



EXECUTIVE  
SUMMARY



# SENEGAL: CO-MANAGEMENT IN OCTOPUS AND GREEN LOBSTER FISHERIES

HOW CONSUMERS, COMPANIES AND AUTHORITIES IN THE EU  
CAN IMPROVE THE SOCIAL, ENVIRONMENTAL AND ECONOMIC  
CONDITIONS OF DEVELOPING COUNTRIES

# ACKNOWLEDGEMENTS

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## KEY CONTACTS

Raúl García Rodríguez

Fisheries officer, WWF Spain

[pesca@wwf.es](mailto:pesca@wwf.es)

Celia Álvarez Doncel

Seafood market officer, WWF Spain

[cadoncel@wwf.es](mailto:cadoncel@wwf.es)

WWF is one of the world's largest and most experienced independent conservation organizations, with over 5 million supporters and a global network active in more than 100 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption. This report has been produced as part of WWF's EU co-funded Fish Forward Project. Fish Forward aims to raise awareness of the global impact of seafood choices made in Europe and their effects on people living in developing countries. [www.fishforward.eu](http://www.fishforward.eu)

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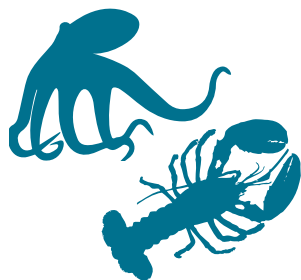
# FISH FORWARD, 11 COUNTRIES PROMOTING RESPONSIBLE CONSUMPTION OF FISH IN THE EU

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*Fish Forward* is an initiative - co-financed by the European Union (EU) and developed by WWF in 11 European countries - to raise awareness among consumers about the need for the responsible purchase of fish and shellfish. It is a project that underlines how the purchase decision, selecting sea products from sustainable sources, has an impact on resource conservation and on sustaining the lifestyle of the people who depend on these resources.

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WWF ANALYSES TWO  
CASE STUDIES OF CO-  
MANAGED FISHERIES  
IN AFRICA: OCTOPUS  
AND GREEN LOBSTER IN  
SENEGAL

This report, titled “Co-management in traditional octopus and green lobster fisheries in Senegal”, is one of the five case studies that Fish Forward has drawn up to analyse the interdependency between fish product purchase options in the European market. It examines its sustainability and its impact on the fisheries and fishing communities in developing countries, with special emphasis on the sustainability of their fishing management, food safety and subsistence measures.

In this study, WWF wished to highlight case studies of fishing co-management in northwest Africa that have made a significant contribution to improving fisheries and which have a notable role in the supply of European markets. In addition, it analyses the challenges these cases have had to face in managing and marketing these products and the consequences for local populations.

In its preparation, WWF identified and described 14 cases of co-managed fisheries in northwest Africa - in Morocco, Mauritania, Senegal and Gambia. Of these, two were selected for a more in-depth analysis that enabled the extraction of lessons learned, which may be of interest to European operators, following these criteria: availability of data that is as complete as possible, supply to the European market, and existence of results that have already been analysed. The fisheries selected were the traditional fishing of octopus (*Octopus vulgaris*) and the green lobster (*Panulirus regius*) in Senegal. In this country, co-management has become one of the main axes of national management, to the point it is even legally recognised in its Fishing Law of 2007.

The team responsible for the study did some fieldwork and interviewed the protagonists of these fisheries. Furthermore, the team visited the main unloading points, processing plants and public administration facilities.

# WHAT IS CO-MANAGEMENT?



IN CO-MANAGEMENT  
FISHERS AND THE  
ADMINISTRATION  
SHARE  
RESPONSIBILITIES

**Co-management is a decentralised fishing management framework where at least one group of fishers and the administration share responsibilities over a fishery or fishing area. Scientists and civil society organisations often participate too, providing a scientific basis to the measures approved and ensuring that environmental or developmental aspects are also included.**

Among the strengths of co-management are the creation of trusted processes between the actors involved, the inclusion of the traditional knowledge of fishers, and their active participation in the management, monitoring and control of their fisheries. All of these factors contribute to co-responsibility of the fishing sector in conserving the resource with the assistance of all other actors. Furthermore, co-management is one of the most efficient tools in adaptive management based on the ecosystem.

This governance model is present in fisheries at all latitudes and with varying features, adapting in each case to their reality as well as the human and material resources available, applying different decision levels or legal guidelines.

The Local Fisheries Committee (originally called CLP, in french) and the Local Council of Artisanal Fisheries (originally called CLPA) are the two types of local organisations charged with applying co-management frameworks in Senegal.



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# FISHING IN SENEGAL

**3,2 GDP**

**FISHING AMOUNTS TO  
3.2% OF GDP IN SENEGAL  
AND IT EMPLOYS 17% OF  
THE POPULATION.**

**Fishing plays a crucial role in Senegal's economy. In fact, it contributes 3.2% of its gross domestic product (GDP), it employs 17% of the population and it is the largest exportation sector with 21% of the total number of exports.**

On the other hand, fishing is an important source of protein for the Senegalese population. Consumption of fish products in 2013 reached 23.9 kg per person per year in this country. This amounts to 11.1% of the nutritional intake of proteins and 42.5% of animal protein needs. This figure is significantly higher than the global average, which is 19.7 kg per person per year, and much higher than the average in Africa, which sits around 9.8 kg per person per year.

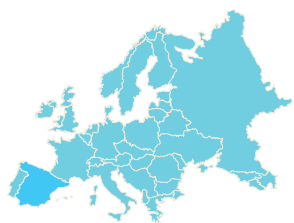
In addition, Senegal is one of the most important African countries for the European fish market and, in particular, for Spain, which is its main European partner. Senegal supplies 0,7% of total extra-EU imports to the EU, with the main commercial species being prawns, octopus, tuna and cuttlefish. Spain receives (in value) 32.5% of the total of imports to the EU from Senegal, followed by Italy (24.8%), France (15.8%) and Portugal (10.1%). These four countries are the main European markets for Senegal fishing with more than 80% of imports.





# OCTOPUS IN SENEGAL, A VICTIM OF OVERFISHING

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SENEGAL IS THE THIRD  
EXPORT COUNTRY OF  
OCTOPUS TO SPAIN AND  
THE FIFTH IN THE EU

**Octopus is one of the country's most important fishing resources with a strong influence from traditional fishing, important links with the European market, and a participatory process to improve fishing on a national level. Senegal was the third export country for octopus being sent to Spain and the fifth exporter to the EU in 2016 (4,634 tons with an average first sale price of 5.60 €).**

The majority of its catches come from the Petite Côte, situated in the central area of the Senegalese coast. Its traditional fleet works with motorised wooden canoes, "pirogues", using a jig-style hook, "turlutte". This fleet employs 1,650 fishers and 720 people in the processing industry, the majority of whom are women.

The Senegalese catches made between 2004 and 2015 amounted to 5,600 tons of octopus (60% of fish by the traditional fleet). However, it is true that there is no regular pattern due to the biology of the species, which is highly influenced by environmental changes. For example, rainfall positively affects the octopus population.



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**FOLLOWING SUCCESS,  
FISHERS BECAME THE  
MAIN SUPPORTERS OF  
CO-MANAGEMENT**

Although there are many discrepancies in fishing statistics, data shows that octopus in Senegal is the victim of overfishing. This has given rise to the start of a participatory process to launch a national plan to manage octopus fishing.

### **Co-management: a long-distance race in octopus fishing**

Work on co-management in Senegal began halfway through the 2000s and the first step taken was to determine the spawning period with the aim of establishing a close season for octopus fishing. Stock was then reinforced thanks to the use of pots and jars to encourage egg-laying.

After the success seen with initial experiences, fishers became the main supporters of co-management. In fact, later they launched additional measures, including the creation of a Marine Protected Areas (MPAs), comprehensive reserves, seasonal closes, a limit of 50 canoes per day and 20 nets per canoe.

Local co-management initiatives like this have led to a collaborative process in developing a national plan for managing octopus fishing. Nonetheless, there are still challenges to be addressed, such as the lack of information on the octopus population and definition of sustainable use levels.

In 2016, this improvement process resulted in the signing of an agreement by Senegal and Morocco through which the latter will help develop a management plan for octopus fishing in Senegal.

### **Everyone appreciates co-management**

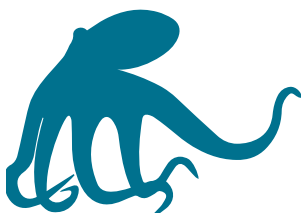
Co-management has brought with it huge benefits in numerous areas on the Petite Côte, both for the species and for fishers.

Biological benefits include an increase in catches and the average size of the octopus. Furthermore, an improvement has been seen in the number and abundance of species associated with this animal, according to the majority of people interviewed.

Moreover, this type of management has had a highly positive response from the fishing community. Unsurprisingly, traditional knowledge is being included as a basis for the measures that are implemented. As such, the experience of fishers is reflected in co-management and compliance with measures, such as net mesh limits, has been improved.

Another key issue is the increase in the income of fishers and sellers of fish, although this may be an effect of the strong demand for octopus in international markets.

Finally, some of the measures in operation in this zone have been recently adopted by the government, meaning they have made the leap from local scale to state level within the national plan.



**THANKS TO CO-  
MANAGEMENT, CATCHES  
AND THE AVERAGE SIZE  
OF THE OCTOPUS HAVE  
INCREASED**

# GREEN LOBSTER IN SENEGAL, THE PRESSURE OF THE INTERNATIONAL MARKET

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**This case study was centred on the town of Ngaparou, southeast of Dakar, where 238 canoes of Senegalese fishers operate to catch lobster using fishing rods, jigs and gillnets.**

In this region, the green lobster is one of the main species fishers try to catch. However, with the increased fishing effort in the 1990s and 2000s, catches and the size of the lobsters being caught decreased due to overexploitation of the resource.

**THE MAIN MARKETS  
FOR THE GREEN  
LOBSTER IN EUROPE  
ARE PORTUGAL, SPAIN  
AND ITALY**

This was the trigger that pushed fishers to launch a community management system that would allow them to save their way of life and recover the health of populations.

The green lobster is a species of high commercial value that is mainly exported to international markets. According to official data from 2015, catches amounted to 69 tons. However, it is difficult to find specific statistics on exports from fishing in Ngaparou.

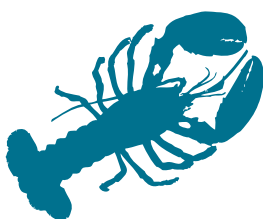
Most likely part of the catch is acquired by wholesale fish dealers based in Dakar, from where the product is exported. In Dakar there are several establishments authorised to export live, fresh or frozen lobster to the European market and other destinations.

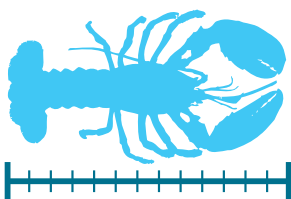
In 2016, the main importer of green lobster from Senegal was China (97% of the product). In Europe, the main markets were Portugal, Spain and Italy, in that order. In addition, the green lobster is also sold in local hotels and restaurants.

## **Co-management: a solution for the lobster**

Co-management in Ngaparou dates back to 2008 when, with the support of the World Bank and the government, a co-management system was established in an attempt to aid the recovery of this species and improve the income of fishing communities.

The need to create shelter areas for the lobster soon became evident, for which reason a fishing protected area (ZPP) was approved, resulting in the division of the area into three zones with different degrees of restriction on fishing activity, from full prohibition to free access.





MEASURES WERE  
LAUNCHED TO  
CONTROL SIZE,  
PREVENT THE  
CATCHING OF YOUNG  
LOBSTERS AND LIMIT  
CERTAIN FISHING NETS

This system was also complemented by other improvements, such as the prohibition of catching young lobsters and females laying eggs, control of a minimum unloading size, and limitation of fishing nets in restricted zones where only gillnets are permitted.

### With this system everyone wins

As is the case with octopus, co-management of green lobster fisheries has brought about significant improvements in many areas, both biological and social.

Among the biological benefits is an increase in overall performance, as well as performance per unit effort and the average weight of lobsters, both of which have tripled. Management measures have also aided other commercial species, as shown by the return of demersal fish species (which had previously disappeared from the area) and a great abundance of juvenile fish from numerous species.

In terms of governance, communities are acting as active driving forces in the design and development of the local-scale measures. Co-management has facilitated the creation of a Marine Protected Areas (MPAs) network with different degrees of usage restrictions, providing a highly effective way of protecting resources.

With regard to economic improvements, there has been an increase in income for fishers and intermediaries too. In this area, initiatives to promote the product in the community have been undertaken, improving its handling and quality, and helping to process the lobster. Consequently, the benefits of co-management are distributed among fishing communities.

Lastly, part of these economic profits are set aside for a social fund to encourage compliance with co-management measures, promote greater cohesion in the community, and make available resources that will help those who require assistance.

THE WEIGHT OF THE  
GREEN LOBSTER HAS  
TRIPLED, GENERATING  
MORE INCOME FOR  
FISHERS



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# CHALLENGES FOR CO-MANAGEMENT IN SENEGAL

Although the benefits of co-management are palpable, octopus continues to be the victim of overfishing and accidental catches by part of the trawling fleet. This is in addition to the vast oceans of information on this type of fishery, which could constitute an obstacle to this management model.



ONE OF THE GREATEST CHALLENGES FACING FISHING MANAGEMENT IN SENEGAL IS THE FIGHT AGAINST ILLEGAL FISHING

Additionally, **the fight against Illegal, Unreported, and Unregulated Fishing (IUU) is another of the main challenges for co-management.** The scarce monitoring of coastal waters means that traditional fishers have to patrol the coast themselves, taking on the financial cost and risk to safety that this entails.

On the other hand, the abandonment of traditionally key species in Senegal, such as the sardinella and the tarpon, in favour of the octopus and the lobster, which are aimed at the international market, is weakening the local processing industry. This situation **produces negative effects, mainly for the women** who work processing small pelagic fish using traditional techniques. This is due to a decrease in the volume of these species meaning these women are obliged to seek other work activities.



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**46%**  
**IN SENEGAL 46% OF  
HOMES ARE VULNERABLE  
TO FOOD INSECURITY**

Although they cannot compete in economic profitability with the species set aside for exportation, these traditional species, which sell for lower prices, are essential to the food security of Senegal. This has aggravated a social problem in terms of lack of fish protein availability in the local market at low prices. In fact, in Senegal 46% of homes are vulnerable to food insecurity.

Moreover, the enormous variations in the sale prices of octopus at the beach, which rocket or stall seasonally as it is influenced by the international market, are notable. This prevents fishers from having regular income, leading to doubts over the equitable distribution of the economic profits from the fishery, which tend to be concentrated in the upper links of the chain.

However, despite there being a real interest in promoting co-management, it is important to stress that there is a certain level of reticence from the State to renounce its powers in fishing management. Currently, measures that are to be applied must be approved by the central government, which slows down the process. One consequent problem is the lack of independence in those managing things at a local level. As such, the process that begins on this scale, with evident successes, is transformed into a more centralised form of management that is removed from fishing communities.

Some successful measures in the case studies are being applied on a national level already and are binding. Despite the fact the adoption of national guidelines or measures from the lessons learned can be positive, it should not be prescriptive. Certain measures may be unsuitable for other zones and they may harm new participatory processes in other local communities as well as their implementation. Furthermore, there are unequal levels when launching co-management systems. The degree of involvement varies greatly depending on the community in question and its size.

This is in addition to the difficulties in urban centres. Despite having a high number of fishers, they are still incapable of good organisation when applying co-management. This is in comparison to what occurs in small fishing towns that are better adapted to implement these participatory frameworks.

One other point is the enormous dependency on external support. Co-management in Senegal is linked to the backing of cooperation agencies and donors from both a technical point of view and a funding standpoint.

A further handicap is the lack of technical and administrative ability from the base to system administrators. Analysis shows that the low education level of those who form a part of co-management makes it difficult to fully develop this model.

Finally, the absence of coordination, communication and synergy between the actors is another aspect that must be addressed. This is similar to the lack of scientific knowledge on species and fishing grounds.

# WWF RECOMMENDATIONS TO INTERNATIONAL COOPERATION AGENCIES

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**In support of traditional fishing ground sustainability in developing countries it is essential that participatory governance models be reinforced, applying the lessons learned from existing experiences and providing a response to the main biological, social and economic challenges through more holistic focuses.**

Cooperation projects must be carefully formulated and designed with attainable objectives, activities and guidelines. The beneficiaries must be involved in their design and launch. As such, local communities and their traditional knowledge may be integrated into the original design of the project, allowing for the complexities of the system to be suitably addressed and for the system to be focused on local needs: sustainability of resources, genus, food security and employment.



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INTERNATIONAL  
COOPERATION MUST  
INVOLVE LOCAL  
COMMUNITIES IN THE  
DESIGN OF PROJECTS



Likewise, improved coordination, communication and knowledge transfer between development agencies is required to create synergies that help to resolve real local problems and needs.

Among the pending tasks that must be considered by international cooperation in octopus and green lobster fishing in Senegal are:

- Strengthen fishing management, including training and effort measures, depending on their relevance in each zone.
- Improve the monitoring of fishing, investigate more important fishing species, and support technical training on land.
- Include climate change in fishing effort projects in Senegal and apply an ecosystem focus to fishing management.
- Reinforce monitoring and control. Drive greater regional cooperation in the fight against illegal fishing.
- Support regional coordination to guarantee food security.
- Determine stock protection measures to maximise efficiency.
- Assess ways of increasing the fish supply without increasing fishing pressure.
- Ensure the supply of fish to local markets.
- Analyse the ecological, social and economic impact of using destructive methods, such as bottom trawling.
- Calculate the role of sustainable aquaculture to decrease risks to food security.
- Act against high poverty rates in Senegal and incorporate efficient strategies to improve distribution of the socio-economic benefits in fishing communities.
- Incentivise alternative activities that generate resources for more vulnerable groups, such as women.
- Seek alternatives to reduce dependency on the exterior.

With regard to the EU, it must ensure full application of the external dimension of the Common Fisheries Policy (CFP), including Sustainable Fisheries Partnership Agreements and harmonised implementation of the Ruling against Illegal Fishing among Member States. It must also help coastal countries to comply with Sustainable Development Objectives or legal tools, like Port State Measures (FAO). In addition, it must ensure coherence between national fishing, environment, trade, foreign affairs and developmental policies.

# RECOMMENDATIONS FOR MARKETERS AND DISTRIBUTORS

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**Fish product marketing, distribution and transformation companies must be committed, via public policies, to supplying their clients with fish from sustainable origins. Consequently, they must guarantee its traceability, facilitating clear, precise information to the consumer, actively supporting the sustainability of the marine resources they market, and conserving oceans.**

**THEY MUST GUARANTEE  
THE PRODUCT'S  
TRACEABILITY,  
FACILITATING CLEAR,  
PRECISE INFORMATION TO  
THE CONSUMER**

This commitment must extend to their suppliers, ensuring they undertake improvement actions at fisheries to guarantee their sustainability and supporting these improvements with agreements that benefit all parties.

Continuous demand and a long-term commitment to environmental and social sustainability at local fisheries will encourage countries and fishers to establish systems of efficient governance.



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# AN INFORMED CONSUMER

**The examples presented in the report show the strong interdependencies that exist between markets and fisheries in developing countries and how overexploitation affects the local communities that depend on fishing resources. The consumer is a key actor in ensuring the fisheries of every ocean are sustainable, benefiting millions of people who depend on the resources we extract from our seas.**

**GOOD LABELLING IS  
KEY TO THE CONSUMER  
BEING ABLE TO MAKE AN  
INFORMED, RESPONSIBLE  
CHOICE**



As responsible consumers, the key is to look for and purchase products that come from sustainable activity. To do so, the consumer must seek information and follow the recommendations of responsible seafood guides, such as the one prepared by WWF. It is equally as important to ensure the product is well-labelled and to understand the species acquired, where it was caught or produced and the way it was caught. The consumer must avoid buying fish outside of legal markets, immature fish or fish of sizes that are not permitted.

To guarantee the product the consumer wishes to buy comes from sustainable origins, the consumer must look for reference logos, such as MSC or ASC.

The consumer has the power to make a real difference and encourage responsible and sustainable fishing from both an environmental and social point of view. In this way, a positive story of sustainable development and healthy seas will lie behind each dish.



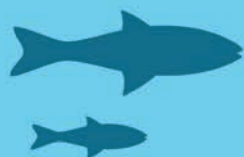
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# Benefits of co-management



Increase  
in catches



Increase  
in size



Improvement in other  
commercial species



Greater cohesion  
in the community



Increase in the  
income of fishers

# Challenges of co-management



Overfishing



Illegal fishing



Abandonment of traditional species



Dependency on external support



Low training



Greater independence of local communities

# Recommendations



International cooperation: involve local communities in the design of projects

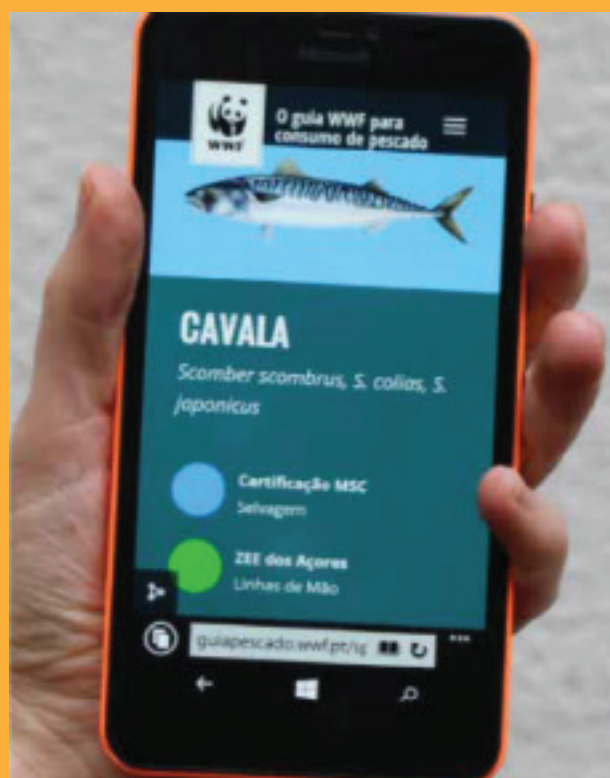


Traders: ensure the traceability of products, providing the consumer with information



Consumers: buy products from sustainable fishing

# THE SUSTAINABLE SEAFOOD GUIDE



**Educating consumers about their choices is central to saving and restoring fish stocks in the Mediterranean and beyond. There are three key points:**

- Check the label to see what you're really buying;
- Don't eat baby fish which haven't had the chance to reproduce; and
- Try something different to reduce the pressure on the most popular stocks.

These are the foundations of WWF's multilingual Sustainable Seafood Guide series. These online guides (which are optimized for use on mobile devices) offer essential information on available products in 12 different European countries, rating a wide range of species with a traffic light system that helps inform shoppers. This runs from blue for

'certified' through green for 'give it a try' and orange for 'caution' to red for 'avoid'.

While simple to use, the guides are based on available scientific data: desktop risk assessments taking into account origin and gear mean it's possible for shoppers to go beyond general species-specific guidelines, and make buying decisions about fish sourced from particular fisheries. The data is updated regularly, so it always reflects what's really happening in the oceans.

If shoppers need more persuading to change their habits, the guides also feature delicious recipes from well-known chefs to inspire them to try something new.

[www.fishforward.eu/en/online-seafood-guides-launched-in-several-eu-countries/](http://www.fishforward.eu/en/online-seafood-guides-launched-in-several-eu-countries/)

# FISHING IN NUMBERS

## 800 MILLION PEOPLE

Worldwide, more than 800 million people depend on fishing as a source of income and food. Many of them live in developing countries.

## OVERFISHING

31% of world fishery populations are overexploited and 58% are fully exploited.

## EU

Half of EU fish imports come from developing countries. In the case of Spain, it is 38%.

## CONSUMPTION

Fish is an important source of protein for the Senegalese population. Consumption of fish products reached 23.9 kg per person per year in 2013.

## FISHING IN SENEGAL

Fishing plays a crucial role in the Senegalese economy: it contributes 3.2% of its gross domestic product (GDP) and employs 17% of the population.



### Why we are here

To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

[panda.org](http://panda.org)