

# Small-scale octopus fishery with clay shelter pots: intangible cultural heritage and sustainable practices

**Laura del Valle Mesa**

**Laura del Valle Mesa** has been university lecturer and is currently a researcher in the group "Observatorio de Cultura y Patrimonio" at the University of Huelva. Moreover, she is also a PhD candidate at the University of Huelva. She holds a University degree in Cultural Management and a Master's degree in Architecture and Historical Heritage from the University of Seville and the Andalusian Institute of Historical Heritage, and a Master's degree in Historical and Cultural Heritage from the University of Huelva. She is a researcher in several projects on intangible cultural heritage with Spanish and European funding. She has been awarded the 2018 Bernardo Pena Award of the International Association of Applied Economics.

# Small-scale octopus fishery with clay shelter pots: intangible cultural heritage and sustainable practices

● Laura del Valle Mesa  
University of Huelva

## ABSTRACT

The Declaration of the United Nations Conference on the Human Environment (United Nations 1972) and the Convention Concerning the Protection of the World Cultural and Natural Heritage (UNESCO 1972) paved the way for the Declarations of the Rio+20 Sustainable Development Conference (United Nations 2012) and the Convention for the Safeguarding of the Intangible Cultural Heritage (UNESCO 2003).

Some of these international declarations aim to achieve goals relating to environmental, economic and social sustainability which incorporate culture as a transversal axis. The knowledge and ways of life preserved through past generations have proven

themselves to be socially and naturally sustainable, and many of them constitute examples of intangible cultural heritage. Artisanal fishing with clay shelter pots for the common octopus, a resource threatened by overfishing, is an example of such heritage that would result in a more sustainable way of life and better protection of our ecosystem resources if safeguarded (NoCCA 2017).

## Keywords

intangible cultural heritage, fishing cultural heritage, sustainable heritage, artisanal octopus fishing

## Intangible cultural heritage and sustainability: safeguarding techniques and knowledge

Over the last half century, we have witnessed a concerning process of depletion of the world's natural resources. The United Nations Conference on the Human Environment (United Nations 1972) established the first international policies to address environmental sustainability. The overall objective was clear: to halt the depletion of ecological resources and tackle environmental pollution for the benefit of future generations.

The idea of sustainability was subsequently extended to the field of heritage through the Convention Concerning the Protection of the World Cultural and Natural Heritage (UNESCO 1972). Other milestones would follow, such as the 2021 Agenda of the United Nations Conference on Environment and Development (United Nations 1992), the Rio+20 Conference on Sustainable Development (United

Nations 2012) and the Sustainable Development Goals of the 2030 Agenda (United Nations 2015). Meanwhile, the Convention for the Safeguarding of the Intangible Cultural Heritage (UNESCO 2003) recognised heritage as a 'melting pot of cultural diversity and guarantor of sustainable development'.

For the purposes of this study, the 2003 Convention defines 'intangible cultural heritage' as 'the practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognise as part of their cultural heritage' (UNESCO 2003: Article 2.1). The definition recognises five domains of heritage manifestation, which include 'knowledge and practices concerning nature and the universe' and 'traditional craftsmanship', expressions that will be approached in this study as examples of contributions by our culture to sustainable development.

This study proposes consideration of clay shelter pots as a heritage element in line with the definition by UNESCO, as well highlighting its role as a sustainable traditional activity. Interventions are also proposed to contribute to the preservation and safeguarding of this intangible cultural heritage and to guarantee a more sustainable future (Molina 2018).

A considerable body of knowledge has been amassed regarding the use of clay shelter pots for artisanal octopus fishing. The Gulf of Cadiz has a strong fishing tradition due to the wealth of the continental and oceanic waters that converge on this coast. Ever since ancient times, its inhabitants have employed very specialised and diverse techniques to take advantage of these natural resources in tune with their way of life. This is the case of species such as the common octopus (*octopus vulgaris*), which is highly appreciated due to its culinary attributes and has become a mainstay of the local economy in many regions.

It is precisely this popularity which can pose a danger to the species, as it leads to the development of other unsustainable techniques and methods that put the local ecosystem at risk.

Clay shelter pots are not only a valuable fishing system due to their contribution to more selective and sustainable fishing activity. They are also an expression of intangible cultural heritage in light of their great historical legacy and worldwide diffusion, forming part of the fishing techniques of different cultures as well as having a very significant role in the history of the Gulf of Cadiz. Due to the implementation of new systems and the inconsistency of certain regulations, clay shelter pots as a fishing system and an example of intangible heritage are in a process of decline that we intend to address in this study.

## Objectives

The general objective of this study is to contribute to the safeguarding of artisanal octopus fishing using the clay shelter pot system in the face of the progressive decline of this heritage. It also seeks to foster more sustainable octopus fishing by contributing traditional knowledge and fishing techniques that have been handed down through generations of fishers. To this end, we have set a series of specific objectives:

1. To describe the technique of common octopus

fishing using clay shelter pots and the other octopus fishing techniques currently employed today.

2. To determine the value of clay shelter pots in terms of heritage and sustainability.

3. To research the legislative, social and economic context influencing the decline of this artisanal technique and its substitution by other more industrialised and less sustainable methods.

## Methodology

The methodology used in this research is mainly based on qualitative ethnographic methods, the results of which are supported by other research and analysis techniques. This has given rise to results that have been analysed and compared through triangulation (Denzin 1970, in Navarro et al. 2004: 2).

First, a bibliographical and documentary analysis and review was carried out in two distinct parts. The first part involved a bibliographical compilation, while the second part consisted of an analysis and summary of administrative and archival documentation.

The bulk of the research involved ethnographic fieldwork, mainly based on the technique of observation (Hammersley and Atkinson 1994) (Punta Umbria and El Rompido, Spain; Fuseta and Sagres, Portugal, between 2020 and 2021). This technique was complemented by interviews with key informants, and recording of narratives and life stories.

A total of 66 participants (62 men and 4 women) directly involved in octopus fishing were interviewed through three discussion groups, one on the Huelva coast (Punta Umbría, 2020) and two on the Algarve coast (Fuseta and Santa Lucia, 2021). All of the participants were between the age of 30 and retirement age. In addition, two fishers from Huelva and four researchers from the Algarve Centre of Marine Sciences (CCMAR) were interviewed individually.

The researchers took part in the Octopus Fishery and Life Cycle Workshop (2021), during which experts and fishers shared their lifelong learning and experience. This event was also attended by Portuguese fishing guilds representing more than 300 fishers, technicians from NGOs, the Portuguese Secretariat of State for Fisheries (SEP), researchers from the CCMAR and a delegation of fishers from Galicia (Spain).

The content of the research was compiled in an audiovisual document and a field journal. Observations were made regarding the research projects, comparing the visions of the participants and the researchers, which also allowed us to learn about their way of approaching the issues raised in this study.

## Octopus fishery in the Gulf of Cadiz

The Gulf of Cadiz extends from Cape St. Vincent to the Strait of Gibraltar, including the Portuguese Algarve region and the Spanish provinces of Huelva and Cadiz bordering the Atlantic Ocean. The Guadalquivir and Guadiana rivers are two major waterways flowing into the ocean that stand out due to their ecological value, with the latter river marking the physical border between the two countries (Figure 1).

The general dynamics of the coastline are northwest-southeast, with some beaches in an east-west direction

resulting in a staggered coastline. At the bottom of this coast there are rocky areas (in the Strait of Gibraltar and occasionally along the Algarve coast) and sandy-clay areas more typical of the Portuguese–Huelva coastline. The marine geography is characterised by low-lying beaches, extensive plateaus and deep trenches located in the province of Cadiz (Benavente et al. 2015; Díaz-del-Río et al. 1998).

The marine geography and biological wealth favours the settlement of numerous marine species, as well as limiting the possibility of using certain fishing techniques. Such is the case of the traditional octopus fishery, the result of a wealth of knowledge handed down through different generations which is still put into practice today to successfully fish for this species (González et al. 2011).

The common octopus (*octopus vulgaris*) is a species found in warm and temperate waters of different seas and oceans around the world. As pointed out by Jurado-Rufaza

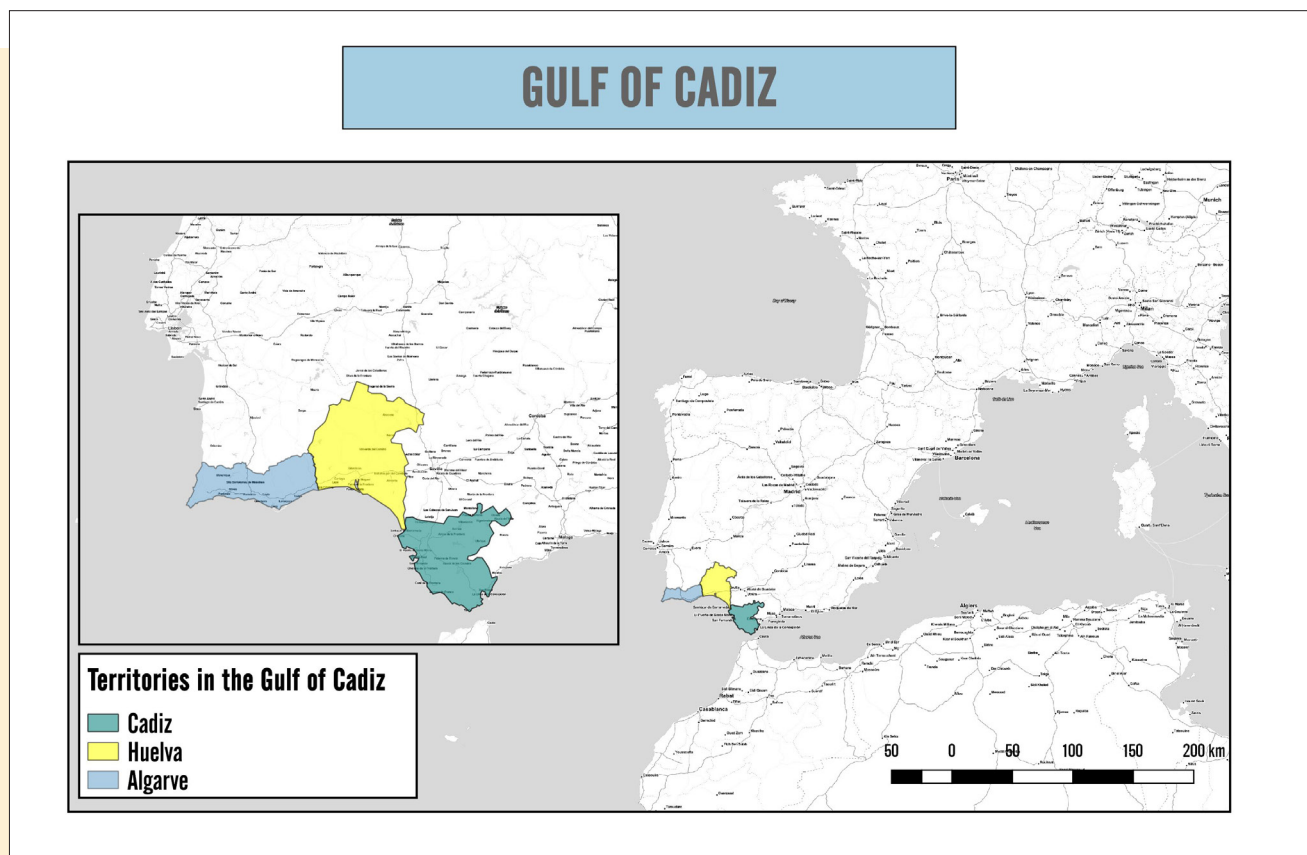
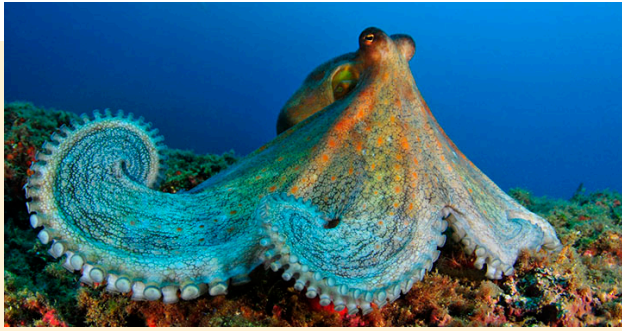


Figure 1  
Gulf of Cadiz  
Source: Author



**Figure 2**  
Octopus vulgaris  
Source: Oceana. <https://fishsizematters.eu/peces/pulpo-comun/>

and colleagues (2011), it is a benthic species with a wide adaptability to habitats, which is why it is found on rocky sea floors and meadows and at different depths. Its life cycle is characterised by rapid growth and a short life span of just over a year (Eslava et al. 2019) (Figure 2).

Due to its reproductive characteristics and its nomadic nature, it is difficult to obtain the annual count of specimens of this species. As Carvalho and Sousa (2003) point out, octopus reproduction is terminal-simultaneous, involving deposit of a large number of eggs with a high mortality rate but which is highly variable depending on the environmental conditions.

The reproductive cycle takes place over several months. The mature females lay their eggs in the months between

February and August, with a decline between September and January. In November there is an upturn in the number of reproductive females. In addition, larger specimens can be found in areas with warm water, such as certain spots in the Gulf of Cadiz (Carvalho and Sousa 2003).

Two main techniques are used for commercial fishing of the common octopus. The first of these is the plastic shelter pot; the second is the clay shelter pot, known locally as an 'alcatruz'. More selective fishing techniques such as hand jigs ('pulperas') are also used with a professional licence.

Although the aim of this study is to describe the contribution to sustainable development of the clay shelter pot as intangible cultural heritage from an ethnological perspective, it is necessary to present both types of fishing gear in order to analyse the advantages and disadvantages of each technique and their contribution to sustainable fishing culture.

As noted by Sauer and colleagues, 'Octopus fishing traps are framed traps with a single entrance partially blocked usually by plastic strips, easy to push in by an octopus but not back out' (2019: 5). As they continue to explain, in some cases they may be baited inside with fish, so that the octopus enters the trap to feed but cannot get out afterwards (Figure 3). The pots can be made of different materials, shapes and sizes. Figure 3-A is an example of a cube-shaped trap. Figure 3-B shows a semi-cylindrical



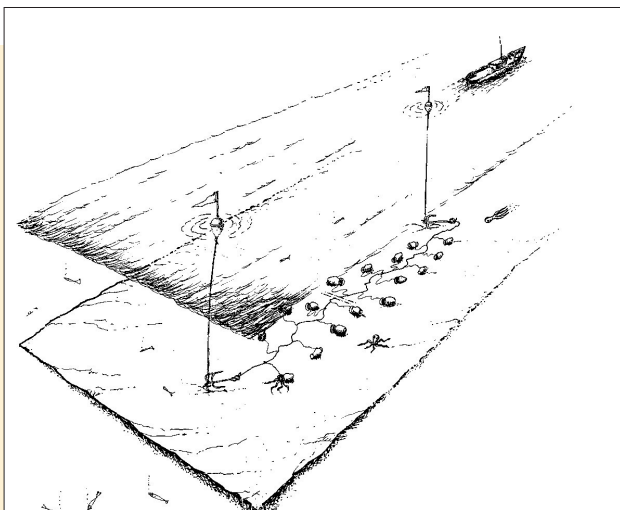
**Figure 3**  
Two forms of plastic trap, Sagres, Portugal, 2021  
Source: Author

shape but using the same capture system, with the flat area serving as the base and support for the trap.

Plastic traps are deployed from a boat via a single 'mother line' (the line that joins all the traps together) with a motor-driven pulley that positions the traps on the sea floor. The set of traps is indicated at sea with a 'mark', a flag with a mast usually attached to an inflatable or cork buoy. This differentiates the traps owned by each boat, as well as indicating the location of the line where the traps are to be collected.

The traps can be collected and deployed daily. The legislation in each territory regulates the limitations on use of this gear, although normally they are collected between two and five days after being set. The system for depositing clay shelter pots on the sea floor is similar to that of the traps. There is also a mother line joining a series of pots to the same buoy, and a 'mark' is also used to indicate the location of the pots and identify the owner.

Clay shelter pots are a passive fishery technique, although they are different from traps. As Sobrino and colleagues point out, the '*alcatruz* is a capture device ... (which) is based on a close knowledge of octopus behaviour: very territorial, "hermit-like" and in constant search of shelter ... it consists of a vase-shaped clay pot without a net to hold the octopus. They are rigged to long lines containing between 50 and 70 clay shelter pots' (2011: 284) (Figure 4).



**Figure 4**  
Clay shelter pot, or *alcatruz*, for common octopus  
Source: Silva and Sobrino (2013)

These fishing techniques are regulated by the laws of each country. The fishing zone of the Portuguese Algarve (the Portuguese part of the Gulf of Cadiz) is mainly regulated by the following regulations:

- Ordinance 635/2005 of 2 August 2005 of the Ministry of Agriculture, Rural Development and Fisheries, which establishes measures on an experimental basis for the management of octopus fishing on the southern coast of Portugal.
- Regulatory Decree 7/2000 of 30 May amending Regulatory Decree 43/87 of 17 July (defining national measures for the conservation of living resources applicable to fishing activities in waters under national sovereignty and jurisdiction) and reissuing it as an annex with all its amendments.

The area of the Gulf of Cadiz in Andalusia is governed by the Order of 25 April 2017, which regulates the capture of octopus (*octopus vulgaris*) in national fishing grounds of the Gulf of Cadiz and establishes a census of vessels authorised to carry out such activity.

Other restrictions have also been established, such as limitation of the fishing fleet (only in the Spanish case), closed fishing seasons (different in each area), minimum catch size, and restriction of the area in which the fishing gear is set so as not to interfere with the biodiversity of the ecosystem and other fisheries, etc.

Although fisheries legislation is of utmost importance as it regulates all fishing activities in the area, this legislation is mainly focused on managing ecological and economic issues in order to meet the needs of fishers without irreparably affecting the survival of the octopus population.

This means that the legislation directly affects the survival of artisanal fishing techniques that are identified with the fishing heritage of the region, yet it does not focus on safeguarding these heritage values. Rather, reliance is placed on heritage legislation specifically designed for that purpose.

In the case of Spain, the application of Law 10/2015 of 26 May for the safeguarding of the intangible cultural heritage stands out. According to its second article, 'the uses, representations, expressions, knowledge and techniques that communities, groups and in some cases

individuals recognise as an integral part of their cultural heritage' are considered intangible cultural heritage assets. In this way, the Law follows the guidelines of the 2003 Convention and recognises the heritage typologies into which the artisanal fishing of octopus using clay pots is classified.

Similarly, the Portuguese Law 107/2001 of 8 September, which establishes the basis for the policy and regime for protection and enhancement of cultural heritage, recognises in its Article 2.4 that 'intangible assets that constitute structural parcels of Portuguese identity and collective memory are part of the cultural heritage'. We also find reference to preserving heritage in Decree-Law 115/2012 of 25 May of the Directorate-General for Cultural Heritage.

In both countries, there is a structure for the protection and recognition of cultural heritage through cataloguing (for the most recognised elements) and inventorying (which involves the documentation of those elements that, although considered relevant, do not enjoy institutional protection).

However, the competent heritage legislation does not recognise octopus fishing with clay shelter pots as an element of intangible cultural heritage. The following section seeks to highlight the relevance of artisanal octopus fishing as intangible cultural heritage and thus contribute to its safeguarding.

## Octopus fishing with clay shelter pots as intangible cultural heritage

Until now, fishing for octopus using clay shelter pots (known locally as an '*alcatruz*', '*cadufo*', '*cangilón*', etc.) has been treated as an artisanal or small-scale fishery and its heritage importance has not been highlighted. In order to understand it in this manner, we will study the activity from a diachronic perspective.

As noted by Tsangridis, Sanchez and Ioannidou, the biology of the common octopus and 'its high commercial value in the Mediterranean since ancient times (Sartor et al. 1998) have resulted in the development of specialised and highly productive fisheries (pots, traps and nets) with catches which are practically monospecific' (2002: 66).

It is difficult to trace the origin of the tradition of the

clay shelter pot for octopus fishing in the Gulf of Cadiz and the origin of its consumption, given that the lack of a rigid skeletal structure makes it difficult to determine its consumption in periods studied using archaeological methodology. Some studies suggest a possible octopus fishery in Roman times. Taking advantage of the system of fishing corrals typical of the Cadiz coast, the octopus would have been hunted thanks to the shallow depth provided by the corrals or using '*cuévanos*' (Sañez-Reguart 1791–1795), pots made of cane or esparto grass that were also used for crab fishing.

As for the clay shelter pots themselves, underwater finds suggest that their use began in the late Roman period (Bernal 2010). Octopus is known to have been consumed on a daily basis by both Muslims and Christians in that same period in other areas of the Iberian Peninsula, encouraged by the practice of Lent and its low price. It was also present in the Middle Ages and the period of Al-Andalus (711–1243) (Martínez 2015), which confirms its consumption in the Gulf of Cadiz since the late Roman period.

This conclusion is supported by recent ethnological works defining '*cangilón*', one of the names given to the clay shelter pots in the Spanish zone of the Gulf of Cadiz: '*cangilón* is a variation of *gongilón*, derived from the Mozarabic Vulgar Latin term *congialis* meaning "measure of wine", an earthenware vessel used to catch octopuses' (Gómez 1989: 21).

The above historical evidence provides an important basis demonstrating the use of this artisanal fishing system over centuries of history, imbuing the use of clay shelter pots with a strong historical and traditional character. However, while important, this is not its only heritage value.

As well as being a noteworthy fishing technique in the local culture, the importance of the tradition of octopus fishing is reflected in a range of strongly consolidated gastronomic, commercial and mythological manifestations that revolve around this species and its consumption. Both the *Guide to the cultural heritage of fishing in Andalusia* (2011) and the *Atlas of the intangible heritage of Andalusia* (2014) – a benchmark in the safeguarding of intangible cultural heritage and recognised by UNESCO – highlight the intangible heritage value of these expressions and elements linked to knowledge and ways of life associated

with octopus fishing in the region of Andalusia.

Its artisanal nature is reflected in its manufacture in pottery workshops and its use at sea, both of which are the result of specialised knowledge of the species and its physical environment that has been passed down orally from generation to generation.

Without reliance on modern technology, this knowledge has been preserved through empirical methods thanks to years of dedication by fishing families and the transmission of knowledge in family and economic environments. It comprises a very selective form of artisanal fishing, designed solely for catching the common octopus, thus demonstrating a very detailed knowledge of its behaviour.

The clay shelter pots are deposited and collected from the sea by an artisanal fleet known under Andalusian legislation as the 'fresh' trawling fleet. This fleet of artisanal boats 'is characterised by daily fishing and the use of trammel nets, trap gear (pots) and hook gear ... [T]hey tend to be small vessels' (Department of Agriculture and Fisheries 2012: 5). There are two characteristics of key importance for the transmission of this artisanal fishing knowledge.

The first of these is the strong endogamic nature of the transmission of this fishing method. It is common to find testimonies that mention starting this work at a very early age introduced by a relative, usually the father: 'I catch octopus almost all year round. That's how I've been doing it for 20 or 25 years, and before that it was my father too, and on the other boat we were also fishing for octopus' (fisher 1, Punta Umbría, 2020).

It is also common to find testimonies describing how many octopus fishers were involved in other fisheries as well and that on occasions, if there was a shortage of personnel, young people who were in the fishing port every day were offered the opportunity to learn the trade.

The second characteristic of utmost importance for the transmission of knowledge and learning about fishing with clay shelter pots is experience. Learning is not only done by receiving information orally, but also through observation and practice, both in port when preparing the gear, assembling it on the boat and repairing it, and at sea when learning the most successful setting locations, the arrangement of the gear at sea, and the optimal

environmental conditions and tides so that the pots do not break or get lost. The whole process is carried out by hand and the boats do not have a mechanised system for this type of fishing.

If the artisanal nature of this fishery is to be maintained, the manufacture of specialised octopus fishing gear is also of vital importance. Some testimonies – for example, in the Portuguese area – describe the almost total disappearance of the use of clay shelter pots due to their substitution with plastic pots or traps, or, in the case of Huelva, the use of materials such as tin cans instead of clay shelter pots.

The production of clay pots for octopus fishing has become more dispersed, with the fishers having to travel to the pottery workshops in the main artisan hubs of the area: 'We started to go to where they made clay pots: to Trigueros, Gibraleón, La Palma del Condado [municipalities in the province of Huelva]. Later on, we went to Portugal. That was where they made the *alcatruces*' (fisher 2, El Rompido, Huelva, 2020).

Some fishers also describe how they sometimes made their own gear: 'I made *cangilones* out of clay or wood, all kinds of material. And I fished quite a lot with them' (fisher 3, Punta Umbría, 2020).

These workshops devoted to artisanal manufacture of clay shelter pots have been disappearing in the areas that previously met the demand for fishing in the Gulf of Cadiz. Today, the fishers of this region are mainly supplied by a workshop located in Jaén, an inland province in the northeast of Andalusia that maintains this pottery tradition. They are also supplied by a workshop in Loulé, a municipality in the Algarve which, despite the limited use of earthenware pottery in that area, maintains its production due to the demand for pots for fishing in the Spanish region of the Gulf of Cadiz (Figure 5).

The manufacturing process consists of two phases. The first phase consists of the manual construction of clay pots of the shape and size suitable to house octopuses, consisting of a wide entrance and a narrow bottom with a hole. They may also have another hole for the attachment to the mother line. The resulting pots are then baked in an oven. The second phase is carried out by the fisher and involves attachment of all the pots to the mother line, depending on their number and nature, along with



**Figure 5**

Master potter: artisan manufacturing clay shelter pots, Loulé, Portugal

Source: Nuno de Santos, 'Lei ambiental espanhola mantém viva tradição algarvia do alcatruz'. Barlovento, 5 July 2017. <https://barlovento.sapo.pt/destaque/lei-ambiental-espanhola-mantem-viva-tradicao-algarvia>

marking of each pot with the fisher's distinctive mark.

Ethnographic work, interviews with key actors and focus group observation have yielded information of major relevance to what was defined by Jesus and colleagues (2022) as LEK (local ecological knowledge). This LEK, treasured by artisanal communities, is 'remarkably fundamental to effectively manage fisheries, support protected area management strategies, species conservation and other factors' (2022: 1).

An ethnoecological approach has been applied to determine the life cycle of the species *octopus vulgaris*, the behaviour of which is still relatively unknown to science, although it is less of a mystery now thanks to the years of observation by traditional fishing communities.

The same applies to the artisanal fisheries of the main countries for octopus fishing worldwide, such as the leading country, South Korea, along with Japan and Taiwan (Dou 2010; Lee 2011; Byun 2022; Kim 2016), which both have a similar level to Spain. These different cultures have traditionally observed the behaviour of the species for its fishing and consumption and as a result they all have a common intangible cultural heritage (Carbonell 2012; Durán 2015).

Despite its heritage importance, the use of clay shelter pots for octopus fishery is criticised by some biologists and fishery experts. A comparison of the viewpoints of

those who value the clay shelter pot as a fishing system and those who do not help us to highlight possible positive ecological values for the sustainability of this fishery. The following section addresses this matter through the work carried out under two research projects.

### **Two research projects in Spain and Portugal: observation of different interpretations and accounts of the same problem**

One key issue emerges from the literature review and observation of the different categories of stakeholders: although this study focuses on the heritage value of artisanal octopus fishing using clay shelter pots, its preservation as traditional knowledge depends mainly on the ecological and economic valuation that is currently granted to this form of fishing.

Using triangulation, we have been able to compare the experience of observing the behaviour of the discussion groups with scientific advances in this field. This has been done through a study of two research projects:

- 'Octopus fishing with clay shelter pots in Euroregion AAA: a common intangible cultural heritage', carried out at the University of Huelva.
- 'Participesca: implementation of co-management of octopus fisheries in the Algarve', carried out at the Centre of Marine Sciences of the University of Algarve.

On the other hand, these projects offer interesting insights into the ecological arguments that certain stakeholders and experts rely on to support the appropriateness of using clay shelter pots on the one hand, and plastic traps on the other, for octopus fishing. All of this will have an impact on the preservation or, on the contrary, the disappearance of this element of intangible heritage which constitutes a vibrant cultural expression linked to the economic activity of fishing. The results of these projects are set out below.

***Project: 'Octopus fishing with clay shelter pots in Euroregion AAA: a common intangible cultural heritage'***

The general objective of this research project was to recognise the origin of the traditional artisanal octopus fisheries on the Huelva and Algarve coast. It sought to unify efforts to enhance recognition of the intangible cultural heritage of the method of fishing for octopus with clay shelter pots and its artisanal, and therefore ecological, quality.

The specific objectives were: (1) to quantify octopus fisheries on the coast of Huelva and identify those of an artisanal nature; (2) to determine the problems faced by the sector and the fishers themselves; (3) to document the art of fishing with clay shelter pots and its heritage values; and (4) to promote the creation of a distinctive brand for this fishery as intangible cultural heritage.

Following observation of participants in the interviews and discussion groups, the first conclusion is that the attitude of the key stakeholders regarding octopus fishing with clay shelter pots is favourable. They see it as a fishing method that is traditionally used in the Huelva area. They consider plastic traps to be very harmful to the seabed and the marine ecosystem. They define it as 'highly polluting'.

They also point out other problems in the sector, such as excessive bureaucracy in order to be able to fish for octopus and other species, the lack of fairness when obtaining fishing permits for various species, competitive difficulties in the market, and poaching in the sector. They also mention the lack of recognition of the local octopus fishery in the area, which is wrongly presented in the market as a fishery of competing areas such as Galicia.

Regarding the protection of small-scale fisheries, this is regulated in the competent legislation on octopus

fishing. However, it is true that this technique has a direct competitor, the plastic trap, the efficiency of which has led to the progressive abandonment of clay shelter pots despite the fishers themselves recognising that plastic traps are a highly polluting method. The words of the President of the Andalusian Federation of Fishing Guilds (FACOPE) based on his own experience are enlightening on this subject:

Octopus fishing was regulated in 2016. A working group was formed and the Andalusian Federation, of which I was not President at the time ... asked me to step in for the President, who was ill, and we carried out work on the role of octopus. In the end an order was drafted and soon after the Federation of Galicia invited us to a talk in Galicia, a meeting, [...] I made a speech there about the clay shelter pots and, well, people were very surprised when I talked about it. [...] Everybody there, all they defended was the '*nasa*' (plastic trap), always the '*nasa*'. I think that even those who fish with the '*nasa*' are a little bit against it. Even them. And those who fish without the '*nasa*', they also see it as a bad thing. Why? Because if we lose any plastic gear we deteriorate the seabed.

The research work carried out in the Portuguese area (in the zone of Santa Luzia) revealed a decline of octopus fishery which prevented us from achieving the desired purpose of promoting recognition of the heritage of artisanal octopus fishing in the Gulf of Cadiz. Therefore, we did not engage in the observation of any more focus groups.

***Project: 'Participesca: implementation of co-management of octopus fisheries in the Algarve'***

This project divided into several phases aimed to diagnose the octopus fishing sector in the Algarve region, working with fishers and exchanging knowledge with them. The ultimate goal was to gather data on the current status of octopus fishing through GPS tracking, counting and samples of specimens. As in the case of Huelva, there were no classified and differentiated statistics for this fishery.

Fishers from Fuseta y Santa Luzia highlighted the problems with conservation of the common octopus due to overfishing of the species in the area. In the Portuguese case, there is no control of the maximum quota, and the only limitation and closure is for specific days of the week

(Sundays) and a location within a specific distance. The fishery method used in this area is the plastic trap, and clay shelter pots are rarely used. It is more common to use plastic pots, which are prohibited in Andalusia as they are highly polluting.

Every day, octopus fishers in the Algarve gather thousands of traps without any size or weight control. They also acknowledge that they ignore the restrictions regarding the area delimited for octopus fishing. This is an issue that the researchers of the GPS tracking project explored. Some of these fishers were aware that their unlimited fishing practices were making octopus fishing unsustainable.

Interviews with biologists from the Participesca project reflect a different view to that of the Spanish researchers. They do not consider plastic traps to be very harmful. However, they do point out that uncontrolled fishing and the lack of awareness of fishers endangers octopus fishing. They consider it to be an educational and governmental problem that must be tackled.

The Octopus Fishery and Life Cycle Workshop was held on 11 and 12 October in Faro and Portimao, respectively, an event attended by the researchers of the project, fishers, the Fishing Guilds of the Algarve, representatives of NGOs and representatives of the Secretary of State for Fisheries, which is responsible for managing and regulating fisheries in Portugal.

Interesting issues discussed included the initiative to research the life cycle of the common octopus and other octopus species; problems with the protection of the species and fishing; the coherence between the life cycle of the species and the adequacy of state management measures; and the differing visions of the research and of some of the fishers attending.

Unlike other coastal areas, the survival of traditional octopus fishing is not even a matter for consideration among fishers in Portugal and Galicia. Fishers in the Galician area expressed their rejection of the clay shelter pot because in Galicia the sea floor is rocky and clay pots can suffer damage and breakage when they are released and collected. They also consider that the female octopuses deposit their eggs inside the pots and when the pot is collected, the new generations of the species are lost with them.

The representatives from the Portuguese zone argued differently. Their concern focused on demanding government control of fishing quotas for traps, known in Portugal as 'covos', which are still not effectively controlled.

The heritage of artisanal octopus fishing is not a matter of concern in the Portuguese region, even though the valuation they are currently making positions industrialised fishing gear as preferential to artisanal fishing. Understanding whether octopus fishing with clay shelter pots is really detrimental to sustainability, as Portuguese and Galician fishermen and researchers argue, is a part of the objectives of concern in this research. In the following subsection we address the ecological assessment of both fishing gears within the parameters of sustainability and environmentalism.

### ***Ecological problems of fishing for common octopus with different fishing techniques***

The detailed work carried out with the different discussion groups also highlighted the problems with octopus fishing, relating mainly to problems of competition and excess demand for the product leading to supply problems due to unsustainable fishing. The social and economic conflicts in each region are at the heart of this problem.

Another problem is the ecological consequences, the area on which we are mainly focused. The economic dependence of many groups of fishers on reaching a number of catches that is profitable for their business focuses their fishing activity on the short term and not on the conservation of the species and its environment in the medium and long term. This is reflected by the inconsistent institutional regulation in each region. Spanish fishers, based mainly in Huelva, have closed periods and quota limitations: 'Fishing vessels of  $\leftarrow 9$  m (local category) can legally fish up to 500 traps, and coastal category vessels (9–12 m and  $\rightarrow 12$  m overall length) are allowed up to 750 and 1,000 traps, respectively' (Erzini et al. 2008: 321).

On the other hand, the use of traps is uncontrolled in the Portuguese area. Compared with the limitation of 1000 traps per boat in Spain, some Portuguese fishers revealed that they can deposit around 5000 traps daily if their boat and resources allow them to do so. One fisher commented: 'If you put one foot in the water you step on a pot and if you take a step further you step on someone else's. We create

the problem ourselves, but if someone else does it, you want to do it too' (Fuseta 2021). They also say that they locate their traps in areas outside the permitted fishing grounds because they cannot fish properly when they coincide with vessels dedicated to catching other species.

There is widespread awareness that the lack of common octopus supply is often caused by overfishing by them as a whole, along with certain poaching practices that harm their regular activity (Aditi and Deepak 2013).

On the other hand, there is the problem of their contribution to the deterioration and pollution of the ecosystem. Recent research by Almeida and colleagues (2022) shows how, in addition to a series of pollutants such as petroleum and zinc in the production process of plastic pots and traps, there is a high percentage of loss of plastic traps due to storms, breakage or dumping of plastics in the Atlantic Ocean off the coast of the Algarve.

The study by Erzini and colleagues (2008) estimated losses of 52,604 traps in 2000. In the case of local fishery, 42.6% of losses were caused by interference with other fisheries and 42.4% by bottom fouling; in coastal fishery, losses were caused mainly by bad weather (40.4%) and interference with other fisheries (40%). The same study revealed that during the first weeks, the traps used to study the impact of ghost traps and their effects on the fauna caught up to two specimens of different species, though they stabilised after 35 days.

It also found the existence of larger predators trapped in the traps between days 55 and 89. The octopus traps were still intact after 12 months, while wire fish traps were completely destroyed over the same period.

With regard to the clay shelter pot, earlier in this study we quoted the President of the Andalusian Federation of Fishing Guilds who reflected on the absolute rejection in Galicia of the art of the clay shelter pot. Fishers there argued that it was detrimental to the life cycle of the common octopus because, they claimed, the females entered the pots in search of shelter to lay their eggs and then died, thus completing the life cycle of the female sex.

A study by Sobrino and colleagues (2011) investigated the impact of different fishing techniques on octopus reproduction and life cycles on the Huelva coast (using clay shelter pots and two types of plastic pots). They observed

a low number of mature females and a total absence of reproductive females. Mature females were found just before spawning in the plastic pots, and to a lesser extent in the clay shelter pots. No pots were ever found with eggs inside them, even though the females had fully developed gonads and eggs of the adequate size for spawning.

The study was repeated, this time extending the period from 15 days to 30 days to rule out the possibility that the lack of eggs was due to the excessively short checking period, bearing in mind the reproductive cycle of female octopuses. 'A line of 100 pots was placed throughout the breeding season (spring–summer) and only checked once a month. Throughout this experiment no spawning was observed on the line during the period when the lines were anchored (March–August 2006)' (Sobrino et al 2011: 288).

The same debate has arisen in nearby North Africa. The study by Jouffre and Inejih (2002) focused on the impact of clay shelter pots on the coast of Mauritania. First, it concluded that clay shelter pots were not selective for brooding females; no more brooding females were counted than males or non-brooding females. It should be noted that in the Mauritanian commercial fishery, octopuses are eviscerated on board, so sex determination is difficult and sex maturity impossible to estimate after landing.

The study confirmed that criticism of the use of clay shelter pots is an argument to discredit artisanal fishing, since they compete in the same space as industrial fishing. 'It is clear now that the problems to be focused on concerning this artisanal versus industrial fishery interaction in Mauritania ... are those of the sharing of the total fishing effort allocated to the same resource' (Jouffre and Inejih 2002: 1083). It is difficult for the two activities to be carried out on the same site as the resource is limited, and while there are laws that delimit each practice they are not always respected.

As a result, trawlers enter the artisanal fishing zone, damaging the pots and lines and dragging them towards sandy bottoms: '... these lost pots do actually represent a new opportunity (and the unique one in some very large sandy and muddy areas) for the female octopuses to find a solid support onto which to fix their eggs' (Jouffre and Inejih 2002: 1084).

Consequently, there are two distinct problems

regarding the ecological impact of fishing. The first is the lack of control and excessive fishing of the species without respecting the reproduction seasons and minimum sizes. The second is the constant loss of plastic pots or traps that contribute to the deposit of macroplastics and microplastics in the ocean, deteriorating the seabed and prejudicing the biodiversity and health of the ocean.

## Discussion

This study proposes considering octopus fishing with clay shelter pots as an element of intangible cultural heritage in the Gulf of Cadiz, in line with the purposes of the UNESCO Convention of 2003 and respecting the premises of sustainability of the 1972 United Nations Conference on the Human Environment, under which cultural heritage assumes a role as a cross-cutting factor.

A wealth of knowledge has been accumulated in the Gulf of Cadiz regarding artisanal and selective octopus fishing, particularly in relation to the clay shelter pot. Changes in the fishing sector have limited the use of this fishing gear to specific zones in the Gulf of Cadiz. Meanwhile, the use of plastic pots and traps has become more widespread.

The research projects analysed shed light on some of the defining aspects of this situation. The project 'Octopus fishing with clay shelter pots in Euroregion AAA: a common intangible cultural heritage' shows that fishers are committed to recovery of artisanal fishing techniques (clay shelter pots) and the abandonment of plastic traps due to their high pollution levels and non-selective nature. Andalusian legislation protects this type of artisanal fishing, although it also allows the use of plastic traps.

The other project shows a rejection of artisanal fishing gear by a majority of the fishers interviewed. Their rejection is due mainly to the fierce competition faced by fishers and the low profitability of clay shelter pots, which are more selective and are made of more fragile natural materials than the plastic traps. Researchers also favour the use of plastic traps over the use of clay shelter pots.

Applying triangulation of data, this paper highlights the ecological problems of concern to both fishers and octopus fishery experts. The studies by Sobrino and colleagues (2011) and Jouffre and Inejih (2002) show that the problem with the use of clay shelter pots is not a question of

ecological issues relating to the pots themselves, but rather problems of competition in the fishing industry. In addition, authors such as Erzini and colleagues (2008) highlight an additional problem associated with overfishing using plastic traps: the dumping of microplastics into the ocean due to their abandonment in the marine ecosystem. In this sense, the use of clay shelter pots has been proven to be a more selective and sustainable fishing technique.

In addition to the environmental debate, there is the issue of the progressive decline of the use of this fishing gear and the lack of concern in some regions regarding its preservation, which would constitute a significant loss of the intangible cultural heritage of these fishing populations. We explained above the heritage relevance of this element and how these populations have historically specialised in this type of fishing which shapes their culture and enriches their intangible heritage.

The *Guide to the cultural heritage of fishing in Andalusia* (2011) and the *Atlas of the intangible heritage of Andalusia* (2014) have compiled inventories of cultural manifestations of heritage value. However, there is no clear reference, in the legislation of either Spain or Portugal, to their protection through specialised cultural heritage laws. In this regard, the possibility exists of complementing specialised fishing legislation with heritage legislation by cataloguing this fishing gear through existing legal channels:

- Law 10/2015 of 26 May for the safeguarding of the Intangible Cultural Heritage (in Spain).
- Law 107/2001 of 8 September, which establishes the basis for the policy and regime for protection and enhancement of cultural heritage (in Portugal).
- Decree-Law 115/2012 of 25 May of the Directorate-General for Cultural Heritage (in Portugal).

This process could take as a reference other fishery heritage elements such as those inscribed in Intangible Cultural Heritage Lists that demonstrate the possibility of this recognition not only because of its ecological importance, but also because it is a heritage element with a broad legacy of knowledge and a relationship with the natural environment for its sustainable use (Kern et al. 2021). Some of these cases include: charfia fishing in the Kerkennah Islands (Representative List, 2020); shrimp fishing on horseback in Oostduinkerke (Representative List, 2013); and the 'Sanké mon: collective fishing rite of

the Sanké' in Mali (Intangible Cultural Heritage in Need of Urgent Safeguarding, 2009).

In addition, further research should be considered to promote a favourable socio-economic environment for the use of clay shelter pots as a form of artisanal fishing, promoting this practice over other industrialised fisheries and social and institutional recognition of the status of octopus fishing with clay shelter pots as intangible cultural heritage and a relevant aspect of the culture of modern society.

This recognition could be of an international nature, since octopus fishing with clay shelter pots like those known in the Gulf of Cadiz as *alcatruces* is also present in the tradition of other cultures in different parts of the world, mainly the other world powers for octopus fishing (South Korea, Taiwan and Japan, where this heritage is called *Tako-Tsubo*).

## Conclusions

Ethnographic work and participant observation in two research projects on octopus fishing allowed us to describe the artisanal technique of octopus fishing with clay shelter pots in the Gulf of Cadiz. This intangible cultural heritage coexists with other industrialised fishing techniques that generate a higher rate of catches, leading to the progressive disuse of clay shelter pots, which are currently only protected by Andalusian legislation on octopus fishing.

There is a rejection of this fishery method in certain zones because its forced use would compete with the use of traps or other techniques and would result in a more sustainable catch and, therefore, lower annual totals. The current regulations are constantly being overlooked by fishers and are insufficient. They do not protect the reproductive seasons of the species, resulting in a progressive disappearance of the species or almost no captures of the species on some occasions.


The reason alleged against its use – namely, that

the use of clay shelter pots has a negative impact on the reproduction of the species – has already been discredited by scientific research. Far from it, this intangible heritage, applied with the corresponding closed seasons and respecting the reproductive cycle of the octopus and the minimum sizes, is one of the best ways to replace the current unsustainable fishing practices (with plastic traps) by an artisanal and sustainable method. It also contributes to reducing the impact of plastics in the ocean and, therefore, in our food.

These ideas could be supported by the recognition of the intangible cultural heritage of this fishery through the mechanisms existing for the safeguarding of intangible cultural heritage. The risk of disappearance of both the species and this heritage element raises the need for urgent measures to support its preservation and the promotion of sustainable cultural practices. These measures should focus on protection of the art of making clay shelter pots by promoting and encouraging social participation in the protection and transmission of this heritage element; preservation of fishing knowledge and artisanal octopus fishing as a way of life; and protection of the pottery workshops that make these clay shelter pots.

It is important to overcome the social barriers that limit the recognition of cultural heritage to monumental, historical and artistic elements, and to grant recognition to intangible heritage such as this natural form of fishing, which is of such importance to the history of the region, its sustainable development and the preservation of its cultural diversity.

## Acknowledgements

This research has been financed within the framework of the International Mobility Grants to Centers of Excellence for Doctoral Students. CEI-MAR 2021. It has also been financed by the Mobility Program Erasmus+ internships, and as part of the Project 2019-1-ES01-KA103-062555, and by grant project PID2022-138651NB-I00 funded by MCIN/AEI/ 10.13039/501100011033, and by 'ERDF: a way of making Europe'. 

## REFERENCES

- Aditi, N., and A. Deepak. 2013. 'Artisanal octopus fishery: socio-economics and management'. In *Ecology and conservation of tropical marine faunal communities*, edited by K. Venkataraman, C. Sivaperuman and C. Raghunathan, 409–418. Heidelberg, Germany: Springer. [https://doi.org/10.1007/978-3-642-38200-0\\_26](https://doi.org/10.1007/978-3-642-38200-0_26).
- Almeida, C., P. Loubet, J. Laso, M. L. Nunes and A. Marques. 2022. 'Environmental assessment of common octopus (*Octopus vulgaris*) from a small-scale fishery in Algarve (Portugal)'. *International journal of life cycle assessment* 27: 849–867. <https://doi.org/10.1007/s11367-022-02072-7>.
- Barlavento. <https://barlavento.sapo.pt/destaque/lei-ambiental-espanhola-mantem-viva-tradicao-algarvia>.
- Benavente, J., F. J. García, L. Del Río, G. Anfuso and A. Rodríguez-Ramírez. 2015. 'Morphodynamic characterization of the Spanish beaches of the Gulf of Cadiz'. *Geological and mining bulletin* 126: 409–426.
- Bernal, D. 2010. 'Fishing tackle in Hispania: reflections, proposals and first results'. In *Ancient nets and fishing gear. Proceedings of the International Workshop on Nets and Fishing Gear in Classical Antiquity: a first approach*, edited by T. Bekker-Nielsen and D. Bernal, 83–137. Cadiz, Spain: University of Cadiz.
- Byun, H. 2022. 'Tideland fishing and oral life history of women: a suggestion on the sustainable development of intangible cultural heritage'. *Intangible heritage studies* 7, no. 1: 217–244.
- Carbonell, E. 2012. 'The Catalan fishermen's traditional knowledge of climate and the weather: a distinctive way of relating to nature'. *International journal of intangible heritage* 7: 61–75.
- Carvalho, J. M. N., and C. Sousa. 2003. 'Contributions to knowledge on the maturation and fertility of the common octopus "*Octopus vulgaris*" (Cuvier, 1797) on the Portuguese coast'. *Boletín del Instituto Español de Oceanografía* 19: 473–482. <http://hdl.handle.net/10508/1428>.
- Department of Agriculture and Fisheries. 2012. *Junta de Andalucía: caracterización de la pesca costera artesanal en Andalucía*. Seville, Spain: Andalusian Government.
- Díaz-del-Río, V., J. T. Vázquez, F. J. Hernández-Molina, I. Somoza, F. J. Lobo, A. Barnolas, A. Maestro, C. Roque, M. C. Fernández-Puga, J. Luis, E. Llave, S. Martín-Alfageme and O. Ferreira. 1998. 'Influencia de la tectónica y de la dinámica oceanográfica en los rasgos geomorfológicos del talud continental del Golfo de Cádiz'. In *Investigaciones recientes de la Geomorfología española*, edited by A. Gómez-Ortiz and F. Salvador-Franch, 317–324. Barcelona, Spain: University of Barcelona.
- Dou, X. T. 2010. 'Safeguarding intangible cultural heritage in productive ways'. Dissertation/thesis, Sun Yat-Sen University, People's Republic of China.
- Durán, R. (et al.). 2015. 'Conservation of maritime cultural heritage: a discrete choice experiment in a European Atlantic region'. *Marine policy* 51: 356–365.
- Erzini, K., L. Bentes, R. Coelho, P. Lino, P. Monteiro and J. Gonçalves. 2008. 'Catches in ghost-fishing octopus and fish traps in the northeastern Atlantic Ocean (Algarve, Portugal)'. *Fishery bulletin* 106: 321–327.
- Eslava, N., L. González, F. Guevara and M. Rodríguez. 2019. 'Caracterización y desempeño de la pesca artesanal del pulpo (*Octopus vulgaris*) usando botes en Venezuela'. *Tecnociencia Chihuahua* 11: 33–41. <https://vocero.uach.mx/index.php/tecnociencia/article/view/168>.
- Gómez, A. 1989. *Breve estudio sobre el léxico marinero de Punta Umbría (Huelva)*. Huelva, Spain: Caja Provincial de Ahorros de Huelva.
- González, M., E. Barcala and M. C. García-Martínez. 2011. 'Fisheries and reproductive biology of *Octopus vulgaris* (Mollusca: Cephalopoda) in the Gulf of Alicante (Northwestern Mediterranean)'. *Mediterranean marine science* 12: 369–389. <http://hdl.handle.net/10508/8147>.
- Hammersley, M., and P. Atkinson. 1994. *Etnografía: métodos de investigación*. Barcelona, Spain: Paidós Ibérica.
- Instituto Andaluz del Patrimonio Histórico. 2014. *Atlas del patrimonio inmaterial de Andalucía*. Seville, Spain: Instituto Andaluz del Patrimonio Histórico.
- Jesus, M. D., C. Zapelini, R. Oliveira and A. Schiavetti. 2022. 'Octopus fishing and new information on ecology and fishing of the shallow-water octopus *Callistoctopus furvus* (Gould, 1852). Based on the local ecological knowledge of octopus fishers in the marine ecoregions of Brazil'. *Frontiers in ecology and evolution* 10: 788879. <https://doi.org/10.3389/fevo.2022.788879>.

- Jouffre, D., and C. Inejih. 2002. 'Are the octopus pots used by the Mauritanian small-scale fishery dangerous for the resource?' *Bulletin of marine science* 71: 1081–1085.
- Jurado-Rufaza, A., E. García-Isarch, A. Sancho, V. Duque and N Carracto. 2011. 'Aspectos biológicos de los cefalópodos comerciales pulpo común (*Octopus vulgaris*) y choco (*Sepia* spp) explotados por la flota europea en aguas de Guinea Bissau'. In 2nd Reunión del Comité Científico entre la República de Guinea Bissau y la UE, Bissau (11–13 April). <http://hdl.handle.net/10508/3643>.
- Kern, K., J. Irmisch, C. Odermatt, W. Haupt and I. Kissling-Näf. 2021. 'Cultural heritage, sustainable development, and climate policy: comparing the UNESCO World Heritage cities of Potsdam and Bern'. *Sustainability* 7: 9131. <https://doi.org/10.3390/su13169131>.
- Kim, J. 2016. 'Understanding of traditional knowledge of agriculture and fishing as intangible cultural heritage and research methods'. *Korean journal of intangible heritage* 무형유산 1: 121–146.
- Lee, K. 2011. 'Traditional knowledge of nature · Space in Jukbangryum[竹防簾] and Junak fishing – cases of Namhae and Nukdo Islands'. *Journal of Korean studies* 한국학연구 38: 101–128.
- Martínez, M. 2015. *La Murcia Andalusi (711–1243). Vida cotidiana*. <Sastamala,> Finland: Annales Academia Scientiarum Fennice Humaniora.
- Molina, B. 2018. 'La incorporación de la cultura y el patrimonio en el desarrollo sostenible: desafíos y posibilidades'. *Humanidades* 8: 57–89. <https://doi.org/10.15517/h.v8i1.31465>.
- Navarro, L., S. Pasadas and J. Ruiz. 2004. 'La triangulación metodológica en el ámbito de la investigación social: dos ejemplos de uso'. In *III Congreso de Metodología de Encuestas: book of abstracts*, edited by A. Padilla and J. Rueda. Granada, Spain: University of Granada.
- Nocca, F. 2017. 'The role of cultural heritage in sustainable development: multidimensional indicators as decision-making tool'. *Sustainability* 9. <https://doi.org/10.3390/su9101882>.
- Oceana. <https://fishsizematters.eu/peces/pulpo-comun/>.
- Sañez-Reguart, A. 1791–1795. *Diccionario histórico de los artes de la pesca nacional*. Madrid, Spain: Imprenta de la Viuda de D. Joaquín Ibarra. <http://catalogo.bne.es/uhtbin/cgiirsi/0/x/0/05?searchdata1=bima0000126749>.
- Sartor, P., P. Belcari, A. Carbonell, M. Gonzalez, A. Quetglas, et al. 1998. 'The importance of cephalopods to trawl fishery in the western Mediterranean'. *South African journal of marine science* 20, 67–72.
- Sauer, W. et al. 2019. *World octopus fisheries*. Reviews in *Fisheries science & aquaculture* 29: 279–429. <https://doi.org/10.1080/23308249.2019.1680603>.
- Silva, L., and I. Sobrino. 2013. 'Management of octopus (*Octopus vulgaris*) in the Spanish waters of the Gulf of Cadiz. ICES subdivision IXa-south'. In Workshop on the Necessity for Crangon (Brown Shrimp) and Cephalopod Management (WKCCM), Copenhagen, 8–9 October. <http://hdl.handle.net/10508/2336>.
- Silveira, P. 2011. *Guía del patrimonio cultural de la pesca en Andalucía*. Seville, Spain: Agencia de Gestión Agraria y Pesquera de Andalucía. Publications and Dissemination Service.
- Sobrino, I., A. Juarez, J. Rey, Z. Romero and J. Baro. 2011. 'Description of the clay of fishery in the Gulf of Cadiz (SW Spain) for *Octopus vulgaris*. Selectivity and exploitation pattern'. *Fisheries research* 108: 283–290. <https://doi.org/10.1016/j.fishres.2010.12.022>.
- Tsangridis, A., P. Sanchez and D. Ioannidou. 2002. 'Exploitation patterns of *Octopus vulgaris* in two Mediterranean areas'. *Scientia marina* 66: 59–68.
- UNESCO. 1972. *Convention for the safeguarding of the world cultural and natural heritage*. Paris, France: UNESCO. <https://whc.unesco.org/en/conventiontext/>.
- UNESCO. 2003. *Convention for the safeguarding of the intangible cultural heritage*. Paris, France: UNESCO. <https://ich.unesco.org/en/convention>.
- United Nations. 1972. *Conference on the human environment*. New York: United Nations. <https://www.un.org/en/conferences/environment/stockholm1972>.
- United Nations. 1992. *Conference on environment and development*. New York: United Nations.
- United Nations. 2012. *Conference on sustainable development: the future we want*. New York: United Nations. <https://www.unep.org/es/node/16086>.
- United Nations. 2015. *Transforming our world: the 2030 Agenda for Sustainable Development*. New York: United Nations.