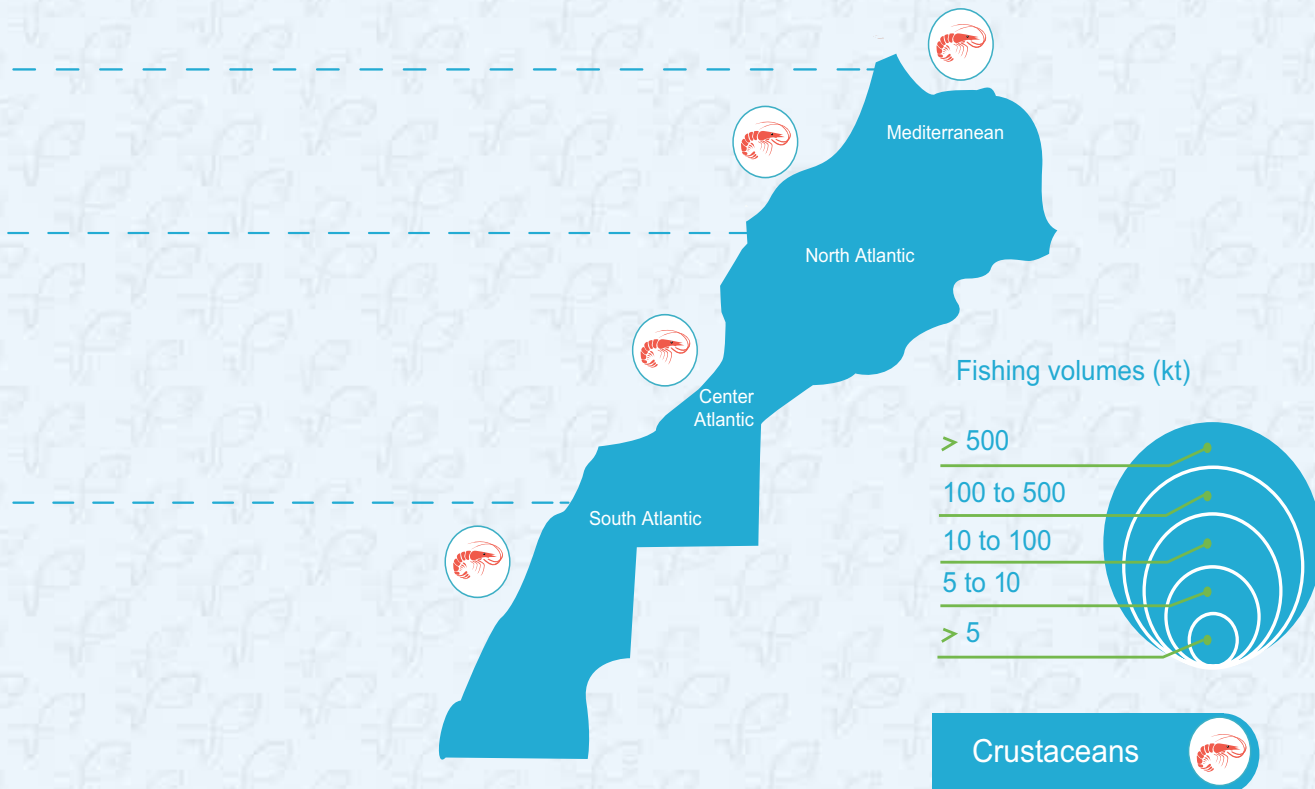
Apetising, a real marin delicacy!



Moroccan crustaceans are known for their exceptional quality and possess a range of species that reveal the diversity of marine life from the Moroccan coast.

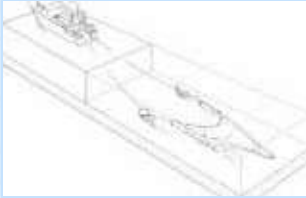
Crustaceans are arthropods which body is coated with an exoskeleton, more or less rigid except in certain areas to allow the joint and the movements.

The most famous species in Morocco are: shrimp, spiny lobster, royal lobster, pink lobster, langoustine and lobster.

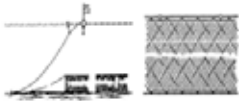


➤ High level fishing techniques

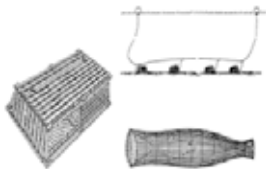
The techniques used to fish these species are :



Bottom trawling : It is a cone-shaped net towed by a ship. It is connected to the boat by steel cables called warps. Otter boards located in front of the trawl allow its horizontal opening. Cables called arms link the trawl panels.



Trammel : this net is formed by an assembly of three superposed layers to each other. The two outer layers are large mesh. The central web is small mesh.



Locker : Or trap, it is a trap with wood, plastic or metal bars in a cage or basket. The bin can be of several shapes depending on the target species and has one or more openings or ducts of entries. Without or with bait, it is generally dropped on the seabed in isolation or connected to a buoy that indicates its position.





► Development Plan for sustainable fisheries

As an important Moroccan marine resource, crustaceans are subjected to a regulated and sustainable exploitation

The Department of Marine Fisheries has implemented, since 1st January 2011, a development plan for the shrimp fishery, which has been revised for the 2015 campaign to ensure recovery of the stock of shrimps, and ensure rational and sustainable exploitation through the revision of the current scheme, and its adaptation to the specificities of the fishery, and the particularities and segments involved in each fishery.

This plan offers short-term emergency measures and other long-term measures. The main short-term measures concern the protection of spawning and shrimp fishing areas by a suspension of fishing activity and by quartering the areas. Whereas the long-term measures will reinforce the aforementioned emergency measures, through the introduction of a quota system applicable to all vessels operating in the shrimp fishery.

Development plan for big crustaceans :

This plan provides measures concerning species such as crayfish lobster and crab, and also the fishing techniques, the fishing areas as well as the periods of biological rest depending on the clutch zones and the species of big crustaceans.

➤ A great Production

The production of Moroccan crustaceans reaches 12 000 tons, worth 825 million dirhams, or close to 8% of the total value of national fish production, distributed as follows :



Reference year : 2014

➤ Moroccan crustaceans valued

Valuing crustaceans in Morocco consists mainly of freezing and packaging costs. The 12 units installed in Morocco are specialized in shelling of crustaceans, especially shrimp.

All the units licensed by the Department of Maritime Fisheries are subject to monitoring and regular follow up. They adopt the HACCP (Hazard Analysis and Critical Control Point) to evaluate and master the dangers that threaten the healthiness of this food.

TYPE	SPECIES	PREPARATION
Fresh or frozen	Crayfish Langoustine Crab Gray Shrimp Lobster Prawn	Alive Shelled In brine
Others	Shrimp	Shell meal Shell drying

➤ Moroccan crustaceans : a taste panel

Because it is finely tasty, and stands for an exceptional taste, the Moroccan crustacean combines the taste of the sea, with equilibrium and exoticism.

Shrimps, lobsters or others, Moroccan crustaceans display a fine flesh texture and many flavours revealing an exceptional freshness





Deep-water rose shrimp : *Parapenaeus longirostris*

The prawn is a decapod crustacean (has 5 pairs of arms). It has a pink-orange shell, the body is compressed laterally, males usually measure between 8 and 14cm long and females between 12 and 16cm long. It lives in muddy or sandy mud areas from 20 to 700m deep.

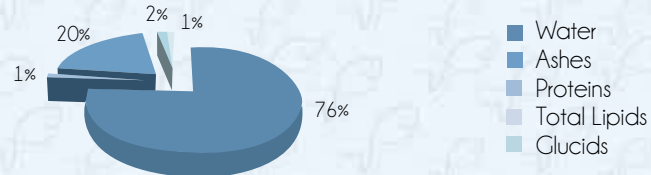
The health aspect :

the Moroccan shrimp is one of the few foods which naturally contain much protein and little fat. It is a source of vitamins, phosphorus and iodine; it contains excellent nutritional quality protein, as well as, but in small amounts, Omega 3 which is essential to the body.

The nutrition aspect :

For 100g of Shrimp

Energy intake : 106 Kcal



Pink spiny lobster : *Palinurus mauritanicus*

This is a big crustacean whose common size is between 20 and 40 cm. It has an elongated body, it is segmented and brownish-red, with blotches and white spots on the back of the thorax and abdomen. It exists between Agadir and "Cap Blanc".

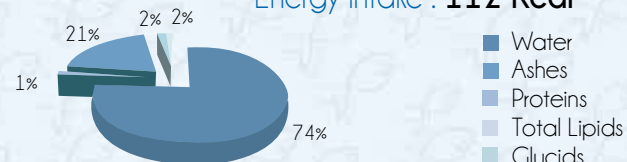
The health aspect :

Because it is low in calories, Moroccan crayfish is a nutritionally interesting food product that provides B vitamins, mineral salts and trace elements.

The nutrition aspect :

For 100g of Pink spiny lobster

Energy intake : 112 Kcal





Norway lobster : *Nephrops norvegicus*

It has a tubular body and a shell equipped with a well-developed rostrum. The first three pairs of legs are terminated with clamps, the first pair is much larger than the others. It has a maximum size of 24cm and a common size of 10 to 19cm.

This species is benthic (moving on the seabed) of muddy or sandy mud, 20 to 800m depth, but is most abundant between 200 to 500m and lives in burrows.

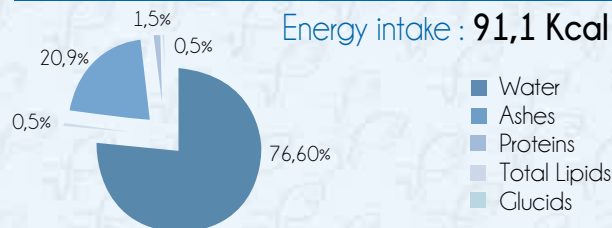
The Health aspect :

Excellent source of protein, the Moroccan langoustine combines minerals (phosphorus, magnesium, calcium), trace elements and vitamins.

The nutrition aspect :

For 100g of Norway lobster

Energy intake : 91,1 Kcal



European lobster : *Homarus gammarus*

Also called Tarouquet, Bougavanti or lobster, its body is long and robust, composed of a carapace, a powerful abdomen and a tail. Its colour is dark blue, its legs have white ends and its branches are orange. The first three legs terminate in grippers whose first pair is massive and asymmetrical and bigger than the others. The lobster has two large antennae and two antennules, its eyes are well developed and mobile and its abdominal segments are smooth. Its common size is 23 to 50cm and up to a maximum of 65cm. This benthic species prefers rocky seabed up to 150m deep and leads a sedentary life.

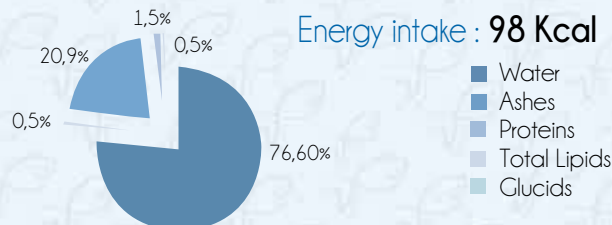
The Health aspect :

The Moroccan lobster, which is lively and nutritional, is packed with beneficial nutrients for your health such as copper, selenium, zinc and vitamin B12.

The nutrition aspect :

For 100g of the European lobster

Energy intake : 98 Kcal



➤ A fresh Moroccan crustacean is first and foremost:

	Fresh means...	Not fresh means...
ALIVE	Reactions and reflexes in : Eye, antennas, Tabs	Dead Animal (no reflexes), (the animal just after his death, can be cooked in court bouillon provided to be sure that he died recently).
UNDER ICE	Black eye, Firm Muscle Thoracic-abdominal membrane, strong, bright and clear, little or no odour.	Discolored and dull eye, Relaxed Muscle greenish or blackish membrane, Putrid smell

➤ The minimal commercial size :

Shrimp	9cm from the eye to the beginning of the tail
Pink spiny lobster	17cm from the eye to the beginning of the tail
European lobster	17cm from the eye to the beginning of the tail
Crowbar	10cm from the eye to the beginning of the tail

A photograph of various shellfish. In the upper left, there is a cluster of dark-shelled mussels, some of which are open, revealing their orange-colored meat. To the right and in the foreground, there are several oysters with their characteristic rough, layered shells. One oyster in the bottom center is open, showing its smooth, white interior. The entire scene is set against a plain white background.

Shellfish

Tasty and savoury

With its rich coastal waters in plankton and brewed by the highest tides, its unusual landscape, its climate and geographical features and vast sandy bottom, Morocco is an area particularly conducive to the development and growth of character shellfish.

Shellfish are molluscs which body is covered by a shell that can have two different forms:

- A hinged shell of two valves: the case of bivalve shellfish or bivalves.
- A single shell: can be coiled, flat or conical, as gastropods.

The gastropods are characterized by a foot on which the rest of the body stands, a well developed head and a protective univalve shell, the most species present in Morocco are periwinkles, abalone, ... etc.

Mussels, oysters, shell, clam ... belong to the group of bivalves and feed on phytoplankton or organic matter.

► Special Fishing Techniques

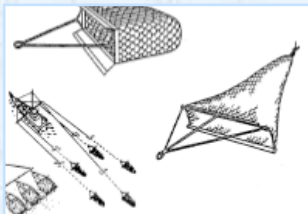
The production of shellfish comes from the collection activity, dredging or fish farming.



Shellfish collection : done manually in natural fields where shellfish is abundant.



Fish farming : breeding mussels (mussel farming) and oysters (oyster) in Morocco is based on the collection of wild hatchery, which feed on natural nutrients found in the environment (filter feeders). It is practiced via various techniques including sub-surface for mussels and raised on metallic iron cages for oysters.



Dredges : machinery / reinforcement nets towed to retain the shells by flowing water, mud, and sand. We distinguish:

- Dredges towed by boat (mechanical) (in the Mediterranean)
- Dredgers hand operated (manual) (in lagoons).

➤ A considerable production

The shell production in Morocco comes mainly from the activity of collecting and aquaculture. It is around 1 400 tons, worth more than 13 million dirhams.

Reference year : 2014

➤ Shellfish valued Moroccan style

14 units installed in Morocco are specialized in packaging shells.

Approved by the Department of Marine Fisheries, they have implemented the HACCP (Hazard Analysis and Critical Control Point) to assess and control hazards that threaten food safety.

TYPE	SPECIES
Fresh or frozen	Periwinkle, mussel, oyster, clam, shell, scallop, sea beans, clams, abalone, knife, varnish, red hull



➤ A variety of shellfish for the gourmets

The Moroccan shellfish benefit from a sea that is endowed with good quality water favourable for their breeding, of a unique culture and treatment and traditional and authentic collecting techniques which allowed them to be appreciated.

Fleshy and melting in the mouth, popular with those who like to eat well, thanks to their breeding in Moroccan seas rich in plankton, Moroccan shellfish, oyster, mussel, ..., have a delicate taste and flavours reminiscent of iodine flavours of the ocean.





Pacific cupped oyster : *Crassostrea gigas*

Also called Japanese oyster, is originally from the Pacific Northwest and has been introduced into Morocco for the purpose of breeding for commercial purposes.

Crassostrea gigas is a bivalve mollusc of brownish-gray colour with some purplish marks. Inside the shell is gray-white. It measures up to 15cm long.



European flat oyster : *Ostrea edulis*

Is a bivalve mollusc which measures up to 10cm in diameter. The shell of the oyster is irregular rather round, thick, with a hollow lower valve and an upper valve plate, a laminated structure and chalky. Its colour is gray to yellowish, often with dark spots or stripes. They live attached to rocks or on soft bottoms from surface to 80m deep.

Moroccan marketed oysters are numbered from 0 (more than 150g) to 5 (30g). The numbers correspond to their size. The higher the number is, the smaller the oysters are. The calibre that is most requested is 3 (starting from 60g).

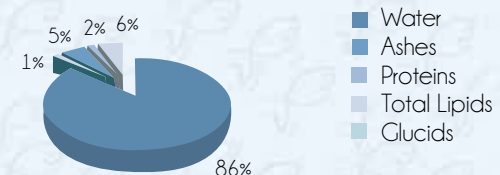
The health side :

Moroccan oysters have restorative and therapeutic qualities indisputable. A 100g serving provides nearly eight times the recommended daily nutritional intake for an adult in B12 vitamin; and nearly 20% of the recommended intake of B3 vitamin. It also provides A vitamin and A pro-vitamin, not forgetting E vitamin.

The nutrition aspect :

For 100g of Oysters

Energy intake : 59 Kcal





Mediterranean mussel : *Mytilus galloprovincialis*

Mytilus galloprovincialis is an endemic species in the Mediterranean with a blue-black shell. It is sedentary, lives on a variety of funds, hard (rock, gravel) or furniture (sandy, muddy). It largely enters brackish waters of coastal lagoons. This bivalve grows rapidly depending on the environmental conditions up to a maximum size of 15cm, its common size is 5 to 8cm. The mussel can filter through its gills to 10 litres of water per day.

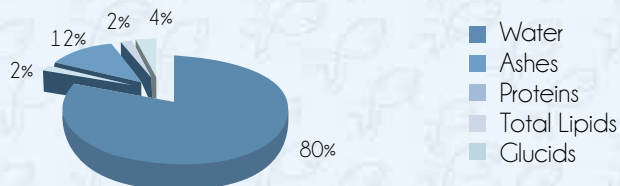
The health side :

Moroccan mussels are rich in essential amino acids we need to make the hair proteins, skin, muscles, bones, blood and other tissues and organs. Similarly, the mussels contain significant quantities of a sulfur amino acid, cysteine, and a product of its degradation, taurine. Both substances are major antioxidants, which help to protect against toxic and free radicals.

The nutrition side :

For 100g of Mussel

Energy intake : 86 Kcal



➤ How to detect the freshness of Moroccan shellfish?

	Really fresh	Not fresh
Alive	Closed shell, Full of clear liquid, heavy Seashell, Scented, After opening the muscle retracts.	Open shell, Liquid Devoid and lower weight, After opening the muscle does not retract, An unpleasant smell (oil, mud, ...).

➤ The minimal commercial size :

Mussel	6cm
Great Atlantic scallop	10cm
Razor clam	10cm
Sea bean	3cm
Abalone	6cm
Periwinkle	2cm
Grooved carpet shell	From 3 to 3.5cm
Cockle	From 3 to 4cm
Smooth clam	From 4 to 5cm
Warty venus	From 3 to 3.5cm
Striped warty venus	2.5cm

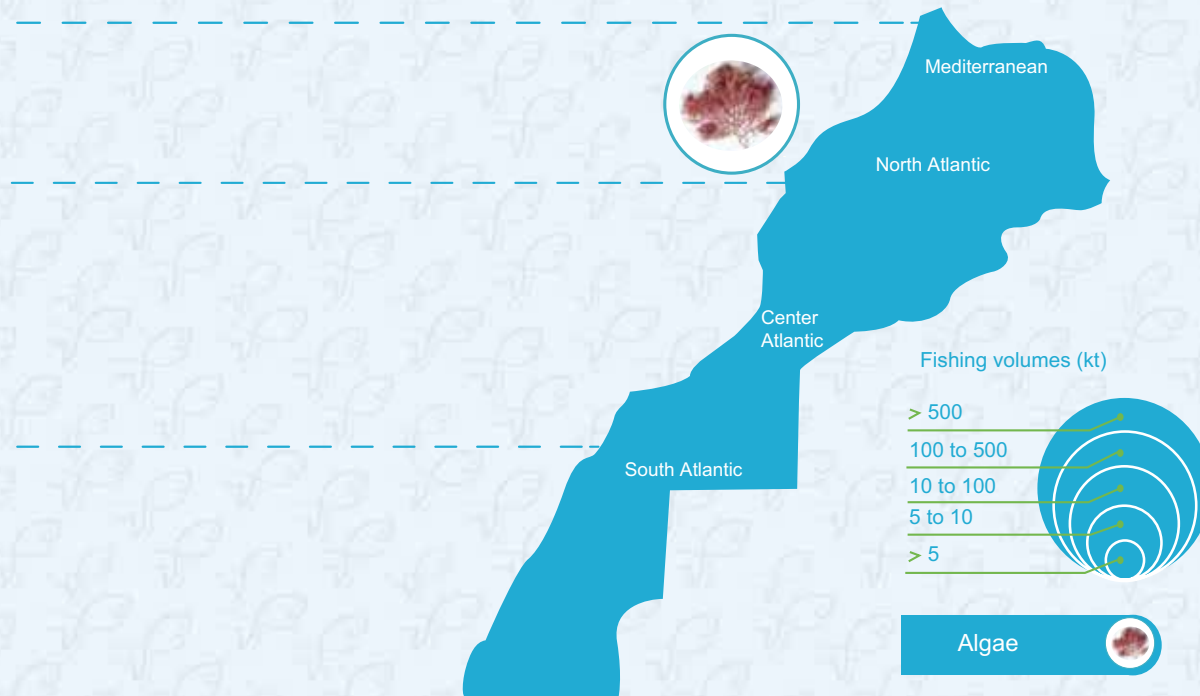


Seaweed

A precious wealth to discover

The Moroccan coastline conceals great diversity in benthic marine algae with more than 480 species (red, brown, green ... etc). Despite this wealth, only three species of *Gelidium* (red algae) are most exploited for industrial purposes: *gelidium sesquipedale*, *Gelidium* and *spinulosum* *Pterocladia capilacea*.

The *sesquipedale gelidium* alone represents 90% of the collection of seaweed treated in Morocco, because it allows extracting a agar to high gelling power.



Development plan of red seaweed :

The exploitation and marketing of marine algae are strictly regulated. The regulations define operating quotas, fishing effort and the biological rest period and quantitative restrictions on exports.

➤ A unique diversity

Moroccan coasts contain rich in species of economic interest and environmental tal algae, including; the Geli-diacea as *Gelidium sesquipedale* the Gracillaires as *Gracilaria sp.*, as the Gigartinacées *Gigartina acicularis*, *Gigartina teedii* and *Gigartina pistillata*...



Gelidium sesquipedale

Gelidium sesquipedale also called Rebiâa, is in the form of thallus red to brown to red rug-ged look and cartilaginous consistency. It consists of a set of slings of variable size tufts (10 to 25cm) upstanding from crawling filaments which ensure the fixing of the alga to the substrate by a series of rhizoids.



Gelidium spinulosum

Cartilaginous appearance, they are of a purple to purplish red. This species mea-sures 2 to 6cm long. The main axes are considerably flattened, narrow at the base, the ultimate branches are short, often opposed.



Pterocladia capillacea

Cartilaginous, the leaves are flattened purplish red, they measure 2cm wide and 20cm high. Pinnate or bipinnate, often bare at the base, the branches are oppo-site or alternate, often tapered at both ends and pyramidal in outline

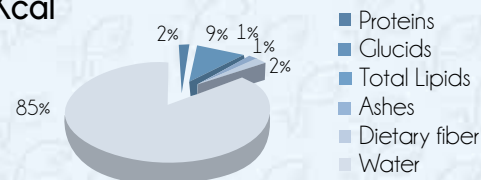
The health side :

Particularly rich in fibre and antioxidants, Moroc-can red seaweed have a nutritional value and have a refined taste. Their regular consumption helps to maintain good health and prevent a lot of diseases.

The nutrition side :

For 100g of seaweed

Energy intake : 45 Kcal



Aquaculture diversity

A true potential

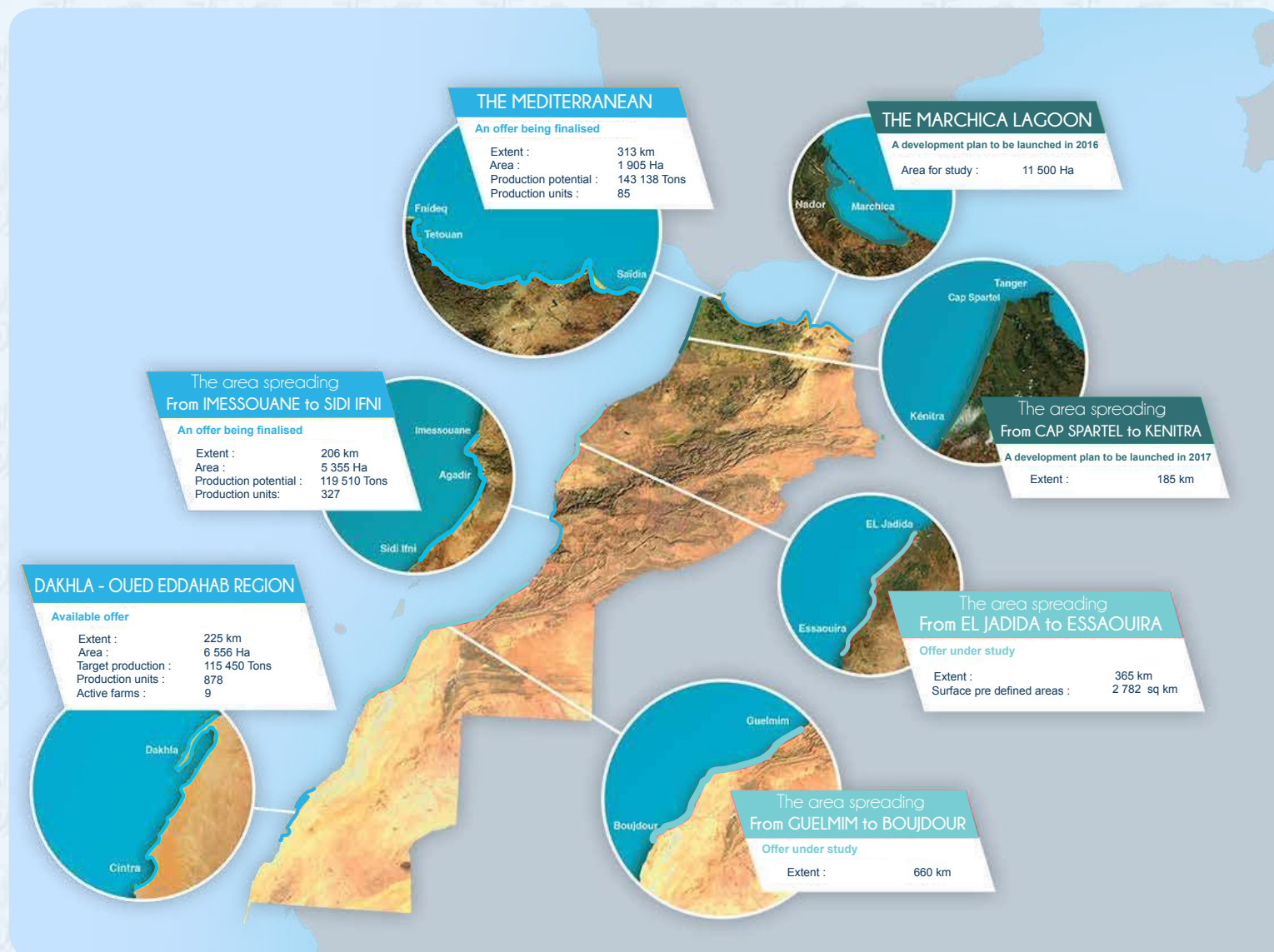


The Morocco abounds with numerous potentials and opportunities to consolidate a sustainable aquaculture sector, particularly in terms of natural assets with diverse aquaculture oriented websites; lagoons, bays, sea or low areas by the sea.

Favourable conditions for breeding a wide range of species are: wolf, bream, meagre, sole, turbot, clam, abalone, mussels, shell, scallop, shrimp, seaweed.



► For a sustainable aquaculture planning



➤ Potential industry ... a diversified wealth



Fish farming

Tangier - Tetouan - Al Hoceima
The oriental - Sous Massa Daraa regions



Wolf

🌡️ 16-22°C
📦 400 - 500gr
🕒 18 months



Bream

🌡️ 16-22°C
📦 350 - 400gr
🕒 16 months



Meagre

🌡️ 14-27°C
📦 800gr - 1kg
🕒 18 months



Fish farming

Laâyoune - Boujdour
Sakia El Hamra, Doukkala - Abda and
Tangier - Tetouan regions



Tiger shrimp

🌡️ 28-30°C
📦 35 - 50gr
🕒 5 - 6 months



Japanese shrimp

🌡️ 5-28°C
📦 20gr
🕒 8 months



Shellfish breeding

Oued Eddahab - Lagouira,
Doukkala - Abda, Tangier - Tetouan
and Oriental regions



Hollow oyster

🌡️ 14-20°C
📏 50mm
🕒 18 - 24 months



Mediterranean mussel

🌡️ 18-22°C
📏 60 mm
🕒 7 - 9 months



Clam

🌡️ 18-22°C
📏 40mm
🕒 12 - 28 months



Shellfish breeding

Oriental - Doukkala
Abda and Guelmim - Es-Semara regions



Red seaweed

🌡️ 14 - 20°C
📏 50 mm
🕒 18 - 24 months



Agarophyte

