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**Sardinia Native Diet:
Traditional Food Habits and Adaptation of its Island Terrains**

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Abstract

One of the world's five mythical regions, or longevity blue zones (LBZ), is Sardinia. It has about 1.6 million people living on it, making it the second largest island in the Mediterranean Sea. Ogliastra and Barbagia are the greatest place of longevity all around the world with the greatest number of centenarians leaving behind Okinawa, Japan. The world's first blue zone that was discovered was Ogliastra. But why is Sardinia's standard of living so drastically different from that of other people? How the Sardinian local eating routine and conventional food propensities make any distinction. We will try to give an answer to this multitude of inquiries here in this paper. A Roman diet, according to some local Sardinians, is the key to longevity, and a well-balanced, nutritious diet can alter genes. The Sardinian people have proven that they are the direct descendants of their Neolithic-era Nuraghic ancestors. In Sardinia, the four things that work in symbiosis with each other—genetics, environment, food, and family—have been linked to gastronomy and longevity. Not only is the food that is grown in Sardinia nutritious, but the process of growing it also led to less stress and longer lifespans.

For this study, different types of sources were used (books, journals, and websites and research papers), as much as possible according to a comparative methodology.

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1. About Sardinia

With a total surface area of 24,089 km² (including the minor islands), Sardinia (fig 1) is the second largest island in the Mediterranean after Sicily. Because Sardinia and Corsica are separated by roughly 10 kilometres of sea, its landscape mosaic confirms a transitional location between Africa and Europe. Its distance from the coasts of both continents is almost the same. The island is generally rocky, with segregated gatherings of mountains like Limbara, Sette Fratelli, and Gennargentu, the most noteworthy of which is 1,834 m, yet it likewise has sloped grounds, levels, and a couple of fields¹.

Figura 1-1- LOCATION MAP OF SARDINIA



The island's landscape has been significantly shaped by humans' long presence. Human stays dating back to the Lower Paleolithic have been discovered in the North, specifically in Perfugas. Notwithstanding, the most forcing ancient local culture has been the Nuragic, the remaining parts of which are still noticeable today wherever on the island, and in especially in regions with high settlement focus like Campeda and Planargia. However, Sardinia has been often influenced politically and culturally by its neighbours. Phoenicians, Carthaginians, and Romans, all succeeded each other as the island's "masters" in history. The island was ruled by Vandals and Byzantines following the fall of the Roman Empire before becoming a protectorate of

Pisa, Genoa, and then Spain. Finally, after a period as inde-swinging realm (1718-1861), Sardinia joined the bound together Italy in 1861. Although historically Sardinia was divided into four administrative provinces (Fig 2) Sassari, Noro, Oristano and Cagliari, recently four more provinces, i.e., Medio- Campidano, Ogliastra, Gallura and Sulcis, have been added to facilitate general planning and management. This political subdivision reflects the large geomorphologic areas that characterise the island. Sardinia is with no doubt underpopulated when compared to other Italian and European regions: it has a demographic density of 66 inhabitants per km², compared with the average of 194 persons per km² for Italy (ISTAT 2001)²

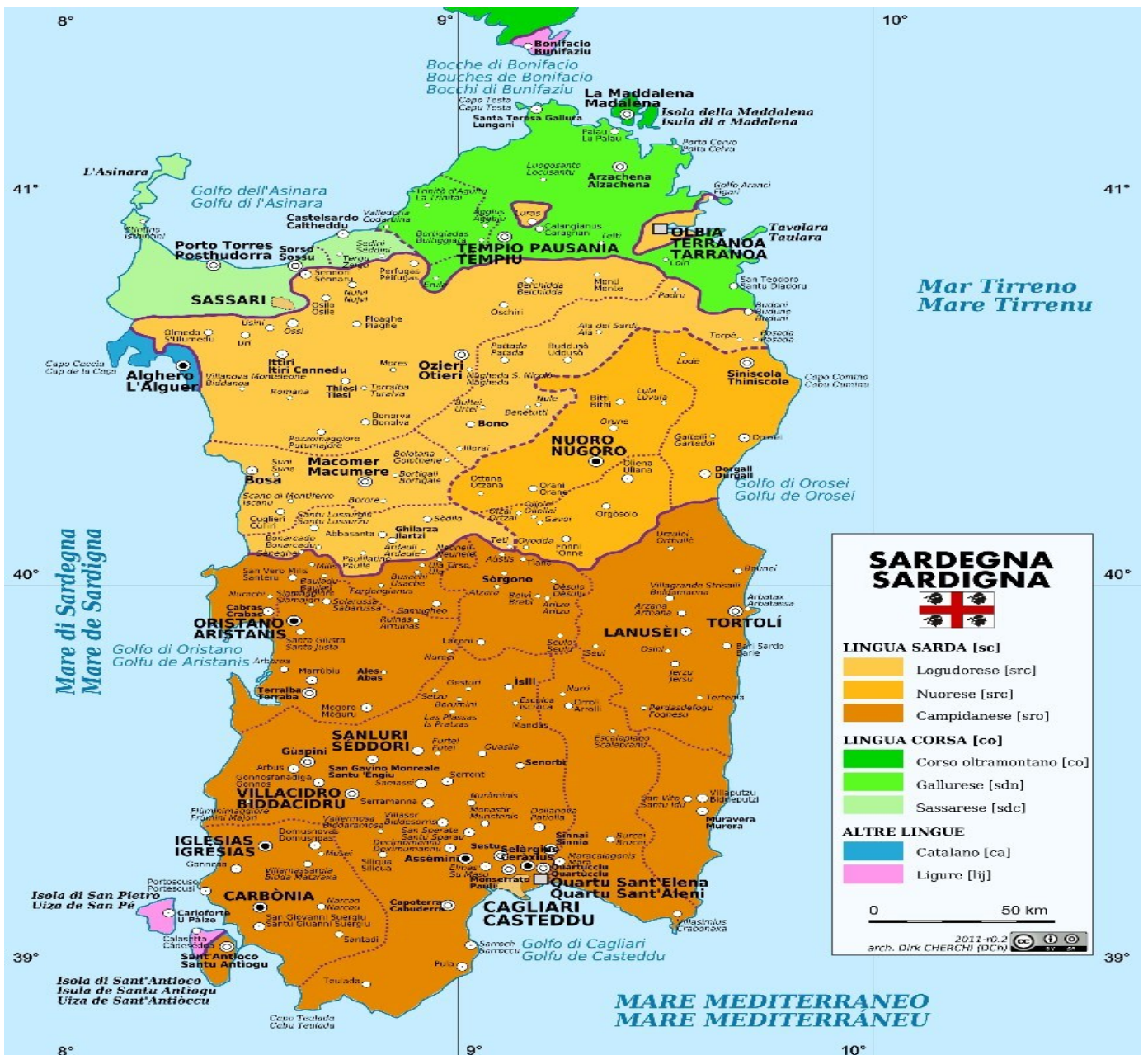


Figura 1-2 Sardinia sub provinces

In ongoing many years, the inland mountain towns have kept on losing population, while the biggest towns have extended because of the financial turn of events. Coastal areas and low land plains have also experienced rapid expansion because of agricultural and tourist development, respectively. Sardinia is not an exception to this trend, which has had a significant impact on the landscapes of the Mediterranean islands. Sardinia has a seasonal climate, with hot, dry summers and chilly, damp winters typical of the Mediterranean region. The primary drivers of the island's climate are its location between the temperate and subtropical zones and the considerable effect of sea breezes. Summer storms have yearly fluctuations that differ from the average rain distribution that happens in spring and fall. The water around the island supplies a breeze that travels towards land after sunset, reducing the heat of the summer season and the chill that the northern wind brings throughout the winter. The connection of the climate-regulating phenomena, such as rainfall and seasonal changes in coastal streams, is a source of variability for Sardinian climate, which is subject to those two governing factors. A variety of microclimates are helpful for Sardinia as well. These are associated with the varying effect of the coast, the amount of sun exposure, and the protection from the dominant winds of the inner areas, which are associated with quick changes in elevation and lithology, which prevent homogenous diffusion of temperature. Because it might be blanketed in snow for a few days in the winter and is cooled down by the breeze that falls along the valleys in the summer, the central mountain region is itself a source of climatic variety.

Soil type	Substrate	Land Use	Location
Typic, Dystric & Lithic Xerorthents	Xerorthents Palaeozoic metamorphic rocks	Pasture, wooded pasture	Ogliastra, Barbagia, Inglesiente
typic, Dystric & Lithic Xerorthents	Palaeozoic Intrusive rocks	Pasture	Gallura, Barbagia, Sarabu
Typic, Aquic & Ultic	Alluvial and arenaria	Agriculture	Campidano, Cixerri, Ottana, Nura

Table 1-1 Dominant soil type in Sardinia (Aru et al.1991)³

The island has been blanketed by semi-natural vegetation typical of the Mediterranean region over more than two thirds of its surface. Forests of holm oak (*Quercus ilex*), cork oak (*Quercus Suber*), broadleaved downy oak (*Quercus pubescens*), Aleppo pine (*Pinus halepensis*), maritime pine (*Pinus pinaster*), chestnuts (*Castanea sativa*), maquis, and garrigue are among the main formations. Of all the vegetation, maquis are the most distinctive. The wild olive (*Olea europaeasubsp. sylvestris*), Lentisk (*Pistacia lentiscus*) fig-1-6, junipers, myrtle (*Myrtuscommunis*), and strawberry trees (*Arbutus unedo*) are the main plants that predominate the rocky slopes. There are still large sections of maquis in the mountains of Sulci in Sardinia's southeast. Fox (*Vulpes vulpes*) Fig-1-4, wildcat (*Felis sylvestris*) fig-1-5 and wild boar (*Sus scrofa*) fig-1.-3 are among the mammals found on the island. The latter is more common, while larger examples from Tuscany were introduced in the previous century. The dama dama, also recently introduced, is a fallow deer. The deer (*Cervuselaphus*), which once roamed the entire island from the interior to the shore during the prehistoric era, is now restricted to the mountainous regions. Mouflons (*Ovis musimon* or *Ovis Ammon musimon*) live in tiny groups of one male and numerous females in the highlands, especially on steep calcareous cliffs. The Giara of Gesturi plateau is home to wild horses. These are smaller than domestic horses, and it is unknown where they came from.

Figura 1-3 Wild boar (*Sus scrofa*)

Figura 1-4 Fox (*Vulpes vulpes*)

Figura 1-5 Wildcat (*Felis sylvestris*)



Figura 1-6 Lentisk (*Pistacia lentiscus*),



2. Sardinian History

Sardinia is an island in the west of Italy and Sicily, and it has a very vast and broad history. The Bronze Age conical stone towers known as nuraghe are the most recognizable remnants of Sardinia's prehistoric past. These enormous constructions, which are often made of basalt or granite, can be several stories tall and have an outside diameter of 10 meters or more. On the island, there are said to be 7,000 towers, many of which are still amazingly intact. Most often, they have the form of a squat, truncated cone with a single entrance leading to a circular room with a vaulted ceiling and an internal stairway leading to a second level or a rooftop balcony. The diameter of the chamber averages 4 meters. The Nuraghes and other prehistoric structures that make up the current Sardinian legacy supply archaeological evidence of a prehistoric human settlement. Sardinian history begins by linking the classical old-style artifacts that fairly dominated the western Mediterranean trade: the Punic, Phoenicians, and Romans. The capital of Sardinia is Cagliari. Sardinian has been populated since the early Stone Age. The presence of an old volcano, Monto Arce, bestows plenty of obsidian (volcanic rocks used for making tools and weapons even before the unearthing of metal. These were the hard, dark, glasslike rocks formed by the rapid solidification). The archaeological evidence that the Nuragic Sardinians and the Phoenicians left behind in Sardinia is made up of approximately 10,000 amazing stone structures called Naragi. In Sardinian history, the Nuragic civilization is particularly significant. Nuragic or nuraghe is the social civilization on the Mediterranean island of Sardinia from eighteenth century BC (centre bronze age) to 23rd century BC. During this time, Sardinians successfully traded copper and lead with Mycenaeans and Crete, and they were partially conquered by Carthage in the 6th century BC before being completely conquered by the Romans after the 1st Punic War (238 BC). It reaped benefits from its central location. In the Navel battle of Sulci in 258 BC, the Romans defeated the Carthaginians. In 238 BC, the Romans usurped Corsica and Sardinia from the Carthaginians, yet they never got acknowledgement from the local Sardinians. The early bronze ages or the bonnanaro culture unveiled a handful of similarities with the contemporary culture of the northern Italy and was the last evolution in Sardinia from 1800-1600 BC⁴ (Leighton, 2022) This cultural amalgamation from mainland Italy to Sardinia brings the new philosophies, recent technologies and their way of living. Around 900 BC the Phoenicians began travelling to Sardinia from what is now Lebanon and some of their hotspots were Caralis, Nora, Bethia, Sulci. As soon as they arrived in Sardinia, they founded a vast trading network of the Mediterranean Sea and because of this Sardinia occupied its unique and central position. For now, the Phoenicians set up several cities and strongholds in south and west of Sardinia. After the Phoenicians, the Carthaginians overtook control over the Mediterranean Sea. The island Carthaginians revolted in 240 BC during the first Punic war.

They gave romans the opportunities to overtook Sardinia as they first got defeated during the Naval battle of Sulci. The romans fully conquered the island in 238 BC without and resistance. There were certain misconceptions about the Romanization process in Sardinia. For instance, some of the Sardinia internal area never went through Romanization or did Romans successfully conquer the whole Sardinian Island. However, after examining all the historical evidence, it was discovered that the Romans also conquered Barbagia's central mountainous region and outer Sardinia militarily and politically. The most undeniable hint of this eccentricity is the nearby miscellany of the Sardinian language, which is still today romance close to the native language spoken in Rome during its diversification into the Mediterranean. There are several historical and archaeological clues, like the roads that connect Olbia to Cagliari through the most difficult part of central Sardinia. During the excavation, the Roman terracotta was brought back to prominence. The invasion of Sardinia was initially solely military in nature, but over time, it began to incorporate food, culture, law, and language, that started to look like their Roman counterparts. Under Roman domain, there was no unexpected change in the social, cultural and monetary way of life of the Sardinian public, however that began influencing them gradually. There were a few little free networks in Sardinia where the Romans didn't enter, yet they used to send their lead representatives to gather their recognitions that they should pay to the romans. and they used to corroborate those communities in this manner. The Romans' invasion of Sardinia was psychologically as well as militarily motivated. The primary point of the romans was to rule over the brain of the neighbourhood Sardinians and to full fill that they gradually and consistently began setting up their engravings into their lives. The Romans favoured eating foods that were grown naturally. They prefer to eat bread, wine, cheese, eggs, fruits, and honey for breakfast, and they prefer to eat vegetables, fruits, and greens for the rest of the day. There are gazillions of parallels between the Sardinian lifestyle of the past and that of the present. Abbamele is the oldest honey-based product recorded in Sardinia, and honey made up most of the Roman diet. In addition to honey wine, which the Romans consumed daily, wine plays a significant role in the longevity of Sardinians. They will in general drink half or one glass of wine either in lunch or supper. Sardinia shared nan abundance of similarities that can be used as evidence to corroborate historical and geographical connection.

2.1 The Nuraghes

The most significant Sovereign cultural expression of ancient Sardinia is without a doubt the nuragic civilization⁵ but it cannot be separated from the utterance that came before and after it. The Nuragic civilization is autochthonous, to be specific a native development shaped in Sardinia by populaces pull on the island for millennia. It depends on the encounters of right away going before pre-Nuragic societies. Since Sardinia is a huge island, it had the option to oblige and support for something like 5000 years, some of the time in close contact with the encompassing scene and at others in states of relative detachment, the advancement of ancient Neolithic individuals devoted to agribusiness and cultivating and those of the Copper Age and early Bronze Age (around 7000-1600 BC). As should be visible from the consequences of the most recent archaeological examination, the Nuragic development has grabbed hold during the centre and late Bronze Age (around 1600-930 BC) and in the early Iron Age (around 930-730 BC). The Bronze Age in antiquity was a time of heroes who were capable of great deeds for good or evil, strong rulers, courageous and crafty soldiers, and clever architects. The Iliad and the Odyssey, poems that were composed a few centuries later but were based on oral tales that were popular in Greece during the Bronze Age, nonetheless effectively capture the ambiance of those bygone eras. Bronze Age Sardinia most likely possessed a non-urban, monarchical, rural, and tribal culture that was still structured and vibrant and capable of changing the landscape, using resources, and proving connections with the outside world. Instead, the Iron Age is the era of the historical peoples, who developed in various Italian areas and on islands, distinguishing themselves by names that are still used today in local communities. In addition, the Iron Age is known as the era of the great facilitators, invasion, first cities, and early states in the west. There were four key stages in the Nuragic civilization's growth. The first phase is that of the archaic nuraghi (Middle Bronze 2: approximately 1600 - 1500 BC); the second phase is that of the classical nuraghi (Middle Bronze 3 and Late Bronze: approximately 1500-1200 BC); the third phase is that of processing (Late Bronze: approximately 1200-930 BC); and the fourth phase is that of crisis and dissolution (Early Iron Age: approximately 930-730 BC). The wreckage of the Nuragic civilization can still be seen in nearly every area of Sardinia. These include the archaic nuraghi, which are stone structures with simple or complex domes, settlements, megalithic collective tombs (also known as "tombs of the giants"), temples, and shrines. To understand the nuraghi best use must be made of all tools available to archaeologists and to adopt them first to approach material reality, thus to the mentality, needs and experiences of the ancient builders and users, paying greater attention to the changes affected in later millennia. The essential difference in the approach taken by archaeologists and by technical persons is that the former should always have for the main object of their reflections, not the artefact but the human being,

rather human society as it develops. When it was believed that nuraghi and bronzes were contemporaneous and that both had endured until the Phoenician and Punic conflicts, as well as with the Romans, it was possible to accept the military function of the nuraghi and the warrior aspect of Nuragic culture. Therefore, the nuraghi were neither fortification, watch towers, or royal residences when they were first built since there were no royals, competent warriors, or watch guards. Few nuraghi were used as temples or as stores and storerooms just at the end of the Nuragic civilization; they were only used as tombs throughout the Roman and Middle Ages.

The nuraghi most certainly served every practical and symbolic purpose needed for Nuragic everyday life throughout the centuries when they were constructed, all within the framework of a culture that was simultaneously developing a hierarchical structure and a rural economy. Numerous discoveries attesting to the storage, preparation, and consumption of food, spinning, etc., show that the nuraghi were used for housing purposes and household activities even if they were not primarily and simply dwellings. Despite not being fortresses, they may have been fortified locations since they were "made strong" and outfitted to defend people and property. In addition, they may have served as outward symbols of the tribal community's strength, prosperity, and control over their respective territories.



Figura 2-1- Pre-Nuragic complex of Monte d' Accoddi

Acknowledging that the nuraghi had no primarily defensive purpose does not imply that the Nuragic people never had security worries. Plenty Nuragic homes, primarily those of the Nuraghe Losa, are encircled and contained by walls with obvious access control mechanisms for defensive purposes. However, they do not necessarily imply a state of perpetual war or the existence of a militaristic society. According to excavation data, some walls are at least associated with the time of the settlements' greatest expansion in the late Bronze Age and early Iron Age, which are also the phases of enhanced competition and conflict.⁶ Although only one or two percent have been excavated, there may have been as many as 6,500–7,000 tholos and 1,000–2,000 complex nuraghi, according to current estimations (Depalmas, 2018b). The typical "tholos" tower resembles a truncated cone with a single chamber and a corbelled vault or cupola on each of two or three storeys. These stories are sometimes equipped with recessed alcoves that resemble cabinets and are connected by intramural stairs. In Sardinia, the Beaker culture (c. 1800–1600 BC) had one final metamorphosis before giving way to the Bonnanaro culture, which shared many traits with the Polada culture of northern Italy at the time. The material culture of these two societies was similar in that both had unadorned ceramics with axe-shaped handles. These influences may have travelled from Corsica to Sardinia, where they absorbed contemporary building methods (such as cyclopean masonry) that were already common on the island.⁷ At that time, new inhabitants from the mainland began to settle on the island, bringing with them new religious ideologies, technology, and lifestyles that made the older ones obsolete or reinterpreted them.⁸:

2.2 The Phoenicians

The advent of the Phoenicians on the island is a fascinating period in Sardinian prehistory. Since many of the prehistoric and protohistoric relics in Sardinia have persisted throughout the years, the island has been a significant source of information about Phoenician history. Initially, historians and archaeologists thought that the Phoenician invasion marked the beginning of the establishment of towns and colonies, in a manner similar to the Greek colonization. However, over time, this perception of the Phoenician expansion has changed. The debate among archaeologists concentrated on the issue of when exactly colonization began and what shape it may have taken. Ancient Greek and Roman authors who looked to pinpoint the founding date of cities like Rome substantially affected these arguments. Similar foundation myths were also told about less important towns and cities of the Roman empire. This drove archaeologists and historians at first to search for the signs of the first settlement of colonies, and when they could not match the ancient sources with their findings of much later date, they reasoned there must have been a pre-colonial phase. But how were these first contacts between Phoenicians and Sardinians proved? Can one speak of colonisation and in what measure? How did these contacts between Phoenician traders and Sardi tribes develop?

The arrival of the Bronze Age ushered in many changes in the Mediterranean, including the emergence of the Nuragic culture on the island of Sardinia (Italy). The Nuragic culture takes its name from the nuraghi, the more than 7,000 dry-stone towers that dominate the landscape. The Nuragic population engaged in an extensive trade network within the Mediterranean throughout the Middle and Late Bronze Age, trading with Mycenae, Cyprus, and mainland Italy. Contact with foreigners intensified the cultural exchange and facilitated the emergence of an elite group. The Phoenicians established colonies on Sardinia in the Early Iron Age, resulting in the incorporation of the island into a world-system that originated in the Near East. The open-air sanctuaries (dedicated to Baal-Hammon) that have been unearthed at Tharros, Nora, Sulcis, and that have also been discovered in Motya (Sicily), Carthage (Tunis), provide the most significant evidence of settlement and the construction of the city. Tophet, a phrase taken from a Hebrew word used in the scriptures to denote an outdoor sanctuary, is the name given to these places of worship. The urns containing the sacrifices' ashes, mainly animals but occasionally kids as well, were placed in the sanctuary. Later, votive steles were also buried with the urns (or in place of a sacrifice).

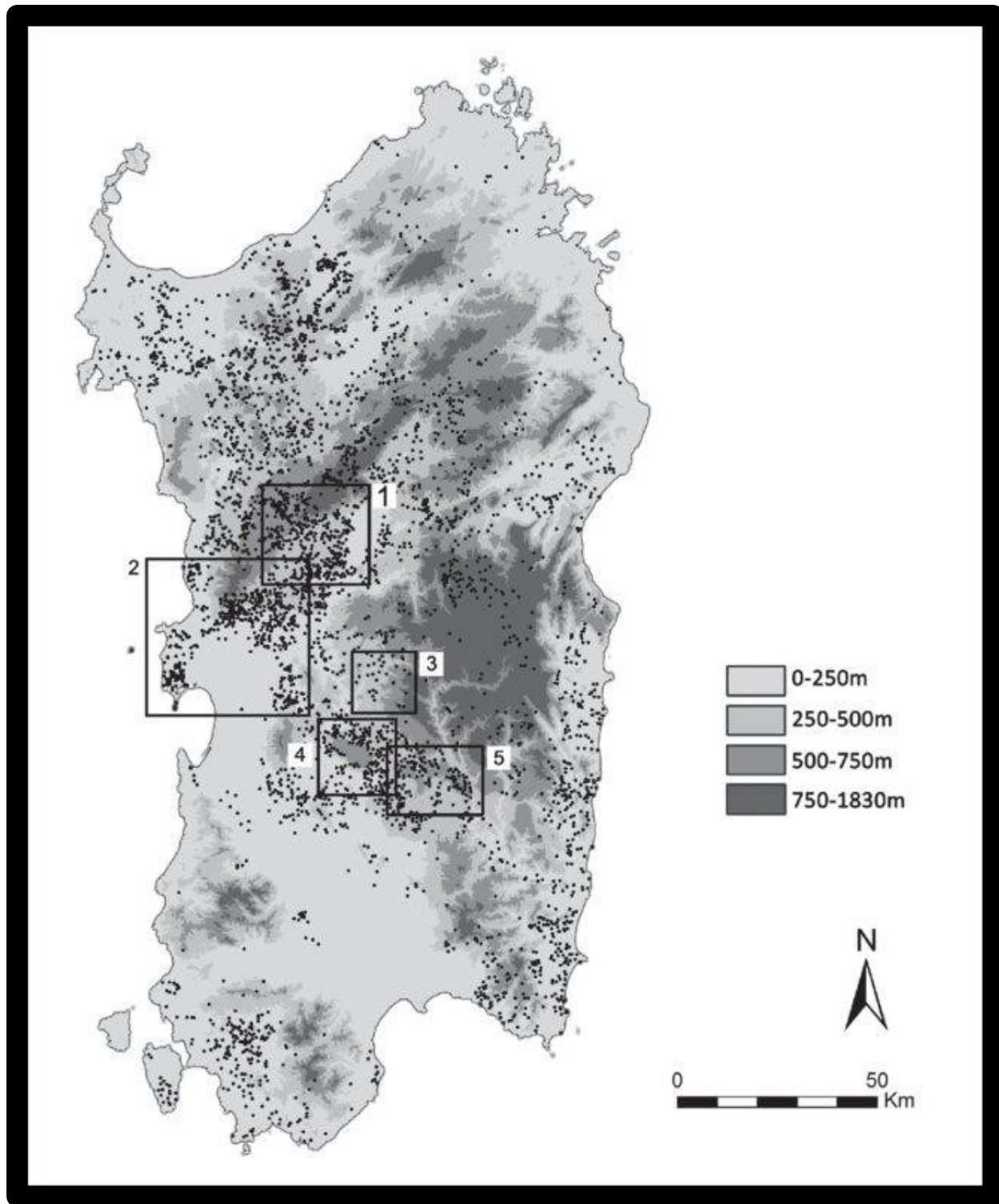


Figura 2-2- - Distribuzione dei nuraghi in Sardegna (da <www.tharros.info>). (1) Marghine e altipiano d'Abbasanta; (2) Montiferru e Sinis; (3) territorio del nuraghe Nolza - Meana Sardo; (4) Giara di Gesturi; (5) altipiano di Pranu 'e Muru.

2.3 Roman Empire

The Carthaginian troops on the island rose up in 240 BC during the First Punic War, which provided the Romans—who had earlier routed the Carthaginians in the naval battle of Sulci—the chance to land on Sardinia and take control of it. The Romans conquered the entire island in 238 BC without encountering any resistance. They inherited a developed infrastructure and urbanized culture that already existed (at least on the plains). It was part of the province Corsica et Sardinia, governed by a praetor, along with Corsica.⁹ It served as one of Rome's primary grain reserves together with Sicily up until the Roman conquest of Egypt in the first century BC. Following the humiliating Roman defeat at Cannae (216 BC), a revolution was launched under the leadership of two prominent Sardo-Punic nobles from Cornus and Tharros, Hampsicora and Hanno. Titus Manlius Torquatus led a Roman force of 22,000 infantry and 1,200 cavalries into Sardinia, where they landed in Caralis and routed Hiostus, the son of Hampsicora, near Milis. The Carthaginian-Sardinian allied forces were then encountered by the Romans in the south of the island, where they were routed and 12,000 men were killed in a fierce battle fought between Sestu and Decimomannu.¹⁰ Another significant uprising occurred in 177–176 BC when Tiberius Gracchus put an end to the Balares and the Ilienses. According to Livy, Tiberius slaughtered or enslaved roughly 80,000 indigenous people¹¹] Marcus Caecilius Metellus suppressed the last coordinated uprisings between 115 and 111 BC. Over the early¹² decades of Roman rule, Punic culture persisted strongly. However, Romanization eventually took hold, and Latin eventually replaced other languages as the primary medium of communication, giving rise to the contemporary Sardinian language. Sardinian people also started to adopt Roman religion.¹³ Within the first century AD, Caralis, the provincial capital, Nora, and Sulci attained the title of Municipium, and a Roman colony named Turris Libissonis (Porto Torres) was established in the northwest.¹⁴ Under Trajan, the settlement of Usellus also became a Roman colony. Two large roads were constructed along the beaches, and two others were constructed inland, linking all the major cities. Mughebid, the Balearic Islands' emir, took control of Sardinia shortly after the year 1000 and descended on the Tuscan coast (Pisa and Luni) from there. The Pisans, with the aid of the Sardinians, drove him out with the encouragement of the pope, to whom Charlemagne had handed Sardinia. The Genoese and the Pisans controlled the trade, possessed a number of coastal cities, and served as arbitrators in disputes between judges. However, a disagreement then developed between the two cities over the scope of their separate rights. The emperors also asserted their ownership of the island because Pisa was an imperial city. Only the coastal towns suffered during the conflict, but the advantages for business offset the harm that the war did.

In 1297, Alfonso f. Aragon was given the investiture of Sardinia by Boniface VIII in an effort to persuade the King of Aragon to give Charles of Anjou back Sicily. The latter started a battle against the Pisans, helped by Branca Doris, judge of Logudoro and lord of Alghero, Ugone of Arborea, and the town of Sassari. The Pisans were forced to sign a peace in 1324, which gave them just the port and lagoon of Cagliari and two suburbs; they were later driven out of these. After the Pisans were defeated, it was necessary to conquer their former allies, the Genoese and the kings of Arborea. Mariano IV defeated the Aragonese but was killed by a plague in 1367, and his son Guglielmo IV abdicated.

Rulers	Period
House of Trastámara ¹⁵	1412–1516
House of Habsburg ¹⁶	1516–1700
House of Bourbon ¹⁷	1700–1708
House of Habsburg ¹⁸	1708–1720
House of Savoy	1720–1861

Table 2-1 Kings of Sardinia

The desires and interests of Sardinians have, however, generally been disregarded by the Savoy and Italian governments. Following the conquest of nearly the entire peninsula, the Kingdom of Sardinia was dissolved in 1861 and the Kingdom of Italy was declared in Florence. Similar to Southern Italy, Sardinians favoured monarchy by more than 60% of the vote in 1946, but a few days later, Italy became a republic. Despite having the highest level of autonomy since the Judicates era, Sardinia's status as an autonomous region in 1948 fell short of what many Sardinians had hoped for.¹⁹ On May 8, 1949, there were the first regional elections. The Rockefeller Foundation helped to successfully eradicate malaria by 1951.[50] The same years saw the rise of a tourist "boom" in Sardinia, which was mostly centred on beach vacations and luxury travel, like that seen on the Costa Smeralda. Approximately ten million people visit the island annually today.

3. Sardinian Food History

Since the Nuraghes, Phoenicians, and then the Romans, Sardinia has had a long history. Nevertheless, when food is thought of, Sardinia is on top with respect to history and nourishment. With approximately 1.6 million people (about the population of West Virginia), Sardinia is the second-largest island in the Mediterranean Sea. Sardinia is one of the five life span blue zones (LBZs) on the planet, alongside four different spots: USA: Lindia, Japan's: Okinawa, Nicoya: Costa Rica and Icaria, Greece, where people claimed to have lived longer than the average life expectancy or to have recently done so. However, most centenarian-inhabited villages only have a few thousand inhabitants. Communities of this amplitude result in towns where everyone appears to know everyone else. This congruence proven accommodating to Buettner, an American public geographic individual, and top-rated creator, when he was trying to find the occupants who had lived for quite some time or more. The first few people he questioned were aware of exactly who he was looking for and directed him to their homes. Even though the island technically belongs to Italy, there are significant cultural, social, and environmental incongruity. The areas of Ogliastra and Barbagia in Sardinia rank extortionate for longevity worldwide. In fact, there are more centenarians living in these areas than in Okinawa, Japan. Individuals of Sardinia are exceptionally persuaded in keeping their set of experiences bursting at the seams with themselves. As per different inquisition there are similitudes among individuals living in the life span blue zones like they love to live in networks, with their families and family members. Even their multigenerational homes prove the importance of family in Sardinia's culture. They live in geographically and historically isolated areas away from city chores, lifestyle, and moderation to nurture their way of life. The current population of Sardinia is thought to be a descendant of the Nuraghe people of the Neolithic era. Sardinia is a very isolated island, and this distance from the mainland of Europe is clear. They still adhere to traditional beliefs, such as the fact that women run households and oversee the family's finances and health, while men work in the fields tending to goats, cows, and other livestock. The number of physical activities that Sardinians engage in each day is one thing that has remained constant throughout their history. Sardinian longevity is heavily influenced by their mental, social, and physical health. However, it is highly unlikely that a substantial number of people can live such a long time and in such good health without eating at least moderately healthy food. Vegetables like zucchini, tomatoes, potatoes, and eggplant, fava beans, whole-grain bread, and a variety of meats like beef, lamb, and Scuteris are more prominent in Sardinian cuisine. Honey, as well as cottage cheese, sarda sheep dairy products, and cheeses like pecorino. A good cheese, according to some local Sardinians, is the key to longevity. The left-over milk after making casu axedu and ricotta is a decent and mineral full beverage that they polish off at last. According to Dr. Sestu,

a specialist in centenarians, Sardinian longevity is primarily due to their history. Throughout their lives, they consume very few, if any, additives in their food. Sardinians' culinary heritage and longevity are intertwined with each other. The old ways of cooking have been passed down through the generations, with the older generation teaching the younger ones. According to him the greater part of the centenarians that visited him had never eaten any safeguarded food. For the people of Sardinia and the island, many things work together in harmony: environment, genes, diet, and family. Sardinians have lived a pastoral lifestyle for a long time, consuming locally produced food. Sardinia's modernization has resulted in cultural erosion and a shift in nutrition, but the Sardinian population in the LBZ continues to follow their traditional eating habits, combining locally grown fruits and vegetables with seasonal pickles. Sardinia is home to a wide variety of unusual foods that date back to ancient times and were developed by the people there's ancestors to help them survive the severe food shortage. The food that they manducated is considered taboo by the rest of the world due to their sporadic similarity and Flavors. Take, for instance, Acorn bread. An acorn is a nut that comes from oak trees and is something that Sardinians eat every day because it has a lot of tannins. The acorns are crushed and soaked in water to lessen their bitterness and toxicity. Again, to diminish its harmfulness and sharpness mud is then blended in with the oak seed feast. Acorn bread is no longer the typical meal in Sardinia, but it is still made and eaten during celebrations and festivals due to its peculiar method. Aside from this Casu Marzu is one more uncommon cheese consumed by Sardinian individuals, privately called 'rotten cheese'. Pane Carasau is likewise one of the customary sourdough flatbreads made with durum wheat flour, yeast, water and salt. Carasau can be put away for a few months without losing its tactile traits because of its creation techniques. These are some foods that have devoured Sardinia since old times. All of these were made with very few readily available ingredients. A territory, region, or area's history is told by its food. Some scholars contend that the Shardana, or "sea people," were the Nuraghic people. Because the Sardinians have protected their island and woodlands since the Bronze Age, this island is closer to its natural origins. As a result, fifty percent of the island is covered in forests and woodland. There are umpteen artificial lakes that are used to capture marine life, but only one is natural. Sea food, on the other hand, does not have a long history with Sardinians, even though Sardinia is an island that is surrounded by the Mediterranean Sea. The native people of Sardinia followed suit after being repeatedly invaded and colonized, leaving the coastline to the dominant invader of the time. However, the fear of intruders from the sea and fishing has returned gradually. This is giving the demonstration of the fact that Sardines are named after Sardinia, the oily little fish that stand for the fresh sardines that can be found in the Mediterranean

4. Sardinian Food

The Mediterranean area of Sardinia is home to a vast range of exotic foods. The history and geography of Sardinia have a profound impact on the cuisine, which is unbreakable. Being a hub for trade and a remote island, Sardinia influences its cuisine. It's distinctive terrain and environmental conditions are merely the cherry on top. Freshness and clarity are hallmarks of Sardinian cuisine, which includes meat, vegetables, wines, and loaves of bread. One of the five mythical regions known as LBZ (longevity blue zones) is Sardinia, where food is the key to longevity. The different creation of food could be a crucial perspective that supports the wellbeing examples and life expectancy of this enormous number of legendary districts. Even though Sardinia is an island, seafood is not a common dish there. Lamb, fresh vegetables, meat, and, most importantly, organically grown wines are the staples of the local Sardinian diet. During the adversity when resources were meagre, unwanted food was eaten to battle hunger and to satisfy the dietary necessities. Such food was regarded as food for the famine. However, as time passed, the food they ate just to survive became an essential part of their lives. Sardinian food is administering the world since quite a while. At the location of Duos Nuraghes in Borore, several historical relics and evidence can be found. According to records and historians, olives were possibly grown during the middle Bronze Age, and by the late Bronze Age, several fruit and vegetable species like Ficus, prunus, Vitis, and Avena were grown. Since the Neolithic period, the main staples like cereals have been around. The following is an explanation of some of the Sardinian traditional and local dishes.

4.1 Sardinian Meat

The physical, cultural, and historical settings of Sardinia, an Italian island in the Mediterranean Sea, have a significant impact on the history of meat consumption there. The island's cuisine and dietary customs have a strong meat component, which reflects the impacts of many civilizations as well as the accessibility of local resources. Ancient Diet: Hunting and collecting were probably the primary sources of nourishment for Sardinia's first settlers, who lived their thousands of years ago. Their diet would have included fish and seafood from the nearby seas, as well as wild animals like deer, wild boar, and small mammals. Mediterranean Civilizations' Influences a string of Mediterranean civilizations over the centuries, including the Phoenicians, Carthaginians, Romans, Byzantines, Arabs, and Spanish, had an impact on Sardinia. These nations brought new agricultural methods, culinary techniques, and ingredients to Sardinian cuisine, which in turn influenced how the cuisine treated meat.

Sheep and Lamb: The prevalence of sheep and lamb in the diet makes one of the biggest contributions to Sardinian meat consumption. Because of the island's steep geography and historical reliance on pastoralism, sheep farming is a significant contributor to the local economy. As a result, Sardinia is renowned for its top-notch pecorino sheep's milk cheese and "abbacchio," a typical meal made with roasted or stewed lamb. Sardinia's upland and coastal regions have varied cuisines as a result of the availability of various resources. In the past, coastal regions have relied more heavily on fish and seafood, whereas interior regions have prioritized pastoralism and foods based on meat. Festivals and Traditions: Meat-based dishes are frequently prepared and consumed at Sardinian religious celebrations and festivals. These events provide the neighborhood a chance to gather together and share traditional delicacies, highlighting the cultural importance of meat in Sardinian society. Traditional meat dishes are still a mainstay of Sardinian cuisine, but contemporary cooks and eateries on the island have adopted creative methods for preparing and serving it. This entails experimenting with novel cooking methods, world influences, and modern presentational styles. The island's rich cultural heritage, reliance on regional resources, and close ties between its people and the land are all reflected in the history of meat in Sardinia. The island's origins and capacity to change with the times are both reflected in the importance of meat dishes in Sardinian cuisine today.

4.1.1 Porceddu

Porceddu is the broiled nursing pig that masqueraded as Sardinians vogueish dish. Cooking and serving remain the same regardless of storage history. The piglet is cleaned, stuffed with meat, and seasoned with herbs before being roasted on sizzles until the meat is tender and the skin is crispy in this traditional Sardinian dish.

This dish put forward the wellspring head of Italian cuisine and customs. The conventional approach to planning porceddu was made in 1919 by a few nearby Sardinians in which one year old pig was butchered and cook in a stove majorly mud broiler for roughly 7 hours with the digs of spices, pepper, garlic and white wine. This dish, which was created in a distinctive manner, became extremely popular across the nation and region. Despite its origins in central Italy, it is a staple of venetian and Sardinian cuisine. The costermongers, whose white vans can be seen on the streets of Italy, handled the majority of the Porceddu sales. Weekends, holidays, and celebrations saw the greatest increase in sales. There are many changes that had occurred in the way of cooking in different regions of the planet, as they alter the dish as per their taste, yet the old Sardinian age prefer cooking it and consuming it in their customary ways. When it was eaten and introduced in the United States, Texas, Umbria, Ontario, and many other states, the dish gained widespread recognition. The Italian immigrants are to be credited with creating this widespread popularism. The Porceddu preparation is time-consuming and requires ability and roasting techniques. To make a firm, brown and flavourful Porceddu, one necessity a nursing piglet weighing around 12 pounds, fat, myrtle, fennel, garlic and salt. Before applying salt to the piglet's interior and exterior, thoroughly clean it. Take your wooden stick or steel spit and set it around 3 feet before the fire. Prior to spitting the pig over fire, construct the fascinating fire with juniper/myrtle, olive, arbutus or oak. Throw in the dried herb twigs, thyme, oregano, mint, basil, apple wood chips, bay leaves, and marjoram once the pig starts to roast to make a flavourful smoke. Turn the split gradually to cook the pig and let the meat assimilate all the aroma. Brush the meat with lard after an hour, move the steel spit closer to the flame, and roast for another two to three hours. Place a knife in the thigh of your meat and look for a hot, crispy, and succulent piece to figure out whether it is cooked. Aside from this technique, individuals likewise choose the conventional one where an enormous pit is dug and is covered with rocks. Where the pig is placed, a large, coal-covered fire is started. The pig roasts for several hours while the aromatic leaves, myrtle, and juniper cover the coals.

4.2 Sardinian Pasta

The rich culinary traditions and cultural influences of Sardinia, an Italian island in the Mediterranean Sea, are entwined with the history of pasta. While pasta has a long history in Italy, Sardinian pasta dishes are distinctive due to the island's location, history, and ingredient availability. Beginning in Antiquity: Wheat has been consumed in Sardinia since the dawn of civilization. Early islanders probably ate some type of straightforward pasta meal derived from wheat, barley, or other grains. Grain cultivation may have been practiced by Sardinians for thousands of years, according to archaeological findings. Impacts from Various Cultures: Due to its location in the Mediterranean, Sardinia served as a crossroads for the Phoenicians, Romans, Arabs, and Spanish civilizations. Each of these nations made an impact on the island's cuisine by bringing fresh ingredients, methods of preparation, and flavours. Over time, while keeping their distinctive regional identity, Sardinian pasta dishes started to absorb ingredients from various civilizations. Sardinia is renowned for its distinctive pasta shapes, some of which are uncommon in other regions of Italy. One such is "Mallaroddu," a type of small, ridged pasta shell that is frequently prepared with a combination of water and semolina flour. "Culurgiones," a ravioli-like sort of stuffed pasta frequently filled with a mixture of cheese, potatoes, and mint, is another typical Sardinian pasta shape. Use of native delicacies: Sardinian pasta meals frequently feature native delicacies from the island, such as saffron, artichokes, fennel, and shellfish. Because of the accessibility of these resources, special pasta recipes that are strongly entrenched in the island's agricultural and maritime heritage have been created. Festivities: Sardinia has a long history of festivals and celebrations, many of which involve food. Sardinians can display their pasta dishes at these occasions, which are frequently made in great numbers and shared with the neighbourhood. Events where Sardinian pasta takes center stage include "Sa Sartiglia" in Oristano and "La Sagra degli Spaghetti" in Cabras. Modern Innovations: While modern chefs and cooks in Sardinia have experimented with inventive twists on traditional dishes, traditional Sardinian pasta recipes continue to be appreciated. While preserving the essential elements of Sardinian cuisine, these alterations may include new ingredients, cooking methods, or presentation styles.

As a whole, the island's rich cultural legacy, closeness to the Mediterranean area, and capacity to adapt and develop while keeping its culinary traditions are all exemplified by the history of pasta in Sardinia. Both locals and tourists continue to appreciate the delicious pasta dishes from Sardinia, which represent the history and culture of the island on every plate.

4.2.1 Culurgiones

With its diverse and original recipes, Sardinian cuisine has always impressed the world. Sardinia as of late came into limelight and constructed a worldwide standing in supporting the creation of pasta. Culurgiones, Sebades, Mallaroddus, and myriad others are examples. Every one of the assortments of pasta are made by hands however sadly it's not sufficient to satisfy the need of the ongoing populace. Like ravioli, Culurgiones are a type of stuffed wheat or semolina pasta filled with potato and mint-flavoured pecorino cheese. Ogliastra district is popular for different delicacies and Culurgiones is among one of them. There have been some adjustments made to the preparation methods to meet the needs of the population. For example, traditionally, the dish was made entirely by hand; however, in recent years, machines have taken over that task to produce the proper quantity, texture, and shape. Some local Sardinians say that the only way to make crafts is through manual agility, which is what gives the product its uniqueness and character. In the Ogliastra region and the islands nearby, the Vatican's make Culurgiones out of freshly made wheat dough and some semolina. These Culurgiones can be filled with Sardinian Pecorino cheese or potatoes, garlic, and mint. The dish has undergone some changes to its ingredients, with fiscidu, a fresh cheese that is available all over Sardinia, taking the place of Pecorino. It was first marinated in a brine solution, which gave it a sour flavour. Culurgiones has some important technological properties as well, particularly about the folding and enveloping operations, which require a series of finger movements to achieve a longitudinal closure with the replicate foil margins facing inward the format. In practice, the stuffing avoids the risk that, as a result of the thermal and mechanical solicitations that are brought about by the boiling of the water, the format can open and, as a result, disperse in the water of cooking itself, in addition to obviously becoming deformed and changing his original form to one that has been cooked to completion.

4.2.2 Fregola

Fregola is often viewed as Fregola, Fregua, Succa, and some more, contingent upon the area of creation and techniques for creation implemented. It is a type of pasta with a more rounded shape and a sizeable difference. It is customarily made with semolina flour and water filled in as a side dish with fish dish or with vegetables. The batter is then kneaded with hands giving it a legitimate shape and surface. After that, the pasta is baked until it takes on a darker colour. Toasting is an essential task because it ensures that the flavours are properly enhanced. It is often mistaken for the traditional North African dish known as couscous because of its shape, colour, and texture. The way they cook is the primary distinction between the two. The Sardinian people alternately use steaming and boiling. Sardinian fregola is often considered as the fortune of Sardinian conventional food having an extremely old history. One might say that Sardinian is getting ready

fregola for north of 1000 years. Some historians and scholars assert that fregola originated because of commerce between the Punic and Phoenicians.



Figure 4-1 Culurgiones



Figure 4-2 Fregola

4.3 Aquaculture

13,000 tonnes of fish (sea bream, sea bass, porgy, croaker, eel, mullet, and trout) and 83% of bivalve molluscs, including mussels and oysters, make up Sardinia's annual aquaculture production which has an estimated turnover of € 20.000.000,00. The primary aquaculture product in Sardinia and the rest of Italy is shellfish; these operations have been going on since the early postwar years and are now well-established. Particularly notable at the national level, mussel aquaculture produces roughly 11,000 tonnes annually, ranking third nationally. The provinces of Oristano, Cagliari, Olbia-Tempio, and Ogliastra are home to most mussel farms.

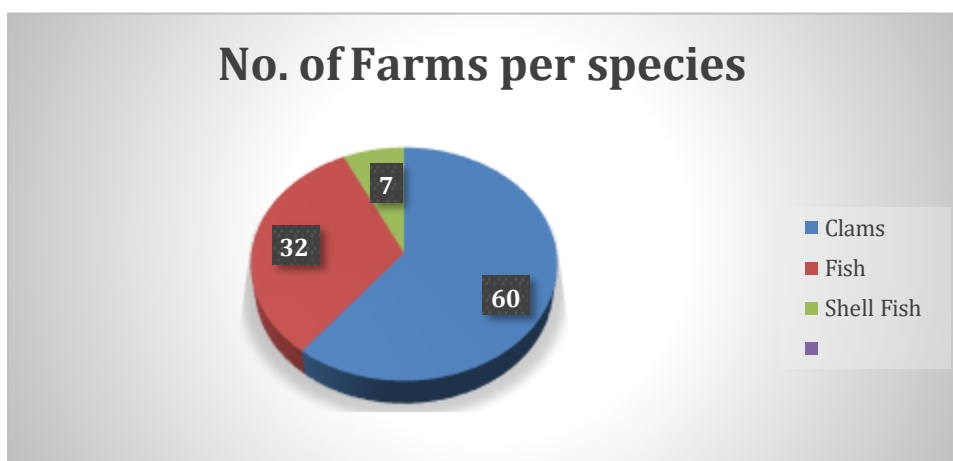
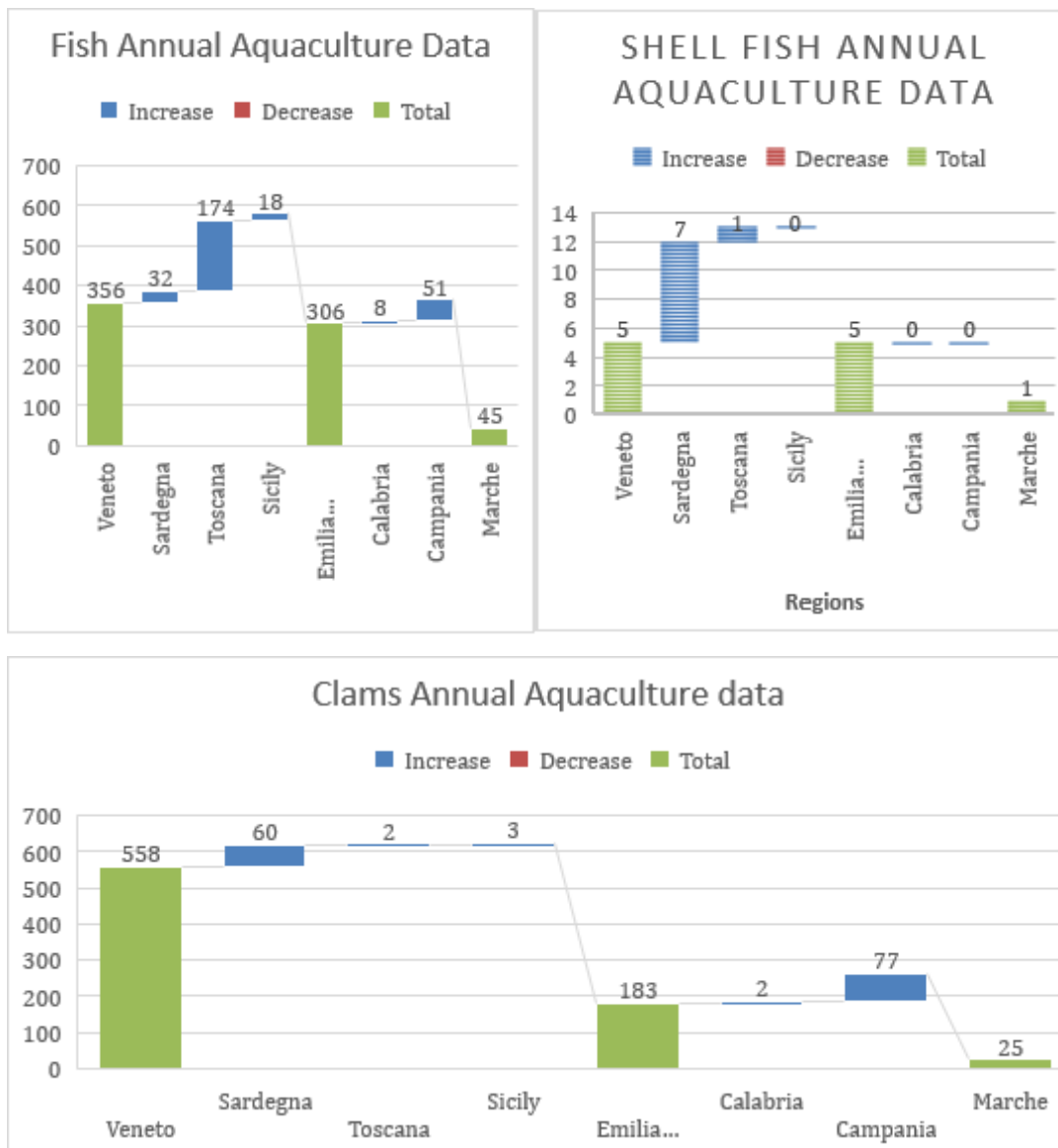


Figura 4-1 No. of Farms per species (statistical data processed on 21/07/2022) National Zootechnical Registry

4.3.1 Fregola con Arselle

The gastronomic heritage of Sardinia, a region with a rich and varied cuisine culture influenced by its geographic location in the Mediterranean Sea, is profoundly entwined with the history of Fregola con Arselle. Fregola: Fregola is a dish that may be traced back to Sardinia's early history because it is said that the island's first people introduced it. Fregola is prepared similarly to couscous, a semolina wheat-based dish popular in North Africa. It is hypothesized that fregola may have arrived in Sardinia as a result of cultural interactions with the couscous-producing Berbers. Small clams, or arselle: Fishing and seafood consumption have long been traditions along Sardinia's coastline. The local diet has long included clams, notably the tiny carpet-shell clams (arselle). Since the beginning of time, people have eaten shellfish and clams, and over time, different traditional dishes have developed to highlight the fresh seafood that is available in the area. The precise origin of the particular mixture of fregola and arselle is difficult to determine. The dish probably evolved gradually over time, though, as Sardinians looked for great recipes that used regional ingredients. A

logical step in the development of Sardinian cuisine would have been to pair the little clams with the toasted fregola pasta, another local favorite.



4.3.2 Bottarga

In Sardinian cuisine, bottarga is a one-of-a-kind and highly prized ingredient. It is a sort of salted, restored fish roe, normally produced using dim mullet or fish. After the fish's roe sacs are taken out, they are cleaned and massaged to get rid of any dirt. After that, sea salt is added to each layer, and they are left to dry and cure for a few weeks. The resulting bottarga has a firm texture and a flavour that is described as briny, salty, and slightly fishy. It also has a rich, intense flavour. It is often added to dishes as a seasoning or garnish and is typically grated or thinly sliced. In Sardinia, bottarga is often enjoyed in straightforward dishes. It is typically grated over pasta, particularly spaghetti, and incorporated into a flavourful sauce with olive oil,

garlic, and chili flakes. The bottarga's flavour is enhanced by the pasta's heat, which helps the oil's aromatic oils escape. Additionally, bottarga is utilized to enhance the flavours of other dishes. It tends to be shaved over plates of mixed greens, utilized as a fixing for crostini or bruschetta, or integrated into sauces and dressings. Some Sardinian dishes even call for bottarga as the main ingredient. One example is a spread made by mixing olive oil, garlic, lemon juice, and grated bottarga together. Sardinia is known for producing some of the best bottarga in the world, which requires skill and patience to produce. This one-of-a-kind ingredient is a delicacy that is sought after worldwide due to its delicate and complex Flavours.



Figura 4-1 Fregola con Arselle

4.4 Egg and Egg products

Vertical cohesion implies that the Sardinian poultry sector has complete control over the quality of its output. By doing so, egg producers are able to rigorously oversee every step of their operation, including the growing of the birds, feeding, housing, husbandry, and selling of their goods. The parent lines that supply poultry producers' operations are typically not their own; instead, they are bought from main breeders. In Sardinia, there are about 171 farms that raise a total of 779.149 chickens. A total of 466.879 heads of laying hens are raised on 99 farms around the area, predominantly in the south. There are 34,503 free-range, 21,534 organic, 178,720 ground-raised, and 220,322 cage-raised laying hens in total. 2% of chicken farms are organic, 20% are farm-raised, and 62% are battery cages. In Sardinia, there are 88 laying farms in total, including 39 outdoor groups, 5 organic groups, 24 caged groups, and 35 ground-raised group

4.5 Sardinian wines

The entire island's vineyard area is included in the Sardinian wine region. Sardinia is the second-largest island in the Mediterranean Sea, after Sicily, and it is off the west coast of Italy. Sardinia wine area has north of 7,000 nuraghe, or forcing tower-like designs, from the antiquated Nuragic Civilisation. The Nuragic public lived on the island during the Bronze Age and add a mind-blowing authentic presence to any guest investigating the island. In general, when people think of Sardinia, they at once think of dramatic beaches and clear waters. Sardinia still has a lot to offer in terms of things to see and do. Simple investigating the neighbourhood gastronomy scene and wine creation from the island, which is unique in relation to customs and tastes you track down in middle area Italy. The neighbourhood wines and food are special by their own doing and ought to be acknowledged with a sober mind for the flavour, fragrance and appeal they make. *Vitis vinifera* L. ssp. One of the world's oldest and most valuable fruit-bearing plants is *vinifera*, or grapevine. It was a significant player in the intricate historical societies of the Mediterranean. Nowadays, it is generally accepted that *Vitis vinifera* L. ssp. was domesticated to produce the modern cultivars. *Sylvestris*, or untamed vines Wild vines are extremely normal among the unconstrained plants of Sardinia. Wine in Sardinia dates to the era of recent research. In the Couples Nuraghes Nuragic settlement, the grape seeds found in the Late Bronze Age and Early Iron Age levels are about the squat sort with short tail which are normal for *Vitis vinifera* L.var. *sylvestris*. This wild species was used often during this time period. According to the primary investigation completed by Corrie Bakels ²⁰these grape seeds had a place with the wild subspecies or *Vitis vinifera* L. The island was essential for the Spanish Realm from 1479 to 1714 when business and social trades between the two areas caused adjustments of its farming items. In viticulture, Spanish and Sardinian grapevine varieties often have names that resemble one another; for instance, 'Bobal' and 'Bovale', 'Cariñena' and 'Carignano', and 'Garnacha', 'Granaccia' and 'Granazza'. Grape varieties may have been exchanged because of political and economic connections, improving the local germplasm's genetic composition, which is something we can assume. At the same time, some Sardinian cultivars may have been brought to Spain through the domestication and cultivation of local wild grapevines. On a new visit to Sardinia, the wine financial specialist and creator Mike Veseth ²¹uncovers that Sardinian wine highlight a place of local grapes with many global assortments that have been filled in Sardinia. According to him²² there are certain wines that can find solely on Sardinia, for example, Tobato from Sella and Mosco. Tobato's history is still a mystery, but some arguments suggest that it came from Spain in the 14th and 15th centuries. Cannonau, which you may be familiar with as Garnacha, is the most significant red variety. Sardinians guarantee responsibility for varietal.

Figura 4-4 Sardinian Wine Regions

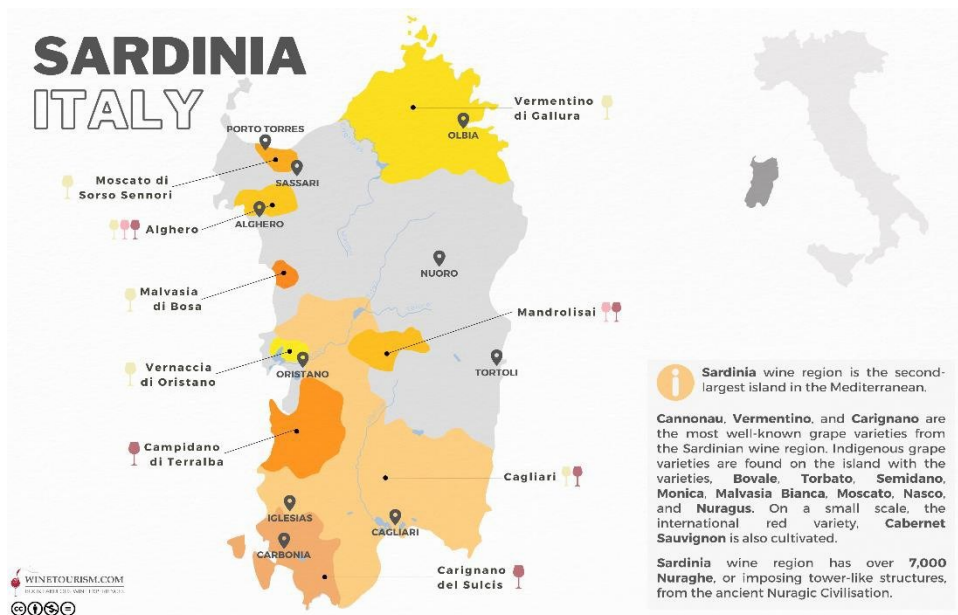


Figura 4-5 Image showing grapes cultivation- Handpicked grapes

'All of those that come from overseas are strangers, and they will eventually all go away again'

This exceptionally Sardinian statement completely makes sense of the mentality of individuals from the island; They may experience foreign influence, but it will also leave again, allowing them to be who they truly are. Naturally, "strangers" have had an impact on the island's culture over time, even when it comes to winemaking and vineyard cultivation. The Phoenicians are said to have been the first to bring wine to the island, long before Christ was born. Winemakers in the Sardinia wine locale have set up many grape

assortments and made assorted styles of wine throughout the long term. Vermentino is created chiefly in the north of the island, while the solid Cannonau is delivered in the south alongside sustained wines suggestive of Sherry. Cannonau wine is delivered in the south alongside sustained wines.

4.5.1 Cannonau wine

Known as the Wine of Centenarians. The most recent research ²³writes down that Cannonau is entirely Sardinian. Historical and archaeological studies have overwhelmingly supported Cannonau's Sardinian ancestry, demonstrating that it does not have Spanish paternity. Numerous researchers, as a matter of fact, erroneously trusted that Cannonau, referred to in Spain as Garnacha, was imported from the Iberian Promontory in Sardinia in 1400. Promotion during the Spanish rule, however it is doubtlessly the inverse or rather, that the Spaniards started to develop this assortment after they tracked down it in Sardinia. In fact, Cannonau seeds tracing all the way back to 1200 BC were found during late archaeological unearthing's in the territory of the Medio Campirano. During that time limit, the old occupants of the island who cruised around the Mediterranean might have helped spread Cannonau in Spain, and specifically, in Seville where it is called Canonazo and in Aragona where it takes the name of Garnacha, lastly in France, where it is known as Grenache. As per an epidemiological delegate study²⁴ bespeaks that individual living in the mountainous locale of Sardinia makes specific cases of life span. The study²⁵ investigates the connection between nutrition and age. People who live in blue zones regularly and moderately consume alcohol. Cannonau wine is a sort of red wine that is created in the district of Sardinia, Italy. It is produced using the Cannonau grape, which is otherwise called Grenache in different regions of the planet. In Sardinia, Cannonau is regarded as one of the most significant and traditional grape varieties, and the wine has gained recognition for its distinctive qualities. Cannonau wine is known for its rich, full-bodied nature, with high liquor content and hearty flavours. It customarily has flavours of dark fruits like black cherry, blackberry, and plum, as well as spices, herbs, and earthiness. The wine typically has a complex aroma and a deep ruby colour. Cannonau wine's elevated levels of antioxidants, particularly resveratrol, are one of its most distinctive characteristics. According to some studies, drinking Cannonau wine in moderation may have health benefits, including improving cardiovascular health. Grilled meats, game, hearty stews, aged cheeses, and other dishes go well with Cannonau wine. A flexible wine can supplement both customary Italian dishes and global cooking styles. It's important to note that Grenache grapes can be grown in many other places around the world, including France, Spain, the United States, and Australia, while Cannonau wine is only produced in Sardinia. The terroir and winemaking methods used in each region can have an impact on the wine's flavours profile and

characteristics. Overall, wine enthusiasts adore Cannonau because of its bold flavours, distinctive character, and Sardinian cultural significance

4.5.2 Vermentino wine

Vermentino is a white wine grape variety that is mostly grown in Italy, especially in Sardinia, Liguria, and Tuscany. It is also grown in France, Spain, Australia, and the United States, among other places. Vermentino wines are renowned for their refreshing character, crisp acidity, and citrusy flavours. Lemon, lime, grapefruit, and occasionally tropical fruits like pineapple and mango are common aromas. Depending on the region and the methods used to make the wine, the style of the wine can be light and zingy or more full-bodied and complex. Vermentino is often used to make still and sparkling wines in Italy. It is in many cases delighted in as a youthful wine, intended to be polished off inside a couple of prolonged periods of its rare. However, some producers also produce aged Vermentino wines that mature into wines with greater depth and complexity. Vermentino coordinates well with various food sources, pursuing it a flexible decision. Its dynamic sharpness and citrus notes make it an extraordinary counterpart for fish dishes, especially shellfish, barbecued fish, and sushi. It additionally coordinates well with light pasta dishes, mixed greens, and starters like bruschetta and antipasti. Vermentino is a delightful white wine that is refreshing and lively to drink, making it ideal for casual gatherings or warm weather. The young shoots of Vermentino are densely covered in hairs that lay flat. Its young leaves are yellow, though its grown-up leaves are dim green and orbicular. There are five to seven lobes on the leaves, and the petiolar sinus is only slightly open or has lobes that overlap slightly. The horizontal sinuses are obvious and profound. The lobes are long in comparison to their width at the base and have clearly distinct teeth with rectilinear sides. There is little anthocyanin pigmentation of the veins. The leaf cutting edge is barbed and risen with a slight waffle-like surface. There are a few upright and some flat-lying hairs covering the leaf's underside in a coat that is moderately dense. Both the bunches and the berries of Vermentino are large, and the berries are oblong. This is a quite productive and vigorous grape variety that must be pruned short. In these conditions, it resists well against the very dry climates of the Mediterranean perimeter. According to European union²⁶ REGULATION (EU) No 1308/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17th December 2013 Vermentino wine was Designated as PDO (protected designation of origin).²⁷

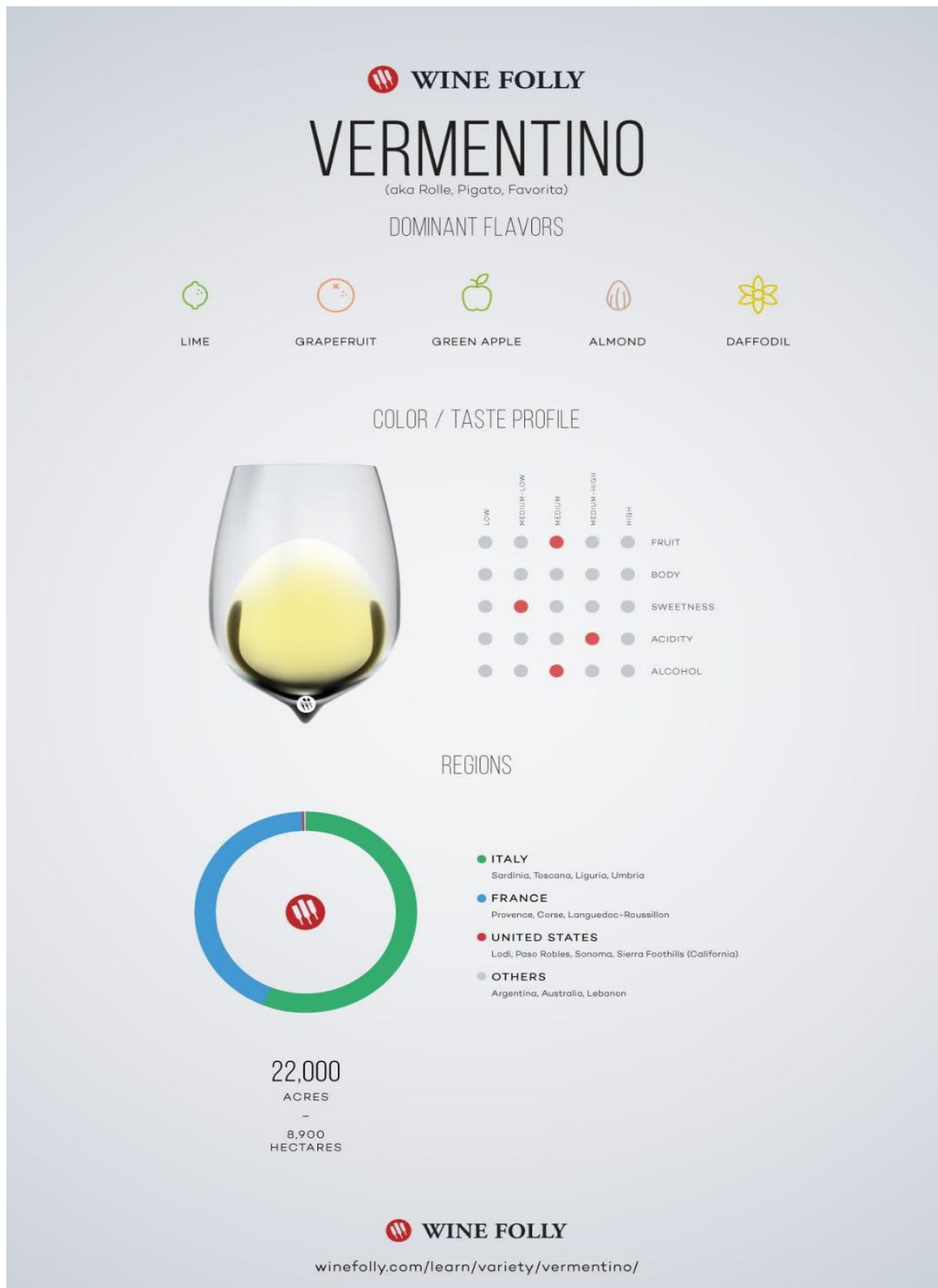


Figura 4-6 Sensory analysis aspects of Vermentino wine

5. Sardinian Breads

5.1 Acorn breads

Oak seed bread is a food of the past that was mainly made in Ogliastra (focal eastern Sardinia). In popular culture, oaks have always been held in high regard because of the numerous applications they provide to humans. In fact, they are referred to as the "King of Trees and Trees of Kings." Known to man since vestige for their properties, they were used in society medication and, as well as being grub for creatures, throughout the long term their organic product was a wellspring of means for crude people groups and the less wealthy²⁸. It appears that acorn-producing trees exported their fruit from Sardinia to Rome, where it was consumed during times of famine²⁹. These trees were most likely the first to provide humans with food³⁰The way that the product of the oak tree was eaten in crude times has been showed by various discoveries of oak seeds saved inside primitive beneficiaries³¹. The acorn tree was chosen by ancient peoples because it made up the most primitive nutrient, according to the etymology of the specific epithet *ilex*, which is attributed to the holm oak and is presumably derived from the Latin verb *eligo*³². Additionally, a wide variety of ingredients were extracted from the acorn by the American Indians: beverages, oil, flour, and *Quercus ilex*, subspecies acorns *Samp ballotta*. are sold, even today, in the business sectors of North Africa and are eaten bubbled. In Sardinia, oak seeds, which today are used exclusively to stuff pigs, in the past gave two food items: bread and coffee. *Pan'Ispele*, a term of pre-Roman origin³³ whose meaning, according to recent interpretations, refers to its similarity to the interiors of the stomachs of pigs that have consumed acorns, is the generic name for this bread. The bread's unusual ingredients: My interest was piqued by water, acorns, ash, and clay, which led me to read relevant literature and conduct interviews with many elderly women in island villages.

Different analysts have alluded to oak seed bread made in Sardinia regardless of whether in established truth the specific readiness has just been given exhaustively by three scholastics. The first was Professor of mathematics at the University of Sassari, Father Francesco Cetti. His work³⁴ is the oldest chronicle in Sardinia that talks about a particular kind of bread made with clay in Baunei. Acorn bread, which was a common food item in the past, is now only made during village celebrations by skilled older women who still remember the ancient custom. Its nutritional value is poorly understood. It has been considered beneficial as well as harmful. At the beginning of the 20th century, it was thought to be nourishing and easy to digest [19]. In 1969, the most recent chemical analyses named it as a revitalizing part that alleviates digestive issues in the intestines. There were a few local variations in the order of the various bread-making steps. The acorns were only collected in autumn from forests of downy oak (*Quercus pubescens* Willd.) or holm oak (*Quercus ilex*

L.). and only from plants that the elders selected. They were regarded as superior, most likely due to their exposure (called Solianas in Sardinian), and they produce fruit that is sweet, smaller, rounder, and easy to distinguish from the bitter varieties that were used as animal feed. The acorns were dried for about three months on a shelf of the traditional sheep herder's hut with its central fireplace (Urzulei) or for about 20 days in a wool sack stacked next to a chimney (Baunei). After being dried, the acorns were either shelled by beating them on a stone (Baunei) or poured into a bag made of goat's skin and vigorously shaken (Urzulei). The two cotyledons, or seed skins, are removed from the acorns at the end of this stage. The following stage was tracking down the mud. This was also taken from places that the elders of the village had showed. It was separated, purged and filled a huge earthenware bowl having chilly water. Using a wooden spoon, the two ingredients were thoroughly mixed to a smooth, reddish consistency (Baunei). Or, according to Urzulei, the clay was stirred often for two or three weeks in water. This system, like the compound course of cation-trade, was done for the reasons for advancing the water with minerals from the dirt, later creating profoundly wholesome bread, plentiful in mineral salts. A copper cooking pot was used to boil this mineral-rich water. The dried acorns were then added to the reddish-boiled mixture without their seed coats. The actual cooking process began at this point. Its purpose was to partially cut the tannins' strong, bitter taste, which are polyphenols that, when present in high concentrations, are harmful to human health.



Figura 4-7 Lande 'e perra chin brodu (First Urzulei's product).

Additionally, the clay gave the paste its typical black colour and neutralized the acorn tannins' bitter and sharp flavour. In addition to adding iron and other mineral elements, it also contributed to the formation of

a uniform mixture. The genuine baking required around 8 or 9 hours in Urzulei and 5 or 6 in Baunei. In Baunei another fixing was added gradually to the bubbling ruddy combination: Sieved ash, typically from downy oak (*Quercus pubescens* Willd.) or grapevine (*Vitis vinifera* L.) fires [10]. It was believed that ash made it easier to cook the acorns [16]. A robust juniper branch continuously mixed the mixture. In Urzulei, the first stage of cooking produced a thick soup-like dish known as Lande'e perra chin brodu in Sardinian, which translates to "Acorn soup." This dish was not particularly appealing and was only intended for family consumption (Fig. 1). When the mixture reached the desired consistency, a further step was to strain the acorns and quickly form small, irregular-shaped cakes. They were dried in the sun or in the fireplace, where ashes were sprinkled on top to prevent sticking. In Baunei, this was known as Su lande cottu as well as Cunfettu in Urzulei that translate to "Cooked acorn" It was a simple meal intended for men who needed energy for strenuous labor. It was frequently additionally cut and proposed to companions, family members and neighbors. The remaining mixture was heated to the point where it resembled corn meal. In Baunei, it was shaped into numerous small pieces of bread known as Su lande'e fitta, and in Urzulei, it was called Gheladina, which translate to "Gelatin of acorns." It was given to children, the sick, and the elderly because it was more refined. It was practically similar to a sweet and was frequently eaten with whey from ricotta cheddar to ease processing. As a result, there were two winners in Baunei and three winners in Urzulei. Aside from being a food item, the shiny, black acorn bread was also used as a remedy for anemia, bloating, and stomachaches. It had a strong, sweet scent and was loaded with iron and mineral salts. It had a flavor that was similar to that of chestnuts and had a slight earthy aftertaste.



Figura 4-8 Acorn bread

5.2 Pane Carasau

The origins of Pane Carasau's history can be traced back hundreds of years to the island's pastoral and agricultural populations and the traditional Sardinian way of life. The bread's formation is directly related to the necessity for a robust and transportable food supply that could feed shepherds and travellers through lengthy treks and periods away from home, despite the fact that its precise origins are unknown. The history of Pane Carasau is intimately connected to Sardinia's rocky, dry geography, which has historically influenced the island's cuisine. Sardinian people needed meals that could endure the test of time, be transported easily, and give nourishment under trying conditions because of the island's remote location and harsh terrain. The name "Carasau" or "Carasatu" is said to have its origins in the Sardinian language and is most likely derived from the word "carasare," which in some dialects of Sardinian means "to toast" or "to dry." This word refers to the process of baking, drying, and toasting the bread to give it its distinctive crispness. At communal baking events, which were social gatherings where neighbours would get together to bake bread³⁵ in shared ovens, Pane Carasau was historically produced in enormous amounts. This made it possible for the community to share food and use resources more effectively. Simple ingredients like durum wheat flour, water, yeast, and salt are all that are needed to make Pane Carasau. After being combined, the dough is thinly rolled out and baked in a hot wood-fired oven. The bread puffs up during baking, and once it is taken out of the oven, it is divided into two thin disks. The bread's distinctive thin and crunchy texture is achieved by rebaking these disks until they are crispy and golden brown.

Because Pane Carasau³⁶ has a long shelf life, it is a perfect food for travellers and shepherds who need to be fed while on long journeys or while taking care of their flocks. It was a convenient and portable food for the islanders because of its dry and crispy character, which allowed it to be preserved for months without losing its flavour or texture.³⁷ Pane Carasau is still a beloved and recognizable part of Sardinia's cuisine, despite how modernisation and the accessibility of other dishes have changed the island's gastronomic environment. It is still made and consumed in Sardinia, offered in establishments that serve traditional Sardinian food³⁸, and esteemed as a representation of the island's rich culinary heritage and resourceful culture by both locals and tourists.



Figura 4-2 Pane Carasau



6. Sardinian cheese

With tough mountains sitting close by green knolls and ripe valleys, since old times the wonderful island of Sardinia has been known for the nature of the milk from its neighbourhood creatures and for the authority of its cheesemakers. Throughout the long term, a large number of them needed to emigrate abroad or to various Italian districts, however they kept on making fantastic cheddar, remembering the strongly flavourful Pecorino Romano for Lazio - a fundamental element for the overwhelming majority Roman works of art like Amatriciana and trippa alla Romana. The PDO-protected Pecorino Romano that is so associated with Roman cuisine can also be produced in Sardinia when they eventually return home. One of the island's most prized culinary treasures is cheese today. Nonetheless, there are many other messy diamonds to be tracked down in Sardinia. Some of them are well-known, while others are hidden gems that the foodie world has yet to discover. Most of them are made and eaten on country farms and in faraway villages. Some even face the risk of eradication, as they're extremely strange to make, however, to eat as well. These are a few of the most well-known and less well-known (some might even say extreme!) Sardinian cheeses.

6.1 Casu Marzu

Sardinian Casu marzu is yet another unusual cheese. In Sardinian, the term "rotten cheese" is referred to as "casu marzu"³⁹. This cheese is made by first curdling goat milk with rennet and then soaking it in brine for a day. The cheese is exposed to *piophila casei* flies for the next 15 days of ripening. Numerous worms are incorporated into the cheese after it has fermented. In order to guarantee the safety of their products, some businesses are currently using captive-raised species of fish⁴⁰. This creamy cheese is meant to be eaten with living worms, which the outside world often doesn't like and doesn't like (see Fig.). The European Union Database does not recognize this food as a traditional food product, despite efforts to control food safety and historical documentation. As a result, the food is unknown and unappreciated outside of the region, and it is illegal to sell it in many countries, including Italy, because living worms are thought to be parasite carriers.

There are numerous health benefits of eating insects, according to studies. Due to their extremely high protein content, edible insects may contain up to 30% of essential amino acids, according to this study, and they may improve the microbiota in the human digestive tract. The numerous vitamins, minerals, and polysaccharides that enhance human immune function were also highlighted in another study. Even though most people around the world don't like it, this specialty cheese has a lot of health benefits and controlled production could ensure food safety and hygiene. No doubt, Case Marzu assumes a significant part in the life span of Sardinian people both as a symbol and thanks to its rich nutrients.



Figura 4-10 Casu Marzu, A type of cheese

Casu marzu is made by leaving entire pecorino cheeses outside with a piece of the skin eliminated to allow the eggs of the cheddar fly *Piophila casei* to be laid in the cheddar. A female *P. casei* can lay more than 500 eggs at once. When the eggs hatch, the larvae begin to eat through the cheese. The acid in the maggots' digestive system breaks down the fats in the cheese, making it exceptionally soft. A typical casu marzu will have thousands of these maggots when it is ready for consumption. When the maggots in the cheese have

died, Sardinian aficionados consider casu martzu to be unsafe to consume.⁴¹ As a result, only cheese in which the maggots are still alive is typically consumed; however, exceptions are made for cheese that has been refrigerated, which kills the maggots. When the cheese has fermented sufficiently, it is often cut into thin strips and spread on moistened Sardinian flatbread pan the maggots may be avoided by some who consume the cheese. Put the cheese in a paper bag that has been sealed for those who don't want to eat it. In the bag, the maggots, starved of oxygen, writhe and leap, making a "pitter-patter" noise. At the point when the sounds die down, the worms are dead, and the cheddar can be eaten.⁴² Pastoralism has played a significant role in shaping the cultural identity that Sardinians have today in Sardinia. Through the connection of people, land, and food, pastoralism has proven to be a representation of Sardinian culture over time. Sheep farming became an important business and a symbol of Sardinian culture because of the landscape of Sardinia. In many parts of Sardinia, pastoralism is still practiced as a traditional economic method and as a way of life that has shaped people's identities in many ways, like how they eat.⁴³ Cheese, which is a popular delicacy in Sardinia, needs to be pasteurized before it can be sold. Even more explicitly, casu marzu, which is a conventional delicacy that has a neighbourhood security, however, by and large has been restricted by the Italian Government because of wellbeing concerns. This cheddar has been a staple in Sardinian culture as it was made by sheep ranchers with their sheep's milk.⁴⁴ Because of the prohibiting of the cheddar, the strategy in which you make casu marzu has been did not remember by quite a few people, yet all at once not all. It's not easy to find, but if you know where to look, it's not impossible. Traditional elders and shepherds from Sardinia preserve the taste of casu marzu in Italy. Even though this cheese is hard to find, Sardinians still eat it on special occasions like weddings and anniversaries⁴⁵.

6.2 Casu Axedu

This is a rich, delicate cheddar, which can be eaten both new or developed. Made with sheep's or alternately goat's milk, it was - despite everything is - customarily made by Sardinian individuals additionally at home. Casu Axedu, which literally translates to "sour cheese," requires a unique method. After adding the rennet and a small amount of the whey from making cheese the day before, it is left to curdle for a few hours before being preserved in brine for 24 hours before being eaten. This is how this mild, sweet cheese becomes extremely sour and flavourful. When new, going with plates of mixed greens and vegetables or spread over nearby bread is normally served. Once developed, Casu Axedu turns out to be hard and can be ground to add flavours to soups and pasta dishes.



Figura 4-11 Casu Axedu

6.3 Fresa de Attenzu

Although Fresa de Attenzu Sardinia is most well-known for its matured hard cheeses, the region also produces a wide variety of intriguing soft cheeses. One of them is Fresa de Attenzu, which is only made in Nuoro and Oristano. It is delivered with cow's (and some of the time sheep's) milk toward the finish of fall. With a slightly more acidic flavour, the small round wheels have a texture that is like that of stracchino cheese and is soft and creamy.

6.4 Pecorino di Osilo

It is a rich and intense hard sheep's milk cheese made in Sardinia. It is known for being extraordinary ily smooth. Pecorino di Osilo is one of many different varieties of Pecorino cheese. This is because the cheese is washed in water and brine for a long time before being rubbed with olive oil. During production, it is also

repeatedly pressed to maintain uniformity and firmness. The Slow Food Presidium is protecting it because it is only made in Osilo and a few other villages close to Sassari.

Triza is a delicious and beautiful string cheese made with milk from Sardo-Modicana cows in the Montiferru region. It can be eaten a few days after it is made. Some say its name alludes to the twisted state of a Trecia, despite the fact that others accept it is gotten from an old Byzantine word, Thierica's. It is sometimes woven into elegant and traditional shapes and eaten during Lent.

6.5 Pecorina Sardo

Sardo pecorino (Sardinian: Berveghinu sardu) is a firm cheese made from sheep's milk from the Italian island of Sardinia: explicitly from the milk of the neighbourhood Sardinian variety. It was granted Denominazione d'Origine status in 1991 and conceded Safeguarded assignment of beginning (PDO in English and DOP in Italian) assurance in 1996, the year in which this European Association certificate conspire was introduced.⁴⁶



Figura 4-12 Pecorina Sardo

The cheese has historically been regarded as an alternative to Pecorino Romano since the turn of the century. Initially this cheddar was alluded to by concocted names or names which alluded to the specific topographical region from which it came. In time, the names, associated with the laid-out customs which as of now portrayed a reasonable standard item, came together in the topographical name of the whole area, as the aggregate epitome of Sardinian sheep-raising. The curd, which is made from whole sheep's milk and added calf rennet, is cut into hazelnut-sized pieces for the "mild" type and rice-sized granules for the "mature" type. It is then semi-cooked, pressed, salted, and ripened, the latter of which can include natural smoking. concerning normal factors, the specific qualities of the areas used for sheep-raising in Sardinia ought to be borne as a main priority; They are mostly natural G pastureland with a lot of natural essences that give the milk used to make cheese special qualities. In terms of human factors, traditional sheep farming,

which is frequently the only source of income in areas where there are no viable alternatives for economic development and is important to the island's population's socioeconomic well-being,

6.6 Pecorino Romano

The cheese that would later become the backbone of the Sardinian dairy sector arrived on the island at the end of the 19th century. one of the first Italian cheeses to receive honours and recognition on a global and national scale. In fact, it is listed in the Stresa Convention of 1951, which deals with the denominations of various cheeses, and it has held the titles of Denominazione d'Origine⁴⁷ since 1955 as well as PDO (Protected Designation of Origin) in all of Europe since 1996. In June 1997, the United States Patents & Trademark authority finally gave it the trademark "Roman cheese made from sheep's milk." A daily ritualistic combination of Sardinia, Latium, and the Province of Grosseto produces whole sheep milk from herds in their grazing regions. The distinctive and special ingredients of this cheese include paste-form sheep rennet, the expertise and experience of regional workers, and meticulous adherence to the many production stages. The flat-sided, cylindrical cheese weighs between 20 and 25 kg. The cheese itself is similar in colour, firm, compacted, or somewhat punctured, and has a thin, ivory- or straw-coloured, frequently domed rind. The mildly sharp flavor of the table variety, which needs to mature for at least five months, transforms into an exceedingly sharp, wonderfully unique taste in the grating version, which is seasoned for at least eight months. The Consorzio per la Tutela del Formaggio Pecorino Romano (Consortium for the Protection of Pecorino Romano Cheese), established in 1979, has established the following requirements for all types of cheese: the name Pecorino Romano in writing, the logo in the shape of a rhombus with rounded edges framing the stylized head of a sheep, with Pecorino Romano written below, the province of origin, cheese maker's code, year. In Sardinia, 2021 has been a very crucial year for sheep breeding. The breeding industry and the regional economy have experienced serious issues as a result of the rise in raw material and energy prices.

Pecorino Romano P.D.O. has evolved over the past few years, becoming more in line with the tastes of its main consumers and developing into a very versatile product that is used not only for grating but also as the main ingredient in a variety of food preparations and ready-to-eat sauces. It is now a staple in Italian cuisine on Italian soil and throughout the world.⁴⁸ Following the disputes between dairy processors and sheep farmers over the implementation of a productive program and the crisis in 2019 that culminated in the protests of the sheep farmers, awareness of Pecorino Romano P.D.O., as well as its economic value, has grown further. As a result, consumers have requested slightly more product, amounting to about 342,027 tons in 2020–2021 and 326,022 tons in 2021–2022. Positive pricing trends have been seen for Pecorino

Romano P.D.O. because it dropped to an average of 6,70 euros per kilogram in 2019 before steadily rising to 8,80 euros per kilogram in 2020 and 2021 and 11,48 euros per kilogram in 2021 and 2022.⁴⁹ Dolce and Maturo, the two types of this cheese, are only made in Sardinia.

Whole sheep milk is combined with local lactic ferments and coagulated with calf rennet to create a cheese that is then placed in cylindrical molds after semi-cottura (half-cooking). To produce the Pecorino Sardo Dolce type, the serum is carefully drained, and the cheese is then salted and seasoned for a short time (20–60 days), but the Pecorino Sardo Maturo variation requires more than 2 months of seasoning. Depending on how it was made, the cylindrical cheese with flat sides and a straight or slightly curved rind had many variations. Weighing between 1 and 2.3 kilograms, Pecorino Sardo Dolce has a smooth, silky rind that is straw-white in color but turns darker as it ages. The cheese itself is dense, stretchy, and sometimes has very small holes. Additionally, mature samples have more grain and are denser. In table cheese, the flavor is pleasantly sharp. Pecorino Sardo Maturo has a uniform, smooth rind and weighs between 1.7 and 4 kg. With seasoning, the color changes from pale straw to a deeper shade.

The actual cheese is compact, perhaps with few holes, and white, with a tendency to turn straw-colored in mature varieties, which are also thicker and grainier. It's a great product for both grating and serving at the table because of the flavor, which is pleasantly sharp.

Sardinia: Production of PDO cheeses (2020 data)			
PDO cheese	Productions (tons)	Milk used for cheese production (tons)	% of total Sardinia deliveries
Pecorino Romano ¹	29.358	176.776	57,09%
Pecorino Sardo	2.181	13.403	4,33%
Fiore Sardo ²	1.104	5.896	1,90%
TOTAL	32.643	196.075	63,33%
Deliveries of sheep's milk in Sardinia		309.631	

¹ Dairy year October - July

² Dairy year November - May

Figura 4-13 Sardinia production of PDO cheese⁵⁰

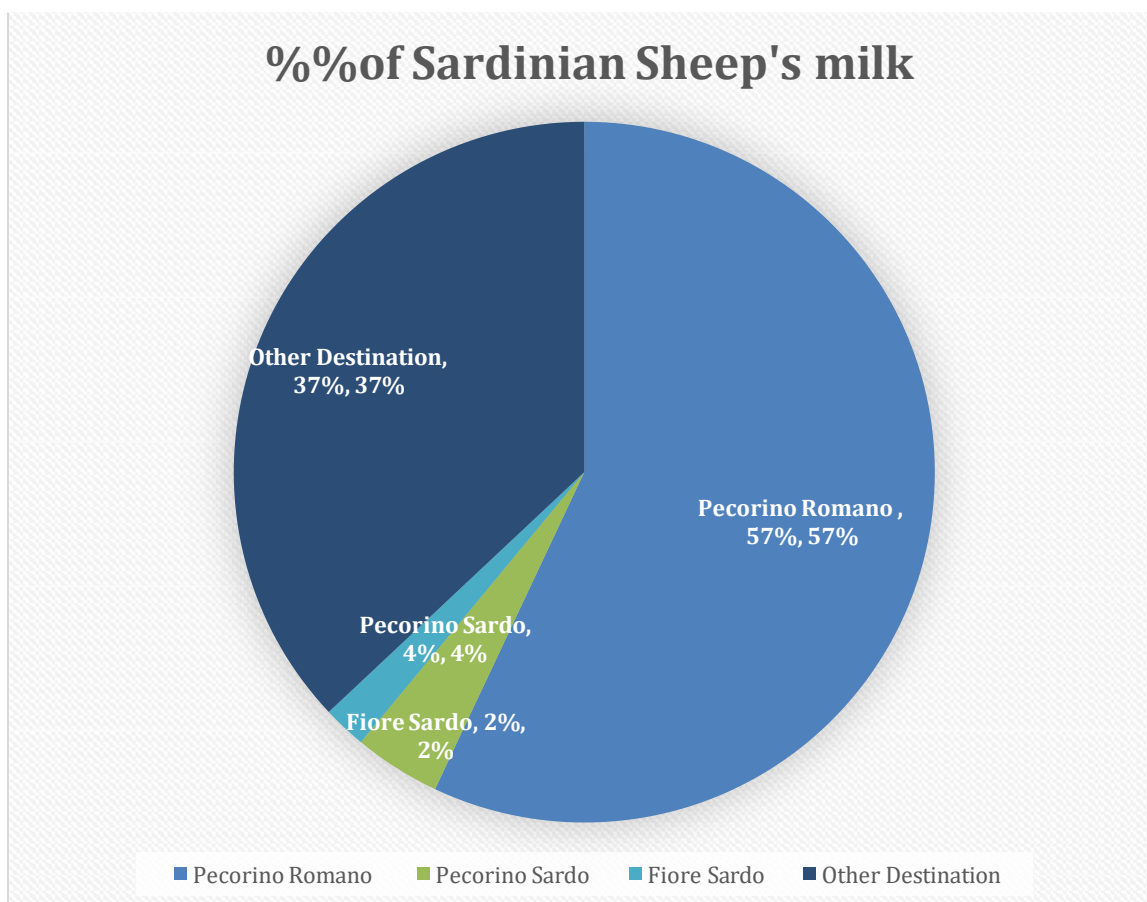


Figura 4-14 Destinations of sheep milk in Sardinia

7. Honey of Sardinia

Honey is an item rigidly connected with its area of creation and whose piece and flavour rely upon the sorts of flowers foraged by honeybees. However, soil, climatic conditions, and human activities also have an impact on the main characteristics of final products. Sardinia (Italy) is an island situated in the focal point of the Mediterranean bowl and covers around 24,000 Km². Most of the surface is characterized by extensive argon-pastoral agriculture and natural vegetation. There are limited areas with serious farming in view of the use of synthetic substances (pesticides or manures), and furthermore restricted modern locale. As a result, the island is mostly natural, which makes it ideal for producing high-quality honey. The melliferous plants of Sardinia incorporate more than 200 species, which allow the development of various Mono floral and polyfloral honeys, including commonplace creations from Asphodel, Thorn and Strawberry-tree (harsh honey) and other ordinary Mediterranean or worldwide spread items like Eucalyptus and Citrus. The honey that is produced on the island of Sardinia in the middle of the Mediterranean Sea is related to its geographical location. As a result, to prove a product's unique characteristics that are related to its geographical area, the honey produced in Sardinia is appointed as a PDO protected designation of origin under the law of the European Union. The melliferous plants of Sardinia incorporate more than 200 species that allow the creation of various Mono floral and polyfloral honeys. Asphodel (*Asphodelus micro carpus*), Thistle (*Galactites tomentosa*), and Strawberry tree (*Arbutus unedo*) honeys, among others, can be produced by some of these plants (Table 1). The simplest and earliest method of producing honey in Sardinia is using traditional hives made of cork, also known as "cork skeps". In some places, particularly in the island's centre, this method is still used. Beekeeping with these simple hives exploits the amassing sense of honeybees. When the hives are full, which typically occurs following the main nectar flow (by the end of June in Sardinia), honey is collected. By and large, honey production is lower than 7 kg/hive. Bees are compelled to leave the skep by blowing smoke through the hive's bottom to collect the honeycombs. By burning smoke-producing materials like dry grass or Ferule stems, the smoke is produced. Extraction of the brushes utilizing plug skeps depends on two main methods. All combs are taken from the nest following the bees' escape from the hive due to abundant smoke blowing in the most archaic method, which is referred to as "bogare a mortu" in the local dialect (which can be translated literally as "take after death" in English). In this customary technique, the skep is recently opened and placed on a stone, at around ten centimetres over the ground, to facilitate smoke blowing through the base. Bees leave the skep and seek shelter in a higher-up, empty one consequently. Bees have a low chance of survival due to the absence of flowers at this unfavourable time—the beginning of summer. The first bee is brought to a room where combs are removed and pressed for

honey extraction after they have been moved to the second skep (10–15 minutes). After the skeps are opened, honeycombs are cut with a knife (over the cross¹) directly in the apiary. This practice is referred to as "iscabitare" in the local dialect, which is spelled "to behead" in English. Honey can be extracted manually or through a mechanical press. Remains from the squeezed brushes (wax, some honey and dust) are processed in warm water, to extricate lingering honey and dust. After the wax separates, the honey and pollen solution are concentrated by boiling to produce a caramelized product known as "abbamele" or "abbatthu." Wax that has been collected can be used for a variety of things, like making candles and treating illnesses. Present day beekeeping depends on the utilization of bee colonies made of wood (Dadant-Blatt hives) and all gear is made of stainless-steel as per the advanced assortment process.



Figura 4-15 In the Sardinian traditional beekeeping method, honey is collected from cork skeps by cutting the honeycombs directly in the apiary, after bees have been forced to escape by smoke blowing and by brushing them away with a bundle of aromatic herbs

7.1 . Asfodel Honey

Although the asphodel plant (*Asphodelus microcarpus* and other *Asphodelus* spp.) (Fig. 4-16) is common in other Mediterranean regions including Puglia, Sicily, and Corsica, this honey is mainly produced in Sardinia. The plant, which is widely distributed in Sardinia's uncultivated areas, meadows, and underbrush and is regarded as a weed, is found there. Between 0 and 1200 meters above sea level, it can be found in a variety of heights. From January until May, flowers are in bloom. One of the main restrictions on its use in apiculture is its early blossoming. Even though its melliferous capacity is unknown, asphodel is nevertheless regarded

as a prime nectar source. The production of monofloral asphodel honey may nearly be ensured due to its proliferation of broad herbaceous populations. When liquid, asphodel honey is light (34–48 mm Pfund), yellow, and when it crystallizes, ivory white. The crystals are sand-like in texture, medium-fine in size, and frequently agglomerate. This honey has a fairly neutral, somewhat flowery scent. The flavour is mildly sweet and medium-intensity. It has a floral scent that fades quickly. This honey and Sulla honey are quite similar because of these qualities. These two varieties of honey are frequently mixed up because of their poor flavour and scent. Asphodel honey can be distinguished from Sulla honey primarily by its mildly flowery aroma and absence of the acidic sensation that is typical of Sulla honey.

In monofloral jars of honey, *Asphodelus micro carpus* is underrepresented, with levels as low as 5,200 3,100 grains per 10 g of honey (Floris et al., 1996) and big pollen grains frequently detected (from 0.5 to 7%). The large grain size of Asphodel and the flower shape, which reduce primary nectar contamination and aid filtering through the proventricular valve, may be to blame for this significant underrepresentation. The pollen spectrum of the Asphodel honey is represented mainly by various spring flowering and contaminant species: *Asphodelus*, *Brassica* f., *Capsella*, *Cistus incanus*, *Cistusmonspeliensis*, *Echium*, *Erica arborea* gr., *Eucalyptus* f., *Lavandulastoechas*, *Malus*, *Pistacia*, *Prunus* f., *Rubus* f., *Smyrnum* and *Trifoliumrepens* gr. *Acacia*, *Borago*, *Citrus*, *Crataegus*, *Galactites*, *Leopoldia*, *Lotus corniculatus* gr., *Matricaria*, *Ononis* f., *Papaver*, *Quercus ilex* gr., *Quercus pubescens*, *Rhamnus*, *Salix*, *Trifolium incarnatum*, and *Trifolium pratense* gr. are a few less common species.



Figura 4-16 Asphodel (*Asphodelus* spp.) flowers and leaves



Figura 4-17 *Cistus* (*Cistus* spp.) flowers and leaves.



Figura 4-18 Strawberry (*Arbutus unedo*) tree flowers and leaves.

Honey	Botanical source	Chemical-Physical characteristics	Organoleptic characteristics
Asfodel	Asfodelus microcarous	Low level of ash content, ph. and acidity	Colour yellow, smell slightly floral, taste is medium sweet to weak, low intensity of aroma
Eucalyptus	Eucalyptus Camaldulensis	High diastase and enzymatic activities	Colour amber and slimy liquid, strong smell, taste is quite sweet with medium intensity
Strawberry	Arbutus Unedo	High level of free acidity and electrical conductivity	Colour amber, smell intense like coffee, taste from intense to decidedly bitter, aroma like smell of rhubarb
Thistle	Galactites Tomentosa	Medium diastase activity, free acidity	Colour amber, taste sweet to acid, weakly bitter, smell floral at the beginning, strong and ends as fish meal
Clear Polifloral	Lavandula stoechas. Asfodelus spp. Echium spp. Trifolium species Rosmarinus sp.	Low level of Ash Content Other chemical and physical parameters follow the average	Colour from white to extra clear amber, smell typical floral, taste medium sweet, aroma usually not intense and persistent.
Dark Polifloral	Galactices tomentosa Carduus sp. Cistus sp.	Medium/high levels of ash content, other chemical and physical parameters follow the average	Colour clear or dark amber, smell intense/very intense, taste intense, taste sweet to very sweet usually fruity, aroma intense and persistent

Table 4-1 Characteristics of the main Mono flora and Polifloral Sardinian honeys.

7.2 Strawberry Tree-Honey (Corbezzolo)

The primary source of bitter honey is corbezzolo, or *Arbutus unedo* as it is scientifically known. It is evergreen bush or little tree, typically develops for up to 5-10 meters. The leaves have a leathery texture and are dark green in colour. Sardinia is one of the largest markets in this world and as per a part of the examinations did in Sardinia shows that the honey capability of this plant is 40kg/ha. Honey plants have a longer flowering season from October to January, with the first ten days of November and December being the best time for nectar secretion. The surface and shade of the honey changes as wrote down by its state. At the point when fluid the variety is golden while in solidified express the variety goes to beige brown. Additionally, the flavour of the honey fluctuates likewise, at first the taste is severe and become astringent recently.

7.3 Cistus Honey

The Cistus plant,(fig 4-17) which can be found in Sardinia, is made up of several species (*C. monspeliensis*, *C. albidus*, *C. corsicus*, *C. incanus*, *C. salvafolius*, and *C. creticus*), with *C. monspeliensis* being the most common. This species grows as a shrub between 0.50 and 2 meters tall. According to, Floris et al. (2000)⁵¹, Floris and Satta (2001), it is a significant source of pollen. However, in some centrifuged Sardinian honeys, its pollen can be extremely prevalent, even exceeding 50%. This demonstrates the significance of this species' nectar for the production of Cistus honey in Sardinia, as has already been shown in other Mediterranean regions (France and Spain). Additionally, the generation of honeydew by the Hemiptera Sternorrhyncha Coccoidea pest *Lecanodiaspis sardoa* Targ. Tozz. infesting Cistus plants can be a significant source of sugar for Cistus honey. Because of its extremely sluggish crystallization, cistus honey is frequently liquid. When liquid, the colours range from amber to dark amber, and when they are crystallized, they range from nut brown to brown. The aroma is moderately persistent, flowery, and primarily fruity. It tastes really sweet. The smell lingers and is pretty potent. It starts out floral and ends jammy or fruity. The aroma's fruity element reminds me of honeydew honeys. Cistus honey has high free acidity, conductivity, and diastase activity levels. The contents of glucose and fructose are 30 and 37%, respectively. 60 milligrams of total phenol per kilogram of honey. The typical range of Cistus pollen concentration in Cistus honeys is 32.8 to 44.7%. Less than 20,000 pollen grains are included in per 10 grams of honey.

7.4 Polifloral Honey

Honeys with poliflora Sardinia produces two types of Polifloral honeys: "clear" (white/extra-clear amber) and "dark" (clear amber/amber/dark amber). These honeys lack a definite conventional classification because of their extreme variety (Floris et al., 1991b; Floris et al., 1996). Early spring is often when clear Polifloral honey is produced, while late spring and even autumn are when dark honey is produced. In general, it is simple to determine which of the two varieties of Polifloral honey can be acquired provided the honey production season is known. *Lavandula stoechas*, *Asphodelus* spp., *Echium* spp., *Trifolium* spp., and *Rosmarinus* (only in the littoral zone) are frequently found in clear honeys. *Carduus* species, including *Galactitectormentosa*, and *Cistaceae*, like *Cistus* spp., make up the majority of the species in dark honeys. White to exceptionally clear amber are among the colours of transparent Polifloral honeys. The liquid form of these honeys is colourless or yellowish, and the crystallized form is white or clear beige. The aroma is often flowery, gentle, and well-balanced with a low intensity. The flavour is sweet to medium-sweet. Typically, the aroma is not extremely intense and lingering. When *Asphodelus* is present, the aroma is flowery, however when *Lavandula* is present, the aroma is fruity. Clear honeys are always relatively fluid when liquid and paste-like with soluble and medium-fine crystals when crystallized, despite the fact that tactile qualities are highly diverse. Since *Trifolium* and *Echium* are consistently present in clear honeys, according to melissopalynological tests, monofloral honeys can occasionally be created. Finally, additional research is required to have a greater understanding of clear honeys' sensory, chemical, and physical features. Dark Polifloral honeys can range in colour from clear to dark amber when liquid to clear beige to brown when solidified. Dark honeys than crystallizes more slowly than clear honeys than. The aroma can range from strong to extremely strong, and it is frequently greater when the fruity essence predominates than when the floral one does. The flavour can range from sweet to extremely sweet, is typically fruity, and occasionally has a bitter or complex aftertaste. The perfume lingers and is really potent. The frequent presence of *Carduus*, which causes a small whitening of the colour, a strong odour, and frequently a bitter aftertaste, is believed to have "animalized" many poly floral kinds of honey. The prevalent presence of *Cistaceae* in dark honey is associated with fruity and syrupy flavour and aroma qualities, as well as a dark amber colour with reddish undertones.

7.5 Abbamele

Abbamele is perhaps of the most seasoned honey-based item kept in Sardinia and makes up of honey, dust, water, also, honeycomb ⁵². To make the Abbamele, honey is first removed from the honeycombs. The honeycombs are then broken up and dipped in warm water to separate the wax from the pollen and remaining honey. Ultimately, orange strip or lemon skins are then added while boiling the creation until an earthy item with water content between 17.7 to 27.7% is gotten. This is boundlessly different contrasted with regular honey, which is produced in a few stages. The removal of the beeswax, pollen, and other particles is the first step ⁵³. Following filtration, the honey is warmed to somewhere in the range of 60 and 65 °C to concentrate the honey to around 17% dampness content while keeping up with the variety and Favour by limiting caramelization. Lastly, microorganisms are destroyed through a brief application of elevated temperature. Abbamele honey has a stronger flavour and more micronutrients than regular honey. Polyphenols in honey products are known to prevent heart disease ⁵⁴, and honeybee pollen is known to have antioxidant, anti-mutagenic, and anti-inflammatory effects due to its phenolic compounds, particularly flavonoids⁵⁵. A comparable creation strategy is moreover performed by locals from southern Portugal to create the supplement rich Água-mel. Presently, high quality Abbamele is perhaps of the most sought-after Sardinian food also, is sold at costs that depend on ten times more prominent than customary honey. The International Honey Commission's (IHC) harmonized honey method was used to measure the refractive index of the samples at 20 °C to determine their water content (Bogdanov, 2002). An Abbe Refractometer was used for this duplicate determination.

8. Honey production in Sardinia

Beekeeping, honey production, and other bee products (beeswax, propolis, and pollen) have traditionally been a source of additional revenue for shepherds in Sardinia. In the meadows where shepherds looked after their sheep, the edibles and wild bees were housed within cork bark. New generations of beekeepers have adopted more traditional beekeeping techniques over the past 30 years, but the bees continue to gather nectar from local wildflowers, and Sardinian honey is flavoured uniquely by the island's unique natural flora and ecosystem. Honey is a product that is directly tied to the region in which it is produced, and both its composition and flavour rely on the kinds of flowers that bees graze. Along with human activities, soil, climate, and environmental factors all have an impact on the key characteristics of finished goods. Large-scale agro-pastoral agriculture and natural vegetation cover most of the surface. There are just a few places where intensive agriculture is practiced using chemical fertilizers or pesticides, and there are only a few industrial zones. As a result, much of the island is still in its natural state, which is excellent for the production of premium organic honey. More than 200 species of melliferous plants grow in Sardinia, allowing to produce a variety of Mono floral and polyfloral honeys, as well as typical productions from Asphodel, Thistle, Strawberry tree (bitter honey), and other typical Mediterranean or widely cultivated trees like Eucalypt. There are 2273 beekeepers in the industry, of whom 1307 produce for personal use and 906 for businesses. There are 4990 apiaries in total, of which 2899 are registered, resulting in 52196 hives and 3242 swarms overall. The apiaries are divided into three groups: nomadic (64.51%), stationary (32.08%), and unclassified (3.41%). Data on production from January to August 2022 demonstrate the detrimental effects of drought on spring and summer crops. Daily highs of 40 °C were frequently exceeded in Sardinia. Spring wildflower crops, particularly those in Mediterranean scrub, drastically decreased. Tus and Citrus..

Figura 4-19 Honey Bee Production In Sardinia

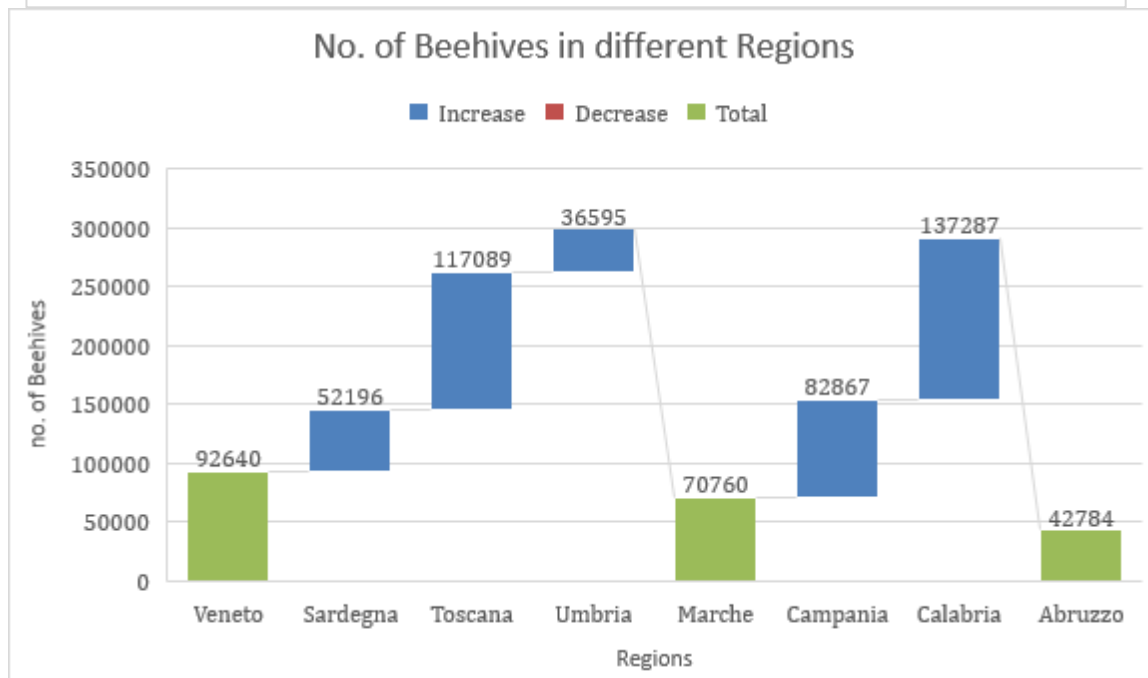
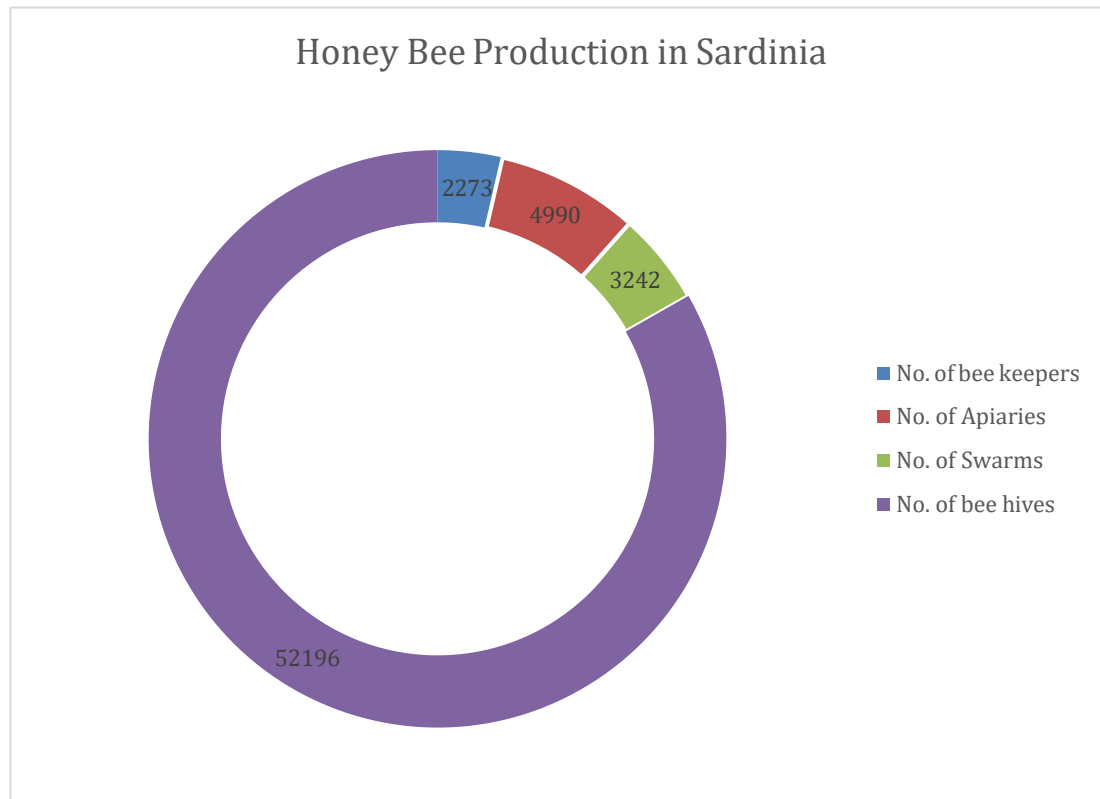


Figura 4-20 Statistical data processed on 21/07/2022 – 56

The output of citrus honey after honey extraction varies by honey type and is predicted to be between 0 to 3 kg/hive, occasionally with additional nectars that might change the production of citrus honey from single-flowered to multi-flowered honey. Harvests of 5–10 kg/hive are predicted for Sulla (*Hedysarum coronarium*) honey in Medio Campidano and Marmilla. Frost and drought had a significant impact on Sardinia's coastal and lowland asphodel harvests. In cases when a harvest was feasible, yields don't go beyond 3 kg per hive. About 10 to 12 kg/hive of thistle honey were harvested. Due to weather changes, strawberry honey production was halted

9. Sarda Pigs

The Sarda or Suino Sardo is a type of homegrown pig from the Mediterranean island of Sardinia (Italy). The current pig population in Sardinia can be traced back to the second millennium BC. Numerous bone fragments and bronze sculptures of domestic pigs have been recovered from Nuragic sites. Authentic and biblio-realistic examination and handle overviews have shown that pig rearing in Sardinia has ancient beginnings recorded by various ancient and verifiable follows. During Sardinia's Roman rule, pig breeding increased because of the island's large areas of oak trees and the tributes it was needed to pay. Various written records on pig breeding were reported during the medieval period. For instance, the "Codice Rurale di Mariano IV" stipulated prohibitions against introducing pigs to pastures in the fall and winter, as well as fees for those who left pigs in vineyards. Sarda pigs and wild boars have coexisted in the region for centuries, and it has recently been proven that the Sarda pig breed is a subspecies of *Sus scrofa meridionalis*. In the most recent available status, there are 13 registered farms of Sarda pigs, with approximately 61 breeding sows and 20 boars. Figures 1 and 2 depict the Sarda, a small breed with black, grey, tawny, or spotted coats. The fibres are various, long and harsh, and on the dorsal line, they make up a mane. It's possible to get a lumbar tuft. Small ears are kept high up or leaning to the side, and the head is cone-shaped with a straight profile and medium development. Wattles are here and there present. The "horse" tail is sometimes a long tail with bristles. Regardless of whether the variety presents enormous phenotypic variability, some morphological attributes are viewed as marks of crossbreeding and are thus cause of rejection from the library: nonappearance of fibres, depigmented skin, straight ears, curved profile, striated shroud or agouti, presence of white band, even partial, on the chest. Sows of Sarda breed have on normal 12.7 nipples.



Figura 4-21 Sarda Piglet



Figura 4-22 Sarda sow with Piglets

Sarda pigs are tamed chiefly in the province of Ogliastra and Nuoro, however it was likewise found in the locales of Sassari. There are sure old-style districts where sarda pigs were raised. The local breeds are kept in an open area, either partially or completely. They are allowed to go openly in lush mountains region, frequently including the public land. All of them are kept without any fences or controls to start the interaction between wild oats and domesticated pigs. African swine fever's difficult eradication was primarily due to this behaviour. The oak and chestnut woods, where the animals graze unrestricted, provide most of their food supply; During times of food shortage, the minimal integration typically consists of cereals (flour or grain) or legumes. The animals are slaughtered when they are quite old and remain in the herd for more than a year under this production method. It is in this way considered normal to simultaneously have youthful pigs, moderately aged pigs, and old creatures (as long as 3 years old and more than 100 kg). Additionally, in the Sarda breed, seasonality of the events (births and deaths) is a common management strategy. The farmers have developed the habit of getting the animals to respond to their voice calls at predetermined points, where they receive the daily amount of food that is offered to them directly on the ground.

Over 50%⁵⁷ of Sardinian pig farmers raise their pigs through the full cycle, producing the traditional cured meats that are consumed by their families. The excess is sold on the local market, particularly during the summer when there are a lot of tourists visiting the island. Sausage, bacon (rolled or not), "guanciale" and "coppa," together with cured ham and shoulder, are the primary products. Piglets, one of the classic meals of typical Sardinian cuisine, are consumed after being slaughtered at the age of 35–45 days. The traditional ham, shoulderham with bacon, and "sartizza a lorika" are three distinctive local items that are distinguishable in addition to these traditional goods. This final product is an extremely long sausage with a spiral shape that can even reach 3 meters in length⁵⁸ and is reminiscent of the "longaones"⁵⁹ reported in the Roman era. ASF, which is difficult to control and eradicate due to the type of breeding, and the presence of numerous unrecognized farms (for which it is difficult to establish the true consistency of the animals belonging to the native breed; are the two main issues that the Sarda pig breed and its products currently face. Over 50% of Sardinian pig farmers raise their pigs through the full cycle, producing the traditional cured meats that are consumed by the members of their households. The excess is sold on the local market, particularly during the summer when there are a lot of tourists visiting the island. Sausage, bacon (rolled or not), "guanciale" and "coppa," together with cured ham and shoulder, are the primary products. Piglets, which are consumed and are one of the traditional Sardinian delicacies, are consumed after being slaughtered at the age of 35 to 45 days. The traditional ham, shoulderham with bacon, and "sartizza a lorika" are three distinctive local items

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10. Sheep Production Sector in Sardinia

Since the second half of the nineteenth century, when companies based in the Italian region of Latium established the first cheese factories and began production of what is still the primary sheep dairy product in Sardinia and Italy: The Pecorino Romano PDO (Protected Designation of Origin, European quality label) cheese, sheep production has become the cornerstone of rural economy in Sardinia. Since then, there has been a significant improvement in milk quality and animal welfare, a sharp increase in milk supply per ewe and farm, and advancements in cheese manufacturing and marketing techniques. Since milk collection and processing are now so well-developed and structured, dairy sheep production in Sardinia might be considered the island's most dynamic agricultural industry, contributing around 25% of the country's overall agricultural income. With roughly 3 million sheep, or 44% of the national sheep stock (ISTAT, 2010), and 3.5% of the total sheep population in the EU (EUROSTAT, 2012), Sardinia is the top-ranking EU region for sheep milk production, accounting for more than 12% of the continent's output (EUROSTAT, 2012). There are 239 heads in the typical flock.

	Sardinia(total)	Sardinia (% of Italy)	Italy
Total sheep farms(n.)	12,669	24.8	51,096
Total sheep (heads no.)	3,028,373	44.7	6,782,179
Total Sheep milk	260,779	65.6	397,509

Table 4-2 Inventory of Dairy Sheep farms in Sardinia and Italy (ISTAT,2016)

The majority of farms (73.3%) are run directly by the landowners or their families. According to ISTAT (2010), the average farm size in the region is 30.4 ha, but there is a lot of variation. The number of farms has significantly decreased over the past few decades, leading to an increase in farm size and headcount per farm. Thus, from 121 heads in 1982 to 239 heads in 2015 (ISTAT 2015) and 252 heads in 2016 (National Database of Farms Animal, 2016), the average number of sheep per farm has increased. In 2010, there were 786 organic farms, of which 208,000 dairy sheep were grown (ISTAT, 2010). These farms, which account for 46% of all farms and heads in the province of Nuoro, are based on natural pastures and cover 101,000 ha in

total. In cheese factories (industries, cooperatives, and mini-dairies), whole milk production is processed. Without adding the mini-dairies, the number of cheese plants is projected to be 71 in 2015 (ISTAT, 2011). Data from ISTAT (ISTAT, 2016)⁶³ indicates that there are 111 dairies in total. The three PDO cheeses "Pecorino Romano", "Pecorino Sardo" and "Fiore Sardo" are the primary products. Around 20% of the entire revenue from sheep farms comes from meat (suckling lambs and culled sheep). A total of 1,100,371 lambs, with an average live weight of about 10 kg, were produced in 2010. Lamb meat accounted for 6,472 t of the 8,341 t of total meat production. According to ISTAT 2016⁶⁴, the production of greasy wool was approximately 1.5 kg/adult sheep or 3,470 t annually in 2015. Shearing typically costs between 1.2 and 1.7 euros per adult head, which is more than the equivalent income of between 0.6 and 1 euros per adult head. The majority of the grassland used in Sardinia's dairy sheep farming system is used for a variety of land uses and input utilization levels. Sardinia really has the largest proportion of land that is used for permanent habitation of any Italian area. It is evident that sheep farms are spread over all the island, although with a lower apparent frequency on the granite-metamorphic soil area, where are located the highest mountains (Figure

11. Sardinian Lamb

The lean and white flesh, pungent aroma, and excellent nutritional contents of Sardinian lamb PGI set it apart from other varieties. It is also modest in size. The meat has a very strong flavour and is quite soft and simple to digest. Since the 17th century B.C., the culture of lamb-breeding has been passed down through the generations in Sardinia. Sheep husbandry has been practiced since the pre-Nuragic era, and written records from the Roman era have also been discovered. Some texts from the 18th century also make mention of lamb marketing. The Sardinian island's climate, which fully satisfies the needs of this species, is typical of these habitats, which are broad open expanses that are heavily exposed to the sun and wind.

Three types of Sardinian lambs are recognized:

- Milk lambs: 5-7 kg cold weight, no hide; only consumed mother's milk.
- Light: cold weight, weighing between 7 and 10 kg without a hide, fed on mother's milk along with forage and fresh or dried cereals.
- Cutting: weight at cold and without hide is 10–13 kg, and mother's milk is fed along with fresh and/or dry cereals and fodder.

Solely Sardinian lamb or first-generation crosses with Ile de France and Berrichon du Cher or other highly specialized meat breeds are allowed to produce this kind of lamb. 329,044 certified animals were butchered in 2012. This is a crucial objective for the entire chain, which includes 28 butchers, 4 scoops, and 3,100 farmers under the Consortium. From 69,000 animals in 2010 to 138,000 animals in 2011, approved productions have steadily increased by more than 50%. There were 300,000 subjects in 2012. The profitability of sheep raising has been severely threatened in recent years by the sharp rise in the cost of electricity and raw materials; nonetheless, the P.G.I. Sardinian Lamb Meat Fair last year demonstrated the tenacity of Sardinian farmers. In fact, output and market prices of P.G.I. products have increased in 2021 and the first few months of 2022. The slaughter of 757 thousand P.G.I. lambs last year, which accounted for 77% of the entire regional production and 64% of the Italian national production, was a record high.



Figura 4-23 Sardinian Lamb

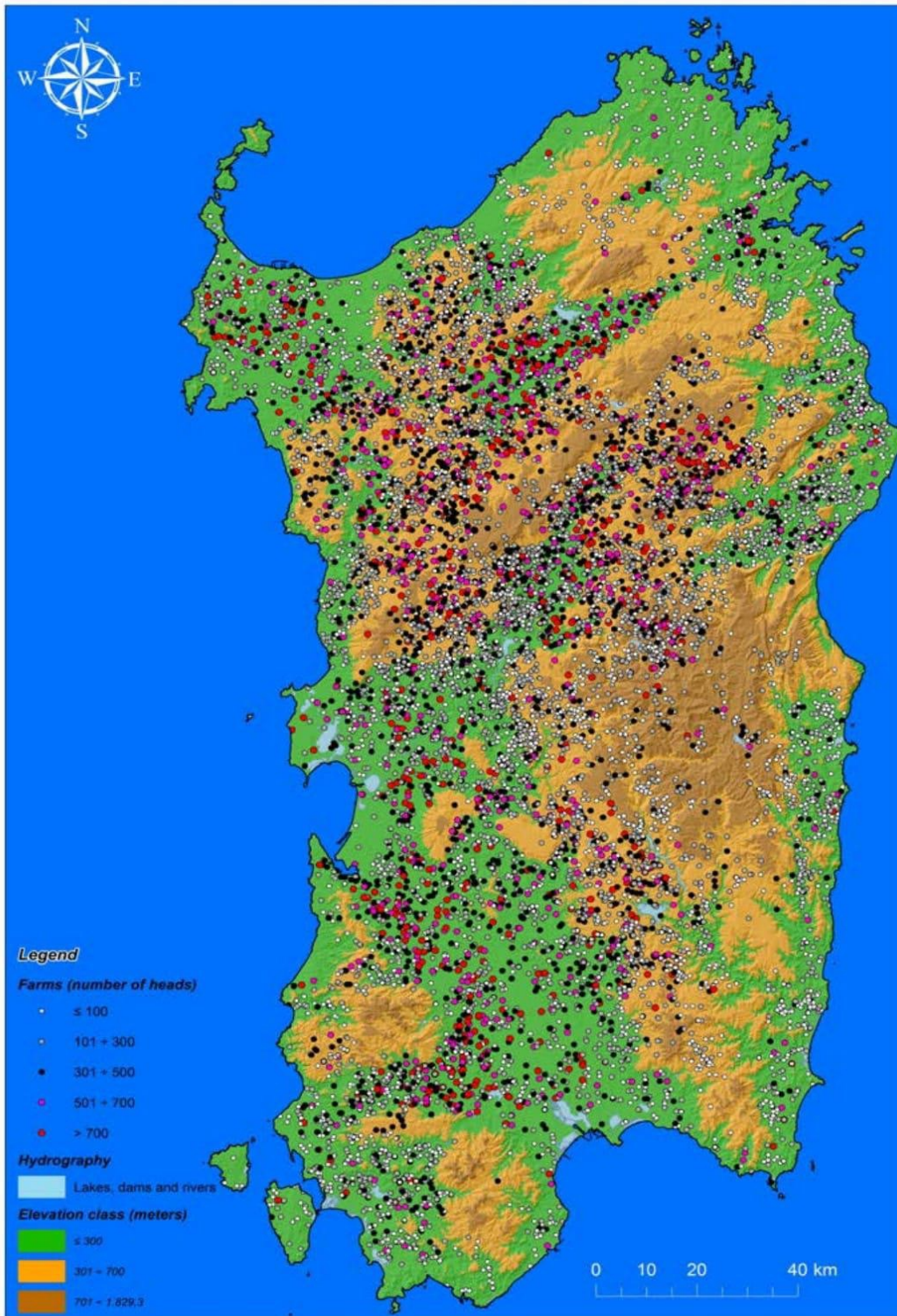


Figura 4-24 Geographic map of Sardinia and sheep farms distribution classified on the basis of head number per farm⁶⁵

The price of lambs is solely correlated with the price of the P.G.I. product, according to data on regional production, allowing it to maintain a proper position on the local and national market despite the market's dramatic contraction. 5100 farms, 28 slaughterhouses, and 14 portioning operations have all attained the P.G.I. designation. The region of Nuoro (32% of them) has the most sheep breeding farms, followed by Sassari (28%), Cagliari (21%), and Oristano (19%). Women make up about 17% (845) of the consortium's workforce. 4,972 tons of P.G.I. Sardinian Lamb were sold in total in 2021, generating over 62 million euros in income. In comparison to regular lamb meat, Sardinian P.G.I. lamb meat costs an extra 2 euros per kilogram on average. 25% of the total production is exported, generating more than 15 million euros in revenue. The price of the product reached 5,54 euros per kilogram and 6,80 euros per kilogram, respectively, over the Christmas and Easter holidays thanks to this sales pattern. This is the best result in the last 30 years. This information is the result of increased consumer demand for P.G.I. products, trade agreements between our associates and major distribution companies, and increased inspections of the lamb meat manufacturing line by our inspectors. The shortage of the product in international markets as a result of high transportation costs and logistical issues linked to the COVID-19 epidemic have also added to the final product's price hike. However, because there is less demand for the product in January and February, the market value of lamb meat continues to decline. This illustrates how crucial it is to diversify productions and alter them according to the season in order to boost the product's domestic and global demand.

12. Sardinia Climate

The Köppen climatic classification for Sardinia is Mediterranean type, group C⁶⁶. The majority of the territory falls into the "Csa" category, with the "Csb" category only applying to the inner sections over 800-1000 m of elevation. According to Chessa and Delitala (1997)⁶⁷, it is characterized by contrast between two seasons with generally mild and rainy winters, scorching, dry summers, and strong transition periods between them. The location of the island in the midst of the Mediterranean Sea, on the dividing line between the tropical zone to the south and the temperate zone to the north, is reflected in this large-scale pattern. Due to the oscillation of arid subtropical cells (the Azores Anticyclone), which move north during the summer and south during the winter, there are significant inter-seasonal changes in precipitation and temperature in this transition area. As a result, the island is left open to the intrusion of humid air masses from the North Atlantic⁶⁸. The main causes of local climate variability that results in the existence of various microclimates on a regional scale are the sea's presence and the inhomogeneous orographic distribution. While Temperate area, with its Sub-Mediterranean category, is restricted to the mountain reliefs (Gennargentu, Limbara, and Goceano), Mediterranean types are found across 99.1% of the island⁶⁹.

Thermicity (thermal gradient and latitude), aridity (precipitation regime), and continentality (elevation and distance inland) are the factors that define the sardinian climate. Eight phytoclimatic horizons that are mostly connected with altitude are present due to the mean annual temperature range of 11.6 °C to 18.0 °C⁷⁰. The island's orographic structure has an impact on its spatial distribution, separating the warmer alpine regions from the Campidano and Nurra plains with higher values. The coldest month is January with a low limit of -8 °C on the Gennargentu Massif, and the warmest month is August with exceptional values (>45 °C) recorded in the Campidano plain⁷¹. The same spatial pattern can be seen in the average yearly temperatures of the maxima (from 16 °C to 22 °C), which show two steady-state periods (July-August and December-February) and two transitional phases (March-April and September-November). The maximum regime during winter displays the sea's major influence while also displaying altitudinal and latitudinal gradients (Figure12- 1).

Cagliari, Sardinia, Italy Climate Graph (Altitude: 2 m)

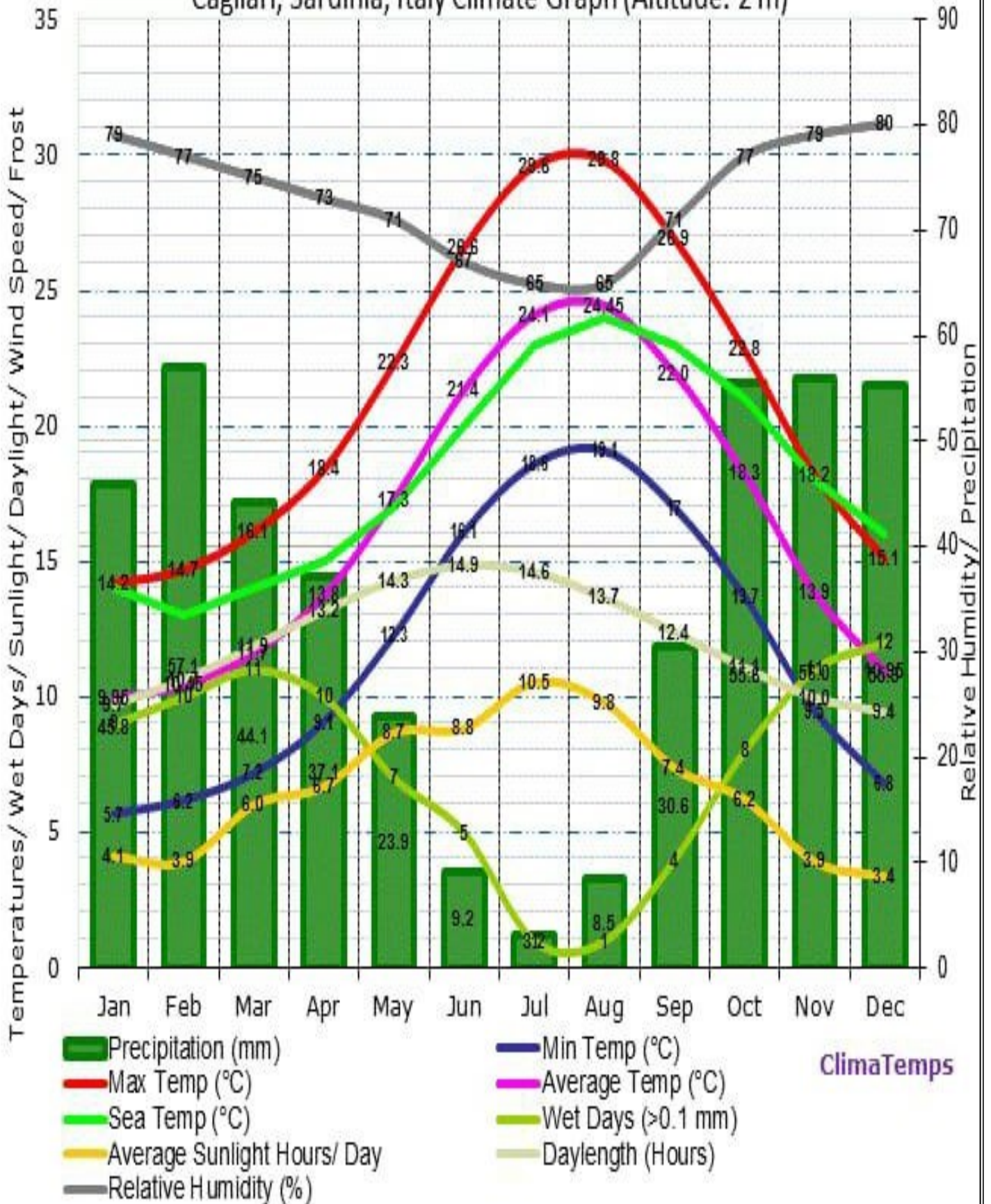


Figura 12-1 Sardinia Temperature and humidity⁷² 74

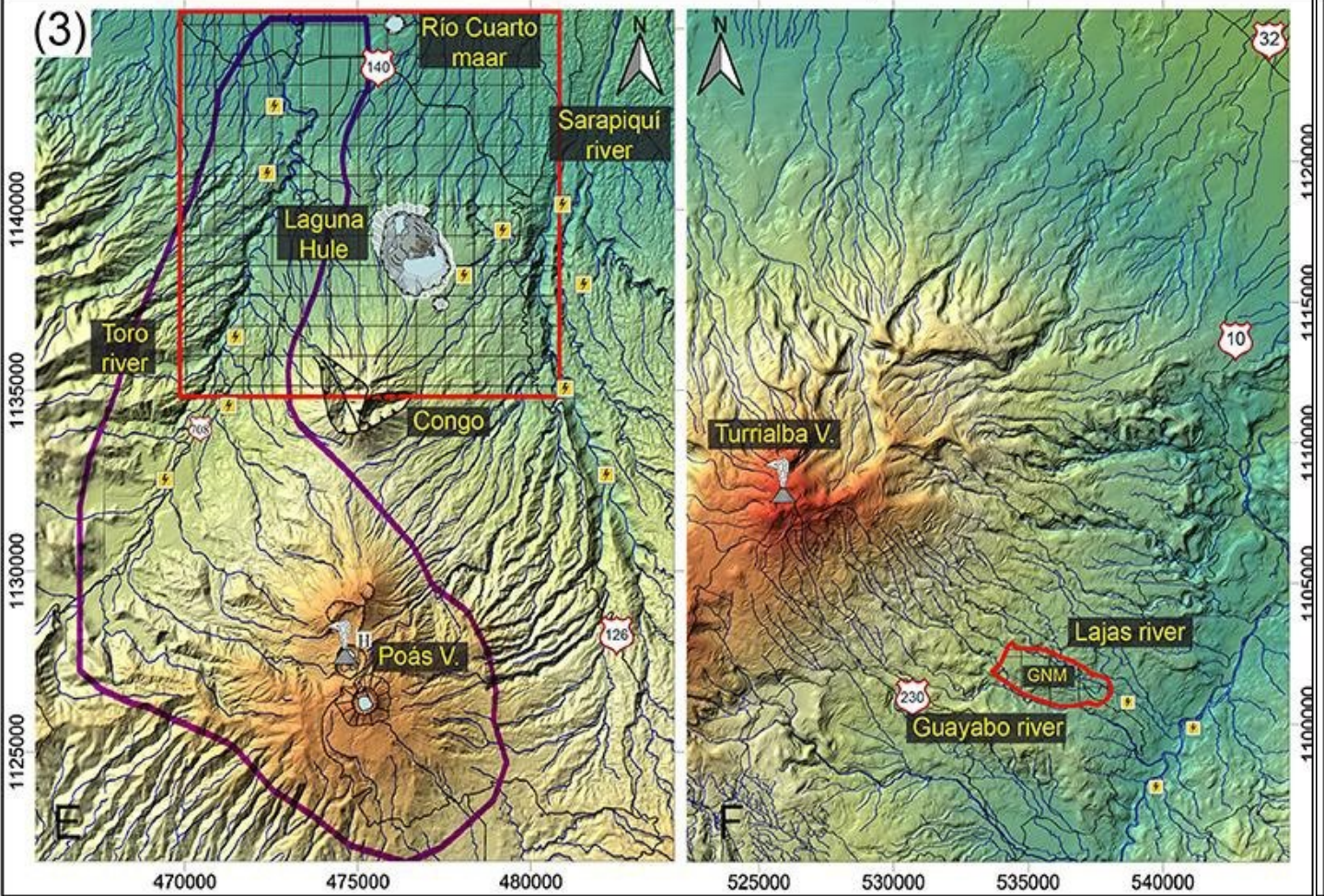
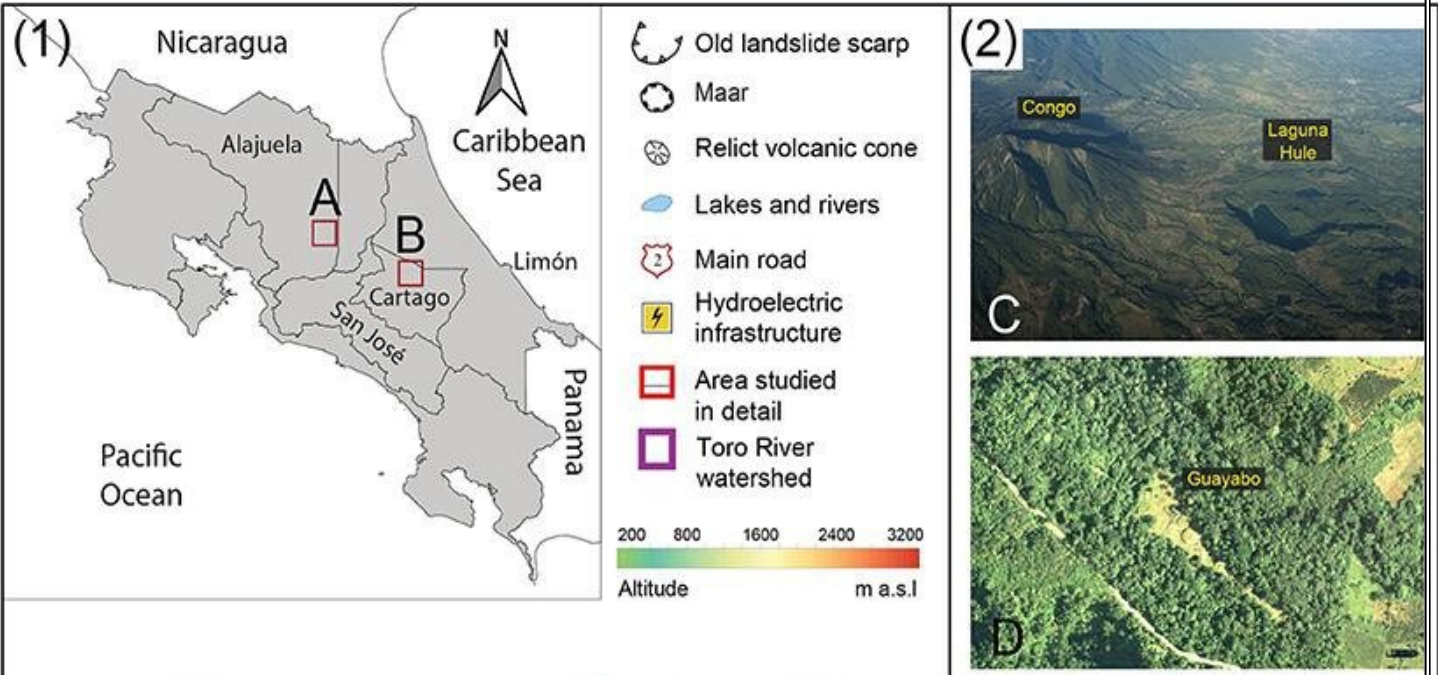


Figura 12-2 Geomorphological map of Sardinia

The inland distance with a slight influence from the latitudinal gradient, and the position of the central - eastern mountain reliefs, which dominates the spatial distribution of the days with temperature 0 °C, are related to the values of the mean annual minima temperatures, which are more stable and range from 14 °C along the coast to 7 °C on the mountain zones (Chessa & Delitala, 2010).⁷³ In the inner mountain sections of Sardinia, the total annual precipitation ranges from 411 mm to more than 1,215 mm ⁷⁴. According to Delitala et al. (2000)⁷⁵, its regime is periodic and especially erratic, changing significantly from year to year without regard to location. According to Delitala (2000), large-scale atmospheric circulation systems that connect to the North Atlantic Oscillation in the west and the Arctic Oscillation in the north are responsible for the seasonal precipitation. Four distinct rainfall zones have been identified based on the annual mean values: (1) the region surrounding the Gennargentu Massif, (2) the middle Gallura region, (3) the Campeda plateau, and (4) the Iglesias region. The driest areas are a stripe along the Coghinas watershed and the Nurra and Campidano plains (Chessa & Delitala, 1997).⁷⁶ The Gennargentu Massif, Campeda plateau, and Limbara mountain, which are the zones with the largest cumulate, have an annual maximum rate of 80 days of precipitation. The majority of rainy days have low mean daily intensities (between 1 and 10 mm), while the driest regions are found in the Campidano and Nurra plains, which fall into the intermediate classes (10–25 mm and 25–50 mm). The largest value of the extreme rainfalls (>50 mm) is along the East coast, with a gradient from West to East⁷⁷.

Name	Direction of Origin	Intensity
Tramontana	North	Low
Grecale	North-East	Low
Levante	East	Medium
Scirocco	South-East	Medium
Ostro	South	Medium
Libeccio	South-West	High
Ponente	West	High

Maestrale (Mistral)	North-west	High
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Table 12-1 Principal Winds in Sardinia ⁷⁸

The majority of precipitation occurs at high elevations, yet there is a distinct difference in the frequency and severity of the rain. While the infrequent high intensity occurrences favor the East zones, the majority of Sardinia's rainfalls are low intensity and uniformly distributed throughout the entire island. The Central-East and South-East of Sardinia see the most intense events (>400 mm), with a highest historical value of 1,400 mm in four days in 1951. On the northwest part of the island, such high intensities have never been recorded and do not occur simultaneously (50). Another crucial element of Sardinia's climate is the movement of its air masses, which is made possible by its orographic structure. A day without wind is extremely uncommon, especially in the winter, and the area is characterized by sea breezes (Furberg et al., 2002). The predominant winds, which originate in the West and North-West, blow in the high intensity class and reach speeds of >13 m/s at least one day out of every three of the year. Since the winds from the west and the north-west are in opposition to one another, the supremacy of one prevents the dominance of the other. Strong winds from the East and South-East (Asinara), North-East (Capo Bellavista), and South-East (Capo Frasca), which occur more frequently in the winter (between 40% and 70%), are another threat to some regions.⁷⁹ Several cycles of deeply ingrained pedogenetic phenomena of the substrate produce Sardinian soils. A section of the Variscan metamorphic band⁸⁰, part of the Southern European edge where the granites intruded (approximately 300 Ma ago), makes up the island's basement. Sardinia was a part of the Tethys carbonate platform during the Mesozoic after undergoing a period of strong erosion during the Permian. Later, due to the rotation of the Sardinia-Corse block, Sardinia was damaged by Cenozoic volcanism. Sardinian soils display a variety of foundational rocks, and they can be divided into the following categories. Sedimentary soils make up the majority of the lowlands, which run the length of the island from north to south with the Marghine belt⁸¹ and Campeda plateau⁸² providing a break in the middle. Depending on the amount of carbonate present, which might boost their fertility and pH, they have a somewhat variable composition. Soils made of granite and other metamorphic rocks, which are crystalline (intrusive) rocks. They essentially cover the entire eastern portion of the island, spanning once more in a N-S direction. It is the Sardinia Corse block's basement. Soils made up primarily of trachyte and basalt effusive rocks. They are predominant in the Island's centre, with a few isolated instances in the south and west. These three different kinds of its matrix give the resultant soils unique physical-chemical properties, with a tendency toward silt-clay texture and neutral-to-

sub-alkaline pH, especially if rich in carbonate, and moderate to high fertility for sedimentary sandy textured soils with sub-acidic pH.⁸³ While soils generated from effusive matrix are typically somewhat fertile with a loam texture and pH ranging from sub-acidic to sub-alkaline, soils derived from granite or metamorphic rocks exhibit moderate to poor fertility (Aru et al., 1991).⁸⁴

13. Effect of climate change in Sardinia

Sardinia is an island track down in the Mediterranean ocean enveloping by the island of Corsica, the Italian landmass, Tunisia and Sicily. The Sardinian people amid the natural surroundings. Today, Sardinia is well - known for its stunning beaches, breathtaking landscapes, clear water, inherent wonders, natural miracles, culturally significant history, and remarkable regional cuisine. There are charming and welcoming towns all along the island's littoral, as well as secluded bays, high mountains, narrow valleys, and idyllic surroundings. Sardinia enjoys pleasant weather with long, scorching summers and average coastal temperatures of 28.5 degrees Celsius from July to August and 9.0 to 9.5 degrees Celsius from January to March. The Maestral wind, a northwest wind from France, makes the island windy, especially between October and April. These winds have an impact on much of the western region as well as the Bonifacio Strait. The temperature of the coasts and fields is displayed in the table under. The European Union has seen alarming climate shifts over the past ten years. Flooding, coastal erosion, increased diversity, and the disappearance of flora and fauna are some of the consequences of the changes that have taken place in Sardinia over the past few decades. The Mediterranean region's shifting precipitation and temperature patterns prove the negative effects on ecosystem sustainability and water resources. This stands for various dangers to the neighbourhood Sardinians that incorporates dread of safety, farming, the travel industry and life span that Sardinian individuals provoke on. Environmental change is without a doubt influencing the food framework in Sardinia, an island in the Mediterranean Ocean. In some ways, Sardinia's food production is being affected by climate change. The rapid increase in temperature of Sardinia is affecting the crop productivity and growth. Sardinia is encountering higher temperatures, prompting heat weight on crops. Heatwaves and delayed times of sweltering heat can lessen yields and nature of agrarian produce. The patterns of precipitation are changing because of climate change, which is causing more droughts and water scarcity in some areas. Climate change may worsen water scarcity issues already present in Sardinia. Crop irrigation is affected by a lack of water, which results in lower yields and lower quality agricultural products. Environmental change can likewise disturb the timing and dispersion of precipitation. Soil erosion and an increased risk of flooding may result from more frequent and intense rainfall events in Sardinia. Crops can be damaged, soil nutrients can be washed away, and pests and diseases can multiply when there is a notable change in the rainfall pattern. The spread of diseases and pests can be aided by warmer temperatures and shifts in the weather. Pests and diseases that were once uncommon in Sardinia are becoming more common, posing new challenges for the agricultural sector. This may need an increase in pesticide use and significant crop losses, both of which may have an impact on public health and the environment. Changes in the best places to grow specific crops may

occur because of climate change. Due to shifting climatic conditions, some crops that have traditionally thrived in Sardinia may become less workable. On the other hand, it might be necessary to introduce new varieties or crops that are better able to adapt to the changing conditions. This would need adjusting agricultural practices and increasing farmer knowledge. Sardinia's food production faces significant challenges from rising temperatures, a lack of water, shifting rainfall patterns, increased pest and disease pressure, and shifts in crop suitability. Sustainable farming methods, drought-resistant crop varieties, improved water management, and climate-resilient farming methods will all have to adapt to these changes.

The Sardinian environment assumes a huge part in forming its food culture and cooking. The Mediterranean climate of Sardinia, an island in the Mediterranean Sea, is characterized by hot, dry summers and mild, wet winters. The dishes and ingredients used in Sardinian cuisine are influenced by the climate, as are the agricultural products and traditional farming methods. Produce from Agriculture: The Sardinian environment upholds the development of various horticultural items. Wheat, barley, and vegetables like artichokes, fennel, and zucchini can all be grown here thanks to the mild winters. Tomatoes, eggplant, grapes, peppers, and other sun-loving plants thrive in the dry, hot summers. Citrus fruits and olive trees also do well in this climate.

Pastoralism and grazing: Sardinia have a long practice of pastoralism because of its great environment for animals. The island is famous for its sheep and goats, which live there year-round and graze on the abundant vegetation. The production of dairy products like ricotta and pecorino cheese, which is made from sheep's milk, is influenced by this pastoral tradition. Seafood: With its broad shore, Sardinia has areas of strength for an of fish in its food. Anchovies, mullet, sea bream, lobster, and sea urchins are just a few of the seafood that inhabit the island's warm Mediterranean waters. In Sardinian dishes like fregola with clams, bottarga (cured fish roe), and a variety of grilled or baked fish dishes, fresh seafood plays a notable role. Methods of Preservation: Sardinia's hot, dry summers have historically entailed the development of food preservation methods to guarantee food availability during less productive times. Traditional Sardinian cured meats like salsiccia and prosciutto crudo are made by drying and curing pork, one of these methods. Similarly, fish and seafood are preserved with salt, resulting in delicacies like salted cod and bottarga. Traditions in the Kitchen: The island's culinary traditions and eating habits have been influenced by the climate of Sardinia. As a result of the abundance of fresh, local ingredients, rustic, and straightforward dishes that bring out the Flavors of the ingredients. Herbs and aromatic plants like myrtle, rosemary, and fennel, which are abundant in the wild, are often used in Sardinian cuisine. Overall, the Sardinian climate, with its mild winters, hot summers, and

influence from the coast, affects the availability of agricultural products, livestock farming, seafood, seafood preservation, and the island's distinctive culinary traditions.

The Case Study of Nora (Sardinia, Italy)

Since the ninth century A.D. till the present, there has been an increase in the Earth's average temperature due to global warming. This is primarily caused by an increase in greenhouse gas emissions (CO₂, CH₄, and N₂O) and is linked to an increase in extreme atmospheric events (drought, desertification, and floods), which have an impact on the environment, society, the economy, health, and culture ⁸⁵⁸⁶. Numerous UNESCO World Heritage Sites are being endangered by climate change, according to recent studies ⁸⁷. According to their magnitude, the following are some of the most obvious and concerning effects of climate change on coastal cultural heritage buildings: (i) On a miniature level, we can see how dry pollution depositions and acidity of rainfall lead geomaterials to weather [^{88, 89}]. (ii) The sea levels are increasing on a huge scale [⁹⁰]. Due to climate change, the stone construction materials are currently undergoing weathering that is thought to be different from that which they may experience in the future. Some of the historic city structures in Nora are being submerged by the shoreline ingression brought on by the rising water, and coastal erosion is escalating. This is the basis for the numerous research that have previously been conducted on this topic in various Mediterranean Sea regions [⁹¹] and in Africa. One of the most significant archaeological sites in Italy is Nora, which was built close to an earlier Nuragic settlement and afterwards used by the Punic and Roman peoples. Nora is situated on the Capo Pula headland.

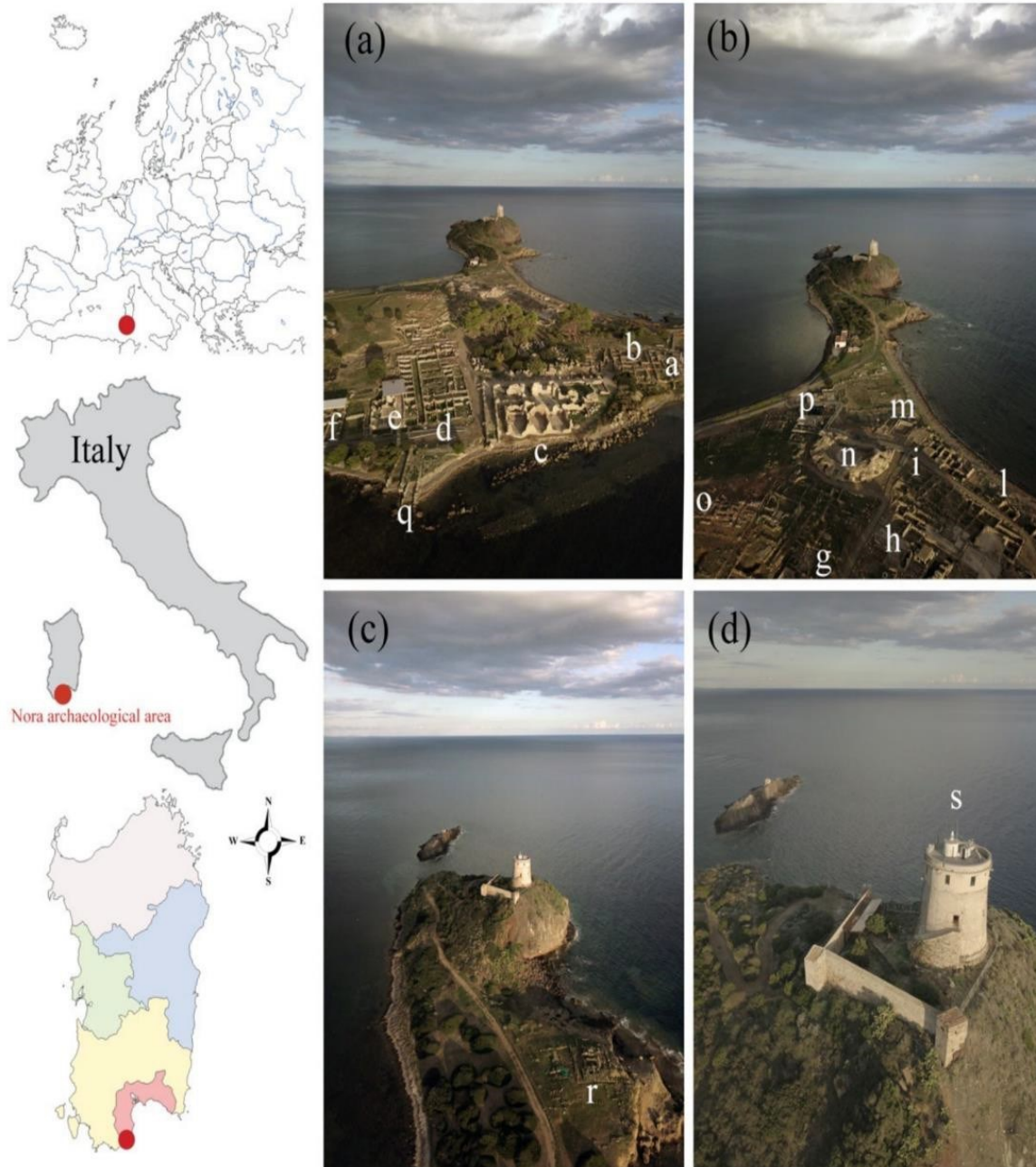


Figura 13-1 The archaeological area of Nora: geographical location (Europe, Italy, Sardinia) and main buildings. a—tetrastyle atrium house; b—Tronchetti director house; c—sea spa; d—polyfunctional complex; e—little spa; f—shophouse complex; g—kasbah; h—ninfeo; i—late-antique houses of the central district; l—coastal houses; m—fullonica; n—great theatre; o—Tanit temple; p—Roman forum; q—Christian basilica; r—sacred area; s—Coltellazzo tower.

Nora was inhabited throughout the Bronze Age, as showed by the discovery of Nuragic presence there [7]. The oldest remains include a necropolis with tombs, which belong to the end of the 7th and the beginning of the 6th centuries B.C. Traces of the Nuragic-Phoenician repopulation may be found as early as the 8th century B.C. Together with Tharros, Nora was arguably the most significant city on the island during the Roman invasion of Sardinia (238 B.C.)⁹² The remnants that are still visible in Nora attest to the growth of the city in the second and third centuries A.D. The forum, theatre, amphitheatre (which has not yet been excavated), thermal homes, and residential buildings are only a few examples of the many structures that still stand in the old Roman city. The quantity of yearly rainfall and temperature have a major impact on how stones react to weathering. The average annual rainfall and temperature in Nora between 1971 and 2000 were both 395 millimetres and 17.7 °C, respectively. The closest weather station, Elmas, which is about 30 kilometres to the northeast, supplied these data. Building stone materials experience mild chemical weathering in these climatic conditions⁹³. This results from the paragenesis mineral in rocks interacting with water to generate clays, minerals, and soluble salts. Particularly when the water is somewhat acidic, these processes take place. Building materials made of stone respond differently to weathering depending on their chemical makeup and specific physical-mechanical characteristics.

Climate Change's Effects on the Archaeological Area

The Nora Peninsula displays an ecology that is balanced and extremely sensitive. It is vulnerable to coastal erosion and geomorphological instability because of wave motion. When combined with winds from the southern quadrants, wave motion is severe. Several publications go into detail about the grave effects that coastal erosion has on the archaeological region. Particularly vulnerable to retreat is the section of shoreline that corresponds to the coastal homes.

14. Genetic history from the Middle Neolithic to present on the Mediterranean island of Sardinia

For many years, geneticists have been particularly interested in the island of Sardinia. According to the most recent genetic reconstruction of Sardinia⁹⁴, the island had a founder population that was mostly descended from southern European Neolithic tribes and remained unaffected by later Bronze Age expansions on the mainland. They generate genome-wide ancient DNA data for 70 people from 21 Sardinian archaeological sites that date from the Middle Neolithic to the Medieval period in order to assess this concept.⁹⁵ The population of Sardinia has long been the focus of several anthropological and population genetic investigations. The historical and demographic past of Sardinians can be used to explain the extremely complex picture of the relationships between Sardinian and other Italian and Mediterranean populations that has been revealed by studies on the genetic makeup of the Sardinian population using both classical and DNA markers. A significant amount of internal heterogeneity was also discovered, which can be attributed first to rigorous isolation and the high endogamy and consanguinity rates that resulted, and secondly, to a selective mechanism associated with endemic malaria that affected the distribution of specific gene frequencies.⁹⁶ Sardinia's population has fought against extinction for ages, as seen by its demographic history. From prehistory through 1700 A.D., the Sardinian population is thought to have never above 300,000 people, with a population density of roughly six people per square kilometre. Despite multiple subsequent colonization's, the island has never experienced true colonization in terms of population increase, urban development, or rural settlement. The Black Plague cut the population in half around 1348 A.D. The population of the seven largest cities decreased from 50,000 to 2,000 by more than 75%. For the Sardinian populace, the years between the plague of 1348 and the assembly of the Sardinian parliament in 1485 proved to be the worst ever due to wars, six further plague epidemics, starvation, food shortages, and the expulsion of rebels against the Spanish throne. There is an increase of 40,000 families, or around 160,000 people, between the censuses of 1485 and 1589. However, a devastating famine in 1591–1592 signalled the start of another period of meteorological and epidemiological calamities. The link between Sardinia and other Italian and Mediterranean populations may be seen to be exceedingly complex, and there is significant internal heterogeneity, according to data on classical genetic markers. Extremely high frequencies of two mutant genes—the thalassemia gene and the gene that prevents the production of the enzyme glucose-6-phosphate dehydrogenase (G-6-PD)—distinguish Sardinians from other populations.⁹⁷ According to Siniscalco et al. (1966; Vona and Porcella, 1984)⁹⁸, the two alleles are not distributed equally over the island. Additionally, there is a strong negative association between the two alleles and altitude. The plains and coastal hills settlements are those that are most impacted by the existence of the two mutants. The two

allele frequencies are lower in mountainous areas. The trend of the two genes in the populations spread along an axis from the Gulf of Oristano in the western part of the island, to the central hilly region, to the eastern coastline side, supports this association. The frequencies drastically fall in the centre mountainous area as you move from the two coastal sides, where they are very high. Sardinians are the most distinct population in Europe and the Mediterranean region, according to autosomal molecular evidence. Sardinian genetic oddity was thought to be the product of physical isolation and genetic drift, with little genetic influence from historical conquests of the islands. The three Y-DNA haplogroups that make up the majority of Sardinian males, or over 70% of the population, are I2 (especially I2a1a-M26), R1b-M269, and G2a. The Western Hunter-Gatherers, the Western Steppe Herders, and the Early European Farmers are where you can find them, respectively. The most prevalent mitochondrial DNA haplogroup in Europe is H.⁹⁹

According to Rickards et al. (1988), Sardinians might be a distinct pre-Indo-European population. The genetic makeup of Sardinians today, it is influenced by a number of ethnic groups with origins in the north-western Mediterranean, eastern Mediterranean, and northern Africa that were put onto a palaeo-Mediterranean substrate¹⁰⁰. Through the examination of a few immunoglobulin markers, additionally hypothesized Middle Eastern origins. The contribution of different elements to the current gene pool is still up for debate. Therefore, it is exceedingly challenging to determine which populations or groups had an impact on the gene pool at the time population of Sardinia.

The majority of Sardinians are island natives; however, a sizeable population has made their homes elsewhere. It was estimated that between 1955 and 1971, 308,000 Sardinians migrated to the Italian mainland. The regions of Piedmont, Liguria, Lombardy, Tuscany, and Latium all have sizable Sardinian populations. In addition, there are many Sardinians and their descendants in the USA (part of the Italian-American population), Belgium, France, and Switzerland. The majority of Sardinians who immigrated to the Americas chose to settle in the Southern region of the continent, particularly in Argentina (between 1900 and 1913, Buenos Aires and its surrounding areas were home to about 12,000 Sardinians) and Uruguay (in the 1870s, Montevideo was home to 12,500 Sardinians). 92% of Sardinians who immigrated to the Americas between 1876 and 1903 chose to settle in Brazil.

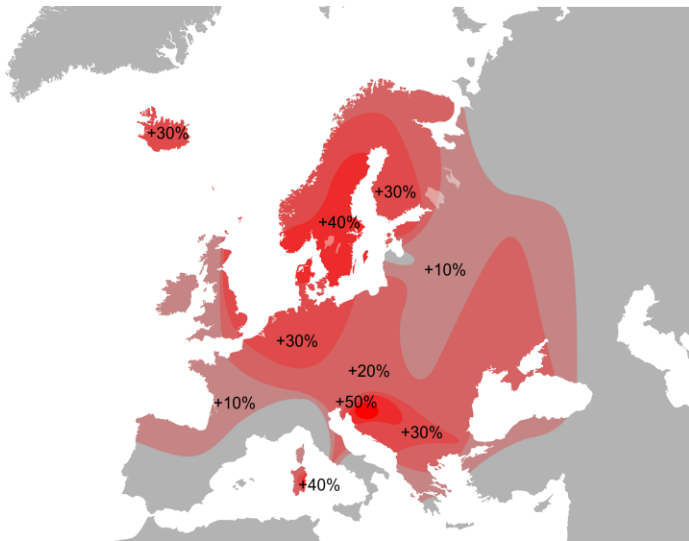


Figura 15-1 Distribution of Haplogroup

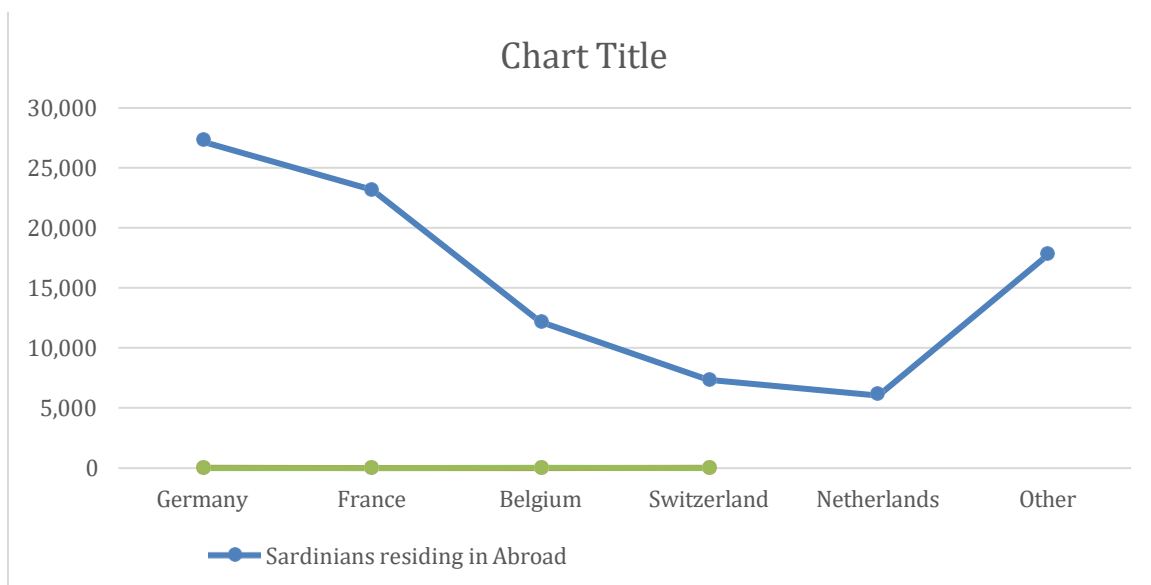


Figura 15-2 Sardinians residing in European countries¹⁰¹

Difference between Sardinian diet and the General diet of Western Europe

It is important to learn about the Sardinian way of life and diet if you want to know the secrets to their longevity. One of the most crucial factors influencing the health pattern and lifespan of different populations around the world may be differences in diet composition. The Sardinian diet will be compared to the typical Western diet in this chapter. The normal American eating regimen in North America, too known as the standard American eating regimen (Miserable), differs unfathomably from the Mediterranean and, specifically, the Sardinian eating regimen from the eastern sloping district. According to the US Department of Agriculture's National Health and Nutrition Examination Survey, SADs consume approximately 47.3% of their calories from carbohydrates, 34.9% from total fat, and 16.1% from protein. European nations have different eating designs. For instance, a study conducted in France¹⁰² found that the typical French consumer consumes on average 2252 kilocalories of energy per day, which includes 75.5 g of fat, 205.6 g of carbohydrates, 81.2 g of protein, and 11.8 g of alcohol. In that capacity, this means approximately 34% of energy admission from fat, 36.5% from carbohydrates, 14.4% from protein, and 3.6% from liquor. Meat protein accounts for 9.4% of daily calorie intake in Italy, dairy products account for 12.8%, and grains account for 38.2%¹⁰³. The Czech Republic, on the other hand, consumes 13.5% of its daily calories from meat, 38.5% from grains, and only 7.5 percent from dairy products, according to the study.

There are a few differences between the western diet and that of Sardinia. For instance, the Sardinian diet includes extraordinarily little animal protein. They eat meat sparingly and use it to celebrate special occasions or to choose their favourite dishes (5 percent versus 16 percent in European or American countries). Instead, people living in the blue zone of Sardinia heavily rely on dairy products, particularly those made from goat and sheep's milk. Only 13.7% of adults in the United States consume whole grains in their daily intake, and carbohydrates make up 47.3% of the SAD¹⁰⁴. Whole grains, on the other hand, account for 47% of the calories in the traditional Sardinian diet. Also, USDA¹⁰⁵ has assessed that 33% of absolute grain utilization by the normal American resident happened in cafés. Tose products had a lot of refining and were processed to make them taste better than to get nutrients. The paper also estimated that less than 9 grams of whole grains are included on average in a typical 1000-calorie restaurant meal. Whole grains, on the other hand, account for 47% of the Sardinian diet's total calories. Consuming whole-grain foods has other advantages for increasing longevity in addition to supplying more micronutrients. Pistachios, walnuts, and almonds, all of which are high in alpha-linolenic acid-omega-3 fat, were among the nuts that Sardinians ate on a daily basis. Whole grains, as opposed to refined grains, were found to have lower levels of total cholesterol, triglycerides, and haemoglobin over time, all of which are intricately linked to healthy body

function and a lower risk of chronic or cardiovascular diseases, according to a systematic review that was recently published¹⁰⁶. In addition, it has been demonstrated that eating whole grains rather than refined grains, which are balanced for the same number of kilocalories, increased feelings of fullness three hours after breakfast, two hours after lunch, and one hour after dinner¹⁰⁷. An expanded sensation of completion post-dinner consumption has aided Sardinians with keeping a calorie restricted diet of roughly 2000kcal, which has been connected to their life span. The rest of Italy¹⁰⁸, the Czech Republic, and the United States, on the other hand, had an average calorie intake of 2149 kcal, 2572 kcal, and 2200 kcal, respectively¹⁰⁹. ONLY ONE NOTE. MERGE THE TWO NOTES INTO ONE Because whole grains have a much lower glycaemic index than highly refined grains, they give you a longer feeling of fullness. Insulin levels fluctuate more strongly in response to foods with a higher glycaemic index¹¹⁰. High insulin concentrations have been linked to an increased risk of diabetes eventually. Grotto and co. 19 also emphasized that added sugar accounted for 480 kcal, or nearly 23% of the SAD's daily calories. A portion of the wellsprings of added sugars incorporate improved carbonated drinks, sweets, cakes, and treats. Tose foods have a lot of calories and a high glycaemic index, but they don't have many nutrients. It has been demonstrated that they raise the risk of developing chronic conditions like diabetes and cardiovascular disease. The Sardinian eating routine, interestingly, contained just 3% of calories from added sugar. Vegetables contain significantly more nutrients than grains and meat¹¹¹. Vegetables, on the other hand, offer a wider range of micronutrients, such as antioxidants and vitamins, that are well-known for their beneficial effects on health, even when consumed in the same number of calories. Vegetable consumption is significantly higher in Sardinia than in the rest of Europe; approximately 12% total calorie intake was lower than the average person's intake of 6%, 2.5%, and 1.3% in France, the rest of Italy, and the Czech Republic, respectively¹¹². In contrast, a study on Namul, a traditional Korean diet that focuses on vegetables and is based on foraging for wild plants in fields or mountains during times of food shortages, came to the conclusion that this diet is high in micronutrients and is linked to the longevity of the local Korean population. A difference of 6-10% in calorie intake from vegetables stands for a much larger vegetable consumption than the number implies at first glance because vegetables are less calorie dense than grains, dairy, and meat. In general, the macronutrient content of the Sardinian diet differs from that of the western diets of other European nations or the American diet. The Sardinian population's longevity may have been significantly influenced by the differ ence in macronutrient composition. For instance, albeit comparative in number, 47% of day-to-day calories from sugars in the Sardinian eating regimen are from entire grains contrasted with 6.5% in the American diet. Consuming more whole grains has reduced the likelihood of developing chronic conditions like diabetes and cardiovascular disease. By

reducing insulin spikes, the Sardinian diet also reduces the risk of obesity and diabetes by consuming significantly less added sugar. Ultimately, higher utilization of vegetables gives an expanded measure of micronutrients and cell reinforcements, which are known to bring down the occurrence of malignant growth, Alzheimer's illness, and eases back cell maturing, factors which are rigidly connected with life span¹¹³. Therefore, it is essential to investigate how Sardinian people's distinctive food contributes to their healthy diet.

Summary

Sardinia, the second largest island in the Mediterranean, has a landscape mosaic that reflects its transitional location between Africa and Europe. The island is generally rocky, with segregated mountains like Limbara, Sette Fratelli, and Gennargentu, the most notable being 1,834 m. The island's landscape has been significantly shaped by humans, with human settlements dating back to the Lower Paleolithic in Perfugas. The most influential ancient local culture is the Nuragic, which remains noticeable today in regions with high settlement focus. Sardinia has been influenced politically and culturally by its neighbors, including Phoenicians, Carthaginians, and Romans. The island was ruled by Vandals and Byzantines after the fall of the Roman Empire, becoming a protectorate of Pisa, Genoa, and then Spain. In 1861, Sardinia joined Italy. The island has been divided into four administrative provinces, with the most recent additions being Medio-Campidano, Ogliastra, Gallura, and Sulcis. Sardinia has a seasonal climate with hot, dry summers and chilly, damp winters typical of the Mediterranean region. The primary drivers of the island's climate are its location between temperate and subtropical zones and the considerable effect of sea breezes. The island has a variety of microclimates, including the varying effects of the coast, sun exposure, and protection from dominant winds. Sardinia has a vast and broad history, with the Bronze Age conical stone towers known as nuraghe being the most recognizable remnants of its prehistoric past. The island has been populated since the early Stone Age, with the presence of an old volcano, Monto Arce, providing obsidian. The archaeological evidence of the Nuragic Sardinians and the Phoenicians left behind is approximately 10,000 stone structures called Naragi.

In Sardinian history, the Nuragic civilization is particularly significant. The Nuragic civilization was the social civilization on the Mediterranean island of Sardinia from the 18th century BC to the 23rd century BC. The island's central location allowed the Romans to usurp Corsica and Sardinia from the Carthaginians, but they never received recognition from the local Sardinians. Sardinia, a Mediterranean island in the Mediterranean Sea, is home to a diverse range of exotic foods, with its history and geography playing a significant role in shaping its cuisine. The island's unique terrain and environmental conditions contribute to its freshness and clarity, which includes meat, vegetables, wines, and loaves of bread. Sardinia is one of the five mythical regions known as LBZ (longevity blue zones), where food is the key to longevity. The local diet includes lamb, fresh vegetables, meat, and organically grown wines. Sardinia's food is influenced by its history, geography, and natural

surroundings. The island's climate is characterized by long, scorching summers and average coastal temperatures of 28.5 degrees Celsius from July to August and 9.0 to 9.5 degrees Celsius from January to March. The Maestral wind, a northwest wind from France, makes the island windy, especially between October and April. Climate change is affecting Sardinia's food production, with rising temperatures affecting crop productivity and growth. This can lead to droughts, water scarcity, and increased pest and disease pressure. Changes in the best places to grow specific crops may occur due to climate change, necessitating the introduction of new varieties or crops that are better suited to the changing conditions. The Sardinian environment plays a significant role in shaping its food culture and cooking. The Mediterranean climate of Sardinia is characterized by hot, dry summers and mild, wet winters, influencing the dishes and ingredients used in Sardinian cuisine. Agriculture produces such as wheat, barley, tomatoes, eggplant, grapes, peppers, and citrus fruits. Pastoralism and grazing are also influenced by the island's rich environment for animals, such as sheep and goats. Seafood is abundant on the island, with anchovies, mullet, sea bream, lobster, and sea urchins being prominent in dishes like fregola with clams, bottarga, and grilled or baked fish dishes.

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