MedArtSal

Sustainable Management Model for Mediterranean Artisanal Salinas

MedArtSal Handbook of good practices

Putting into practice the MedArtSal Sustainable Management Model for Mediterranean Artisanal Salinas

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About the MedArtSal project

MedArtSal - sustainable management model for Mediterranean Artisanal Salinas - is funded by the European Union under the ENI CBC Med Programme. The project total budget is € 3.2 million, and the EU contribution is € 2.9 million (90%). MedArtSal is a four-year project which aims to promote the sustainable development of artisanal salinas, providing concrete support on economic, environmental and governance issues. Addressing common challenges in four Mediterranean regions (Italy, Spain, Lebanon and Tunisia), the project will promote the development of a sustainable and adaptable management model fostering the territorial valorisation of artisanal salinas. The project is led by CUEIM – University Consortium for Industrial and Managerial Economics (Italy) and the partners are Association for the Development of Rural Capacities (Lebanon), Fair Trade Lebanon (Lebanon), IUCN Centre for Mediterranean Cooperation (Spain), Mediterranean Sea and Coast Foundation (Italy), Saida Society (Tunisia), University of Cádiz (Spain) and Tuniso-Italian Chamber of Commerce and Industry (Tunisia).

https://www.enicbcmed.eu/projects/medartsal

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Introduction

Traditional salt pans and small salt flats in the Mediterranean region have been experiencing a steady decline since the 1950s, with many falling into abandonment. This trend not only impacts the local salt companies but also poses risks to biodiversity and the preservation of cultural and natural heritage.

Today, Mediterranean salinas (in this publication we will use the terms salina, salt flat, saltworks and salt pan interchangeably) face multiple pressures due to changing social values and economic challenges, including competition from cheaper land-produced salt and global trade dynamics. Faced with the need for economic viability, salinas are confronted with the choice of closure, industrialisation, or transitioning towards sustainable tourism and the production of new artisanal products.

In response to these challenges, the MedArtSal Project (2019-2023) aims to promote the sustainable development of artisanal salinas in Italy, Spain, Lebanon, and Tunisia, through the MedArtSal Model[1] (Figure 1). This model identifies and encourages the adoption of innovative sustainable actions in Mediterranean artisanal saltworks.

Figure 1. The MedArtSal sustainable model for Mediterranean artisanal salinas. ©MedArtSal

[1] UCA (2021). *MedArtSal Sustainable Management Model for Mediterranean Artisanal Salinas.* MedArtSal project deliverables A.3.3.1., A.3.3.2 and A.3.3.3. Final report. (Available at: https://medartsal.com/download/management-model/)
More information: https://www.enicbcmed.eu/medartsal-model-vision-sustainability-artisanal-salinas-mediterranean

This comprehensive handbook provides information, research and innovative tools on sustainable actions that fall under the MedArtSal Model -for the sustainable management of artisanal salinas-, and support good practices and efforts in the salt flats through diversification of services, commerce, biodiversity preservation, ecosystem services and tourism (Figure 2). There are four sections covering key topics including, environmental quality and biodiversity, the diversification of goods and services in salt flats, best practices for governance and a final section showcasing case studies of salinas projects funded under MedArtSal in Italy, Lebanon, Spain and Tunisia.

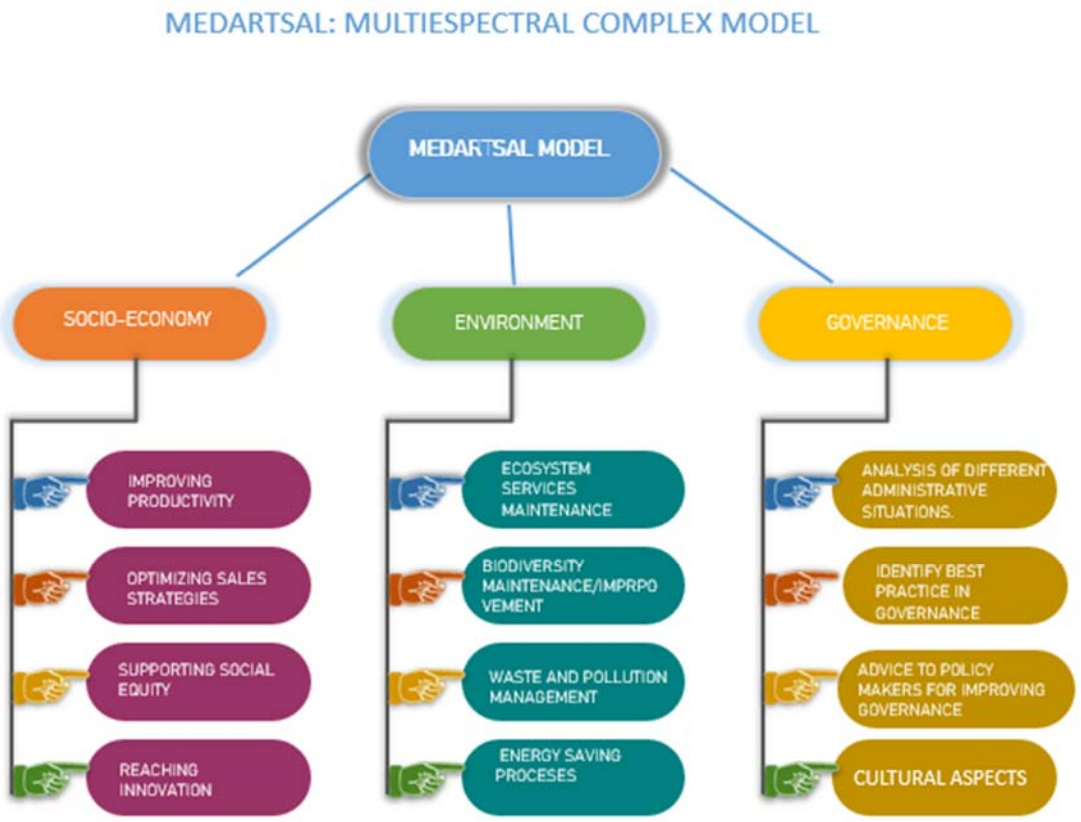

Figure 2. The different sections considered in the complexity of creating a sustainability model for the salinas, taken into account for the development of the MedArtSal Model. The Model and Sustainability Components indicated in the Factsheets of this Handbook refer to the elements of this Model. Source: UCA (2021) (https://medartsal.com/download/management-model/)

The solutions and recommendations presented in this handbook are aimed at all stakeholders associated with Mediterranean artisanal salinas, from salt flat workers and managers to local and regional level policy and decision-makers, as well as, local communities based in and around the salinas.

These practical examples and good practices may not all be exportable, in whole or in part, to other saltworks in other countries or surrounding regions, as in some cases their applicability may depend on the existing context, natural, social or economic environment, or legislation.

With coordinated actions and a focus on sustainable management, the MedArtSal project aims to stimulate the local economy, promote territorial cohesion, and ensure the long-term viability of artisanal salinas in the Mediterranean, while enhancing nature conservation.

Section 1
Environment

Section objective: To offer solutions that support the preservation, conservation and enhancement of natural ecosystems in Mediterranean artisanal salinas.

Environmental Quality and Biodiversity

Despite being an artificial habitat, artisanal salinas act as unique and functional coastal wetlands and therefore, hold immense value for nature conservation.

This section explores the significance and multifaceted aspects of conserving the environmental quality and biodiversity of artisanal salt flats in the Mediterranean. These precious habitats offer a unique range of potential benefits, from facilitating bird nesting to increasing resilience to climate change and providing ecosystem services such as blue carbon.

Understanding and implementing the tools, techniques, and resources discussed in the following sections, will help to ensure that we can foster the preservation and enhancement of these invaluable ecosystems.

The Section on Environmental Quality and Biodiversity covers the following themes:

1. Salina restoration and management
2. Increasing knowledge and monitoring of biodiversity
3. Facilitating bird nesting
4. Reducing pollution
5. Increasing the energy saving and efficiency
6. Increasing resilience to climate change
7. Building knowledge of potential ecosystem services provides by artisanal salinas (including blue carbon)

Factsheet 1: Salinas Restoration and Management

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Model Component: Environmental
Strategy: Biodiversity and ecosystem conservation
Sustainability Components: Biodiversity maintenance / improvement, ecosystem services maintenance

Justification
One of the primary challenges faced by artisanal salinas is economic viability. The lack of profits has led to a gradual disappearance, deterioration of facilities and loss of biodiversity in salinas since the 1950's.

More recently, efforts have been made to revive abandoned Mediterranean and Atlantic salinas, which hold ecological, economic, and cultural values. In order to do this, the salinas must become economically viable. This requires a comprehensive approach involving the diversification of products and services. Restoration, management, conservation experiences, and improved practices are key actions to maintain and enhance biodiversity while sustaining salt harvesting.

This factsheet provides examples of how to make an artisanal salina profitable, while also conserving local biodiversity.

What does it mean to restore a traditional salina?
Thanks to human interventions in salt harvesting, salinas have their own ecosystems. Particularly artisanal ones, which hold significant value for biodiversity and culture. When we talk about 'restoring' a salina, it does not mean returning the site to its natural marsh state, but rather focusing on reviving the traditional systems for salt extraction.

For successful restoration, it is crucial to apply appropriate knowledge and techniques that will minimise the impact on the natural environment of the salina. Restoration initiatives should support a positive collaboration between the environment, economy, and society when promoting and revaluing the salinas.

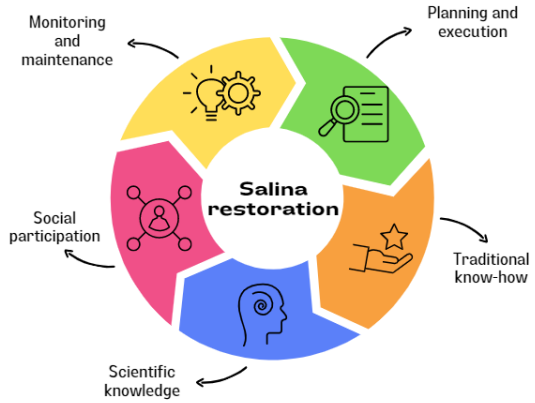

Figure 3. Aspects to consider when restoring a salina. ©Yana Korneeva Abdulaeva

Given that salinas are an artificial habitat, beyond restoration, active management is essential for maintaining the ecological value of an artisanal salina.

Key recommendations to restore and manage a salina

1. **Understand the habitat:** Study fauna, flora, water flow, and physical structures. Seek input from scientists and experienced salt workers.
2. **Evaluate the economics:** Identify available financing sources. Sufficient funds are crucial for successful execution at all stages.
3. **Monitor and maintain:** Continuously assess improvements for effectiveness and carry out year-round maintenance.
4. **Obtain necessary permits:** Ensure proper authorisation for improvement activities.
5. **Citizen participation (optional):** Encourage volunteers to join planned actions and learn about biodiversity conservation in the salt facility.
6. **Avoid introducing exotic, non-native species**, which can become invasive. If you find one, notify the relevant authorities.

Examples

1. **Reconstructing water control structures** (ponds, walls, gates) enables precise adjustment of water depth (<5 cm in crystallisers, 20 cm in evaporation ponds, and up to 40 cm in storage ponds), influencing temperature and salinity levels that impact species inhabiting different ponds. This management approach has the potential to increase biomass and improve prey accessibility for aquatic birds. Monitoring bird feeding rates across the various ponds can help evaluate the effectiveness of this measure.

Figure 4. One of the gates controlling the flow of water in Salina La Esperanza (Cádiz, Spain). ©Yana Korneeva Abdulaeva

2. **Reconstructing the crystallisation zone**, including gates regulating water flow and the central path. Manual or mechanised methods can be used based on the condition of the salt facility. This action allows the area to serve as both a breeding or resting ground for coastal birds and a site for artisanal salt production. Different substrates (e.g. recycled rubble, sand) can be provided along the central path to attract birds to varying degrees (refer to "Facilitating bird nesting Factsheet" for more details).

Figure 5. Substrate contribution in one of the areas of the Salina La Esperanza (Cádiz, Spain), used as a breeding area by migratory birds. ©SC-ISE UCA

3. **Implementation of a monitoring and maintenance program**. Essential maintenance tasks in a salina include cleaning evaporation canals and crystallisation ponds. Accumulated dirt and mud, particularly during winter, significantly harm biodiversity and economic factors such as salt and fish production. It is advisable to clean the ponds prior to the salt harvesting season. Furthermore, conducting sampling of invertebrates, algae, and fish can monitor their abundance and diversity.

Figure 6. Salt workers cleaning the crystallisation ponds manually. ©SC-ISE UCA

The MedArtSal project has also supported saltworks restoration actions, as can be seen in Factsheet 30B (on the restoration and return to activity of an abandoned salina in Spain) or Factsheet 31B (on the restoration of parts of a salina in Italy).

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Factsheet 2: Increasing Knowledge of Biodiversity in Salinas (Monitoring and Inventory)

Author(s): Elisa Ulazzi[1], Manuela Puddu[1] and Francesca Etzi[1]
[1]MEDSEA Foundation

Model Component: Environmental
Strategy: Biodiversity and ecosystem conservation
Sustainability Components: Biodiversity maintenance / improvement, ecosystem services maintenance

Justification
Biodiversity is the variety of all living organisms, including animals, plants, micro-organisms and fungi, that make up our natural world, and us humans. Biodiversity holds value for both utilitarian and intrinsic reasons. Utilitarian values include meeting human needs like food, fuel, shelter, and medicine. Ecosystems provide essential services such as pollination, climate regulation, water purification, and pest control. It also has intrinsic value, independent of its usefulness to humans, representing the inherent right to exist.

Biodiversity loss is threatening the benefits nature provides to people around the world (see Factsheet 7 "Increasing knowledge of ecosystem services"). Several international bodies have highlighted the importance of, and are working to monetise the value of biodiversity and to establish and develop economic instruments for fiscal policy as a way of valuing and protecting biodiversity.

Salinas are globally recognised as vital hubs of biodiversity and providers of valuable ecosystem services. By preserving and enhancing biodiversity, salinas not only support the natural environment but also generate economic and other related benefits for operators and the surrounding populations. In essence, increasing biodiversity and its associated ecosystem services enhances the value and sustainability of salinas.

Why is it important to monitor, maintain and increase biodiversity of the salina?
By understanding the threats and pressure to biodiversity, and how they play out in context, we can be better prepared to manage conservation challenges and to be more resilient in our future choices. Monitoring activities, defined as the systematic and focused observation and measurement of present changes of biodiversity, usually within a defined context (e.g. a research question or a management goal) play a crucial role in achieving this as they allow us to keep an account and inventory of the biodiversity in the salina. In other words, monitoring helps salina managers and other stakeholders to quantify the value of the biodiversity and therefore, establish the best way to use the environment for economic gain, whilst also conserving the biodiversity in it.

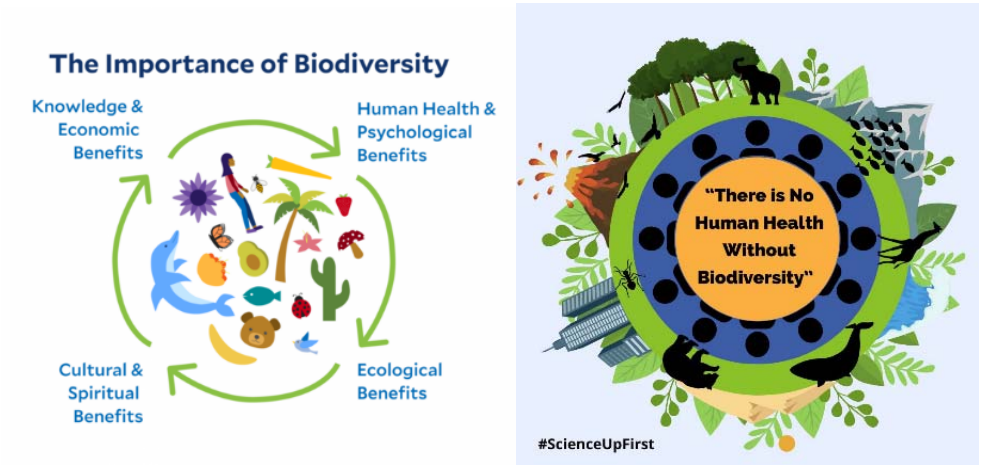

Figure 7. The importance of biodiversity. ©Yale Office of Sustainability (left) and ScienceUpFirst (right)

The choice of monitoring methods will depend on the specific objectives and context, and determining suitable strategies and techniques for analysing biodiversity change and status in the context of sustainable development is an ongoing challenge. However, the fundamental principle of monitoring remains consistent: observing and measuring relevant parameters to accurately describe system changes.

A key aspect of monitoring activities is collecting data using recognised methods that enable spatial or temporal comparability with other datasets.

Monitoring data and historical databases are crucial for:

- Understanding the role and impact of drivers and causes of change.
- Analysing processes and mechanisms of change.
- Laying the foundation for modelling and predicting future changes.

Structured monitoring activities play an important role in the planning of sustainable management and development.

Key recommendations to monitor biodiversity in salinas

- Define the purpose of monitoring, such as assessing habitat health or improving habitat to increase species diversity.
- Determine the parameters to be monitored, including units of measurement and relevant indicators.
- Select appropriate methods based on monitoring objectives and area characteristics.
- Determine the number of monitoring stations or instruments needed based on the selected method and monitoring goals.

- Establish the timing of monitoring, whether it's a one-time assessment, annual monitoring, or seasonal monitoring.
- Create a comprehensive database of monitored data, including method used, units of measurement, date of sampling/analysis, location, and personnel involved.
- Based on monitoring data and analysis, develop a list of actions or programs to enhance or maintain biodiversity status.

Examples

In the MedArtSal project, two salt flats were monitored to observe bird presence, nesting, and feeding. Previous monitoring helped identify specific bird species and their behaviour.

1. Management analysis was conducted in Spain's La Esperanza salt flat to **improve aquatic bird settlement and hatching success** (see Factsheet 3 on bird nesting). Different management actions were implemented and compared to control areas to assess effectiveness. Hatching success was measured by monitoring individual nests every 4 days using a formula by Fraga and Amat (1996). The experimental zone received reproductive promotion measures, while the crystallisation zone served as a comparison area.

Figure 8. Images of Little tern, Kentish plover and Pied avocet nests (left to right) respectively located on the provided shells (La Esperanza Salina case Study – Spain). ©University of Cádiz

2. In Italy's Cervia Salina, measures were taken to **enhance the habitat for rare and protected bird species**. Clay mounds in the southeast provided suitable nesting grounds, but erosion and vegetation posed challenges. Existing nests were monitored, reshaped, and cleaned, while new nests were created and others restored. Nesting plays a crucial role in maintaining the ecosystem of approximately 827 hectares, supporting balance and biodiversity.

Figure 9. Bird nests after the intervention – (Salina of Cervia, Italy – MedArtSal pilot action). ©Parco della Salina di Cervia

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Factsheet 3: Facilitating Bird Nesting

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[1]University of Cádiz

Model Component: Environmental
Strategy: Biodiversity and ecosystem conservation
Sustainability components: Biodiversity maintenance / improvement, ecosystem services maintenance

Justification:
One of the most important ecosystem services provided by salinas is the conservation of bird biodiversity. Despite being artificial habitats, salinas act as functional wetlands and can support birds seeking refuge from habitat destruction and climate change. In fact, an estimated 50% of the Mediterranean waders (also known as shorebirds) use salinas for food. Many also use salinas for nesting and reproduction.

The proper management of a salina can promote the reproduction of aquatic bird species.

This factsheet shows techniques tested by the MedArtSal project's scientific team to facilitate bird nesting in artisanal salinas.

How to improve bird settlement?
Salinas provide birds with fundamental habitats for reproduction, food and in some cases rest. The proper management of these areas could also encourage different aquatic bird species to use salinas as a substitute habitat for their natural one.

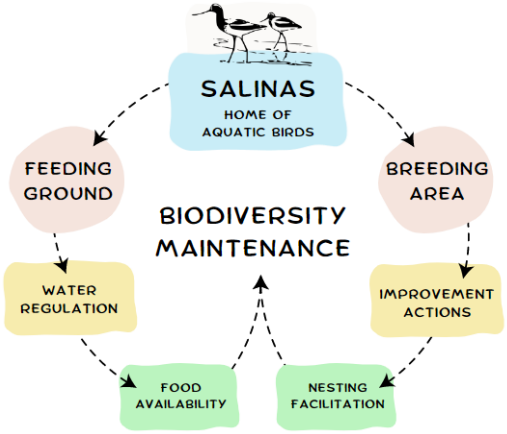

Figure 10. Diagram of the process of maintaining bird biodiversity in salt pans. ©Yana Korneeva Abdulaeva

Two ways to improve breeding areas for birds in salinas are:

1. The regulation of water by salt workers creates diverse water depths and salinity levels, which play a vital role in supporting the survival of numerous bird species, particularly waders.
2. Salinas are essential areas of reproduction for many waders, and different actions carried out in the salt flats can favour the settlement and reproductive success of these species, examples of this are explained below.

Key recommendations for facilitating bird nesting in salinas

1. **Understand the habitat:** Study fauna, flora, water flow, and physical structures. Seek input from scientists and experienced salt workers.
2. **Evaluate the economics:** Identify available financing sources. Sufficient funds are crucial for successful execution at all stages.
3. **Monitor and maintain:** Continuously assess improvements for effectiveness and carry out year-round maintenance.
4. **Obtain necessary permits:** Ensure proper authorisation for improvement activities.
5. **Citizen participation (optional):** Encourage volunteers to join planned actions and learn about biodiversity conservation in the salt facility

Examples

1. **Supplementing nesting areas with shells** (calcareous material) can improve chances of reproduction for birds such as the Kentish Plover and Little Tern. Calcium in shells is vital for egg production, and its deficiency can hinder reproduction. In Salina La Esperanza, Spain, implementing this practice resulted in a significant benefit, with over 80% of nests now found in the new shell patches. The area is now considered favourable for nesting.

2. **Selective clearing of specific plant species** along the salina walls improves predator visibility for the Pied Avocet, expanding the breeding area. However, clearing is advisable only in a secure, predator-free colony.

3. **Microstructures**, such as small Y-shaped sticks, contribute to promoting reproduction by enhancing settlement conditions for species like the Kentish Plover.

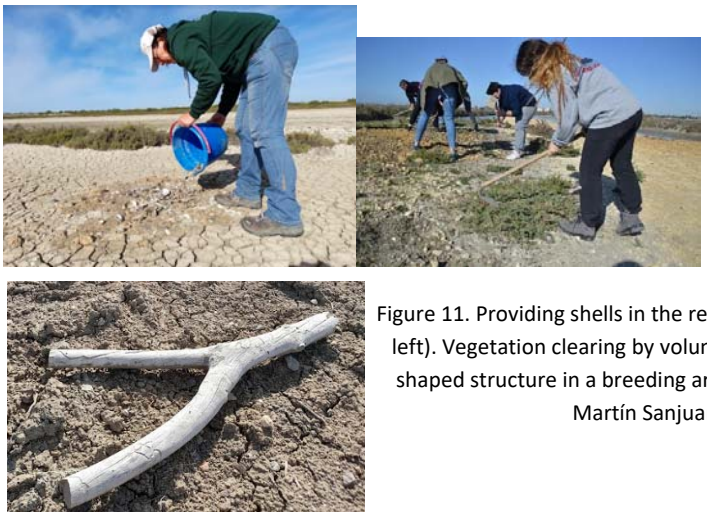

Figure 11. Providing shells in the reproduction area (top, left). Vegetation clearing by volunteers (top, right). Y-shaped structure in a breeding area (below). ©Nuria Martín Sanjuan

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Factsheet 4: Reducing Levels of Pollution in Artisanal Salinas

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[1]Independent Consultant [2]IUCN Centre for Mediterranean Cooperation

Model Component: Environmental
Strategy: Environmental quality
Sustainability components: Waste management and pollution, Biodiversity maintenance / improvement, ecosystem services maintenance

Justification

Salinas are susceptible to pollution from various sources, mainly from land-based sources, including excess nutrients, heavy metals, herbicides, pesticides, plastics and microplastics; pollutants that reach the sea and from there these ecosystems. Excess nutrients, like nitrogen and phosphorus, can disrupt the natural balance of salt marsh ecosystems, while heavy metals pose health risks to wildlife and humans. Herbicides and pesticides, intended to target specific species, can affect non-target organisms. Stormwater runoff carrying sediments, chemicals, and pollutants from urban areas can alter the hydrology of salt marshes, leading to erosion and changes in salinity and soil saturation.

Additionally, seawater can carry microplastics, which can also accumulate in the sediments of salt marshes, and often find their way into extracted salt and subsequently into edible salts. The salt manufacturing process may also leave more of these microplastics in the salt. Some studies suggest that harvesting and processing techniques may influence the amount of these residues that remain in the salt, with generally lower microplastic load in traditionally harvested products (see Reference [1]).

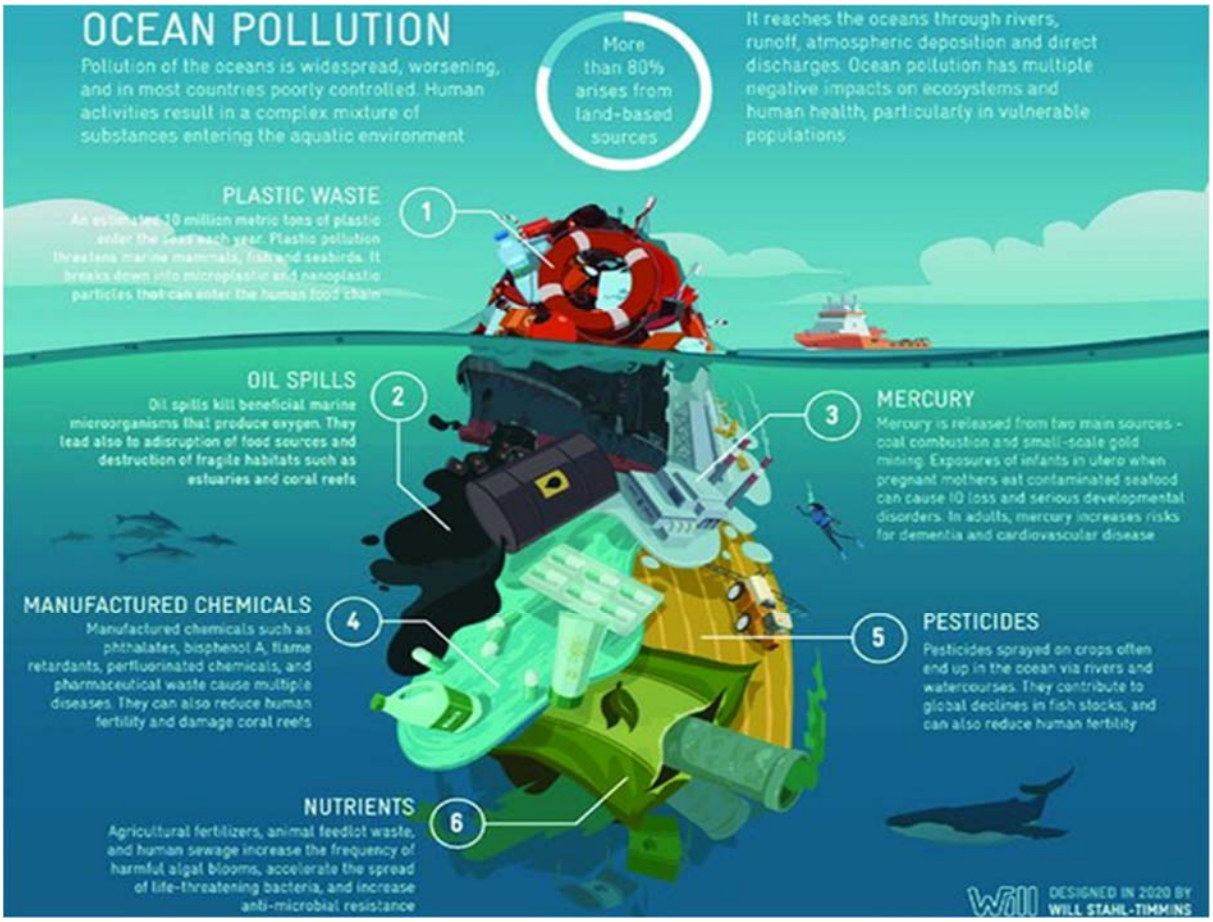

Figure 12. Main sources of seawater pollution. ©Will Stahl-Timmins (CC BY 4.0) (http://dx.doi.org/10.5334/aogh.2831)

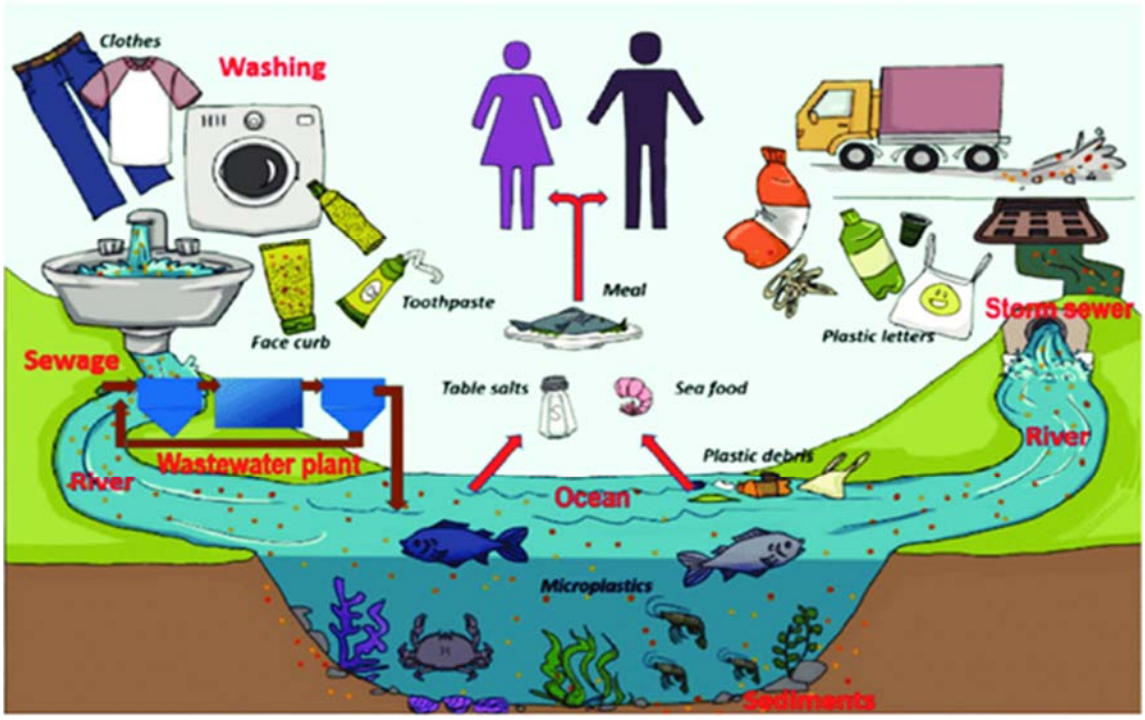

Figure 13. Microplastic pollution in aquatic environments and impacts on food chains. ©Wu, Yang and Criddle (DOI: 10.1007/s11783-017-0897-7)

Figure 14. Pollution in salt marshes can come from a variety of sources, such as litter brought in by the tides. ©B.Hawkins Kreps

The saltworks itself can be a source of pollution, both solid and liquid waste, as well as light and noise pollution, due to the operation of the installations and machinery, if any.

It is essential to address these pollution issues to protect the salinas and the value they offer as unique coastal ecosystems, as well as, safeguard human health.

How to reduce pollution in the salina?

Given the fact that pollution in salt flats comes from numerous sources (mainly from external sources -from seawater, sediment or air-, or internal sources, -produced by the saltworks themselves-), there is no single solution to reducing pollution levels and research on best practices and technology is ongoing. To reduce the levels of contamination by microplastics and other pollutants in the water entering the salt pans, for example, some systems are being investigated, using filters.

For instance, a microfiltration process developed by a research team could potentially be used just before pumping seawater into salt pans, enabling the production of plastic-free edible salts (see Reference [2]). A water filtration approach is being tested by Salina San Vicente (Cádiz, Spain) in the framework of the MedArtSal project grant activities (see Example section for more information).

Key recommendations

Here follow some general recommendations for reducing pollution levels in artisanal salinas. Their applicability will depend on the specific context and issues in each saltworks. All of them have to be monitored regularly.

1. **Waste management and potential pollutants in the saltworks itself:** Implementing proper management protocols to minimise the production and release of pollutants and waste into the environment (such as plastics, debris, contaminated sludge, or oils and fuels from machinery). This can involve the proper disposal and treatment of waste generated during salt production processes or for the operation of the saltworks facilities. If the waste cannot be treated by the municipal waste collector, it must be handed over to an authorised waste manager. In the process of packaging and selling salina products, more environmentally friendly, less polluting and more easily recyclable materials should also be chosen as far as possible.
2. **Water conservation:** Using water efficiently and implementing measures to minimise water pollution, from both external and internal sources. This can include the proper management of water sources, adequate treatment of wastewater, and reducing the use of harmful chemicals or pollutants in the salina itself. Many of the salt marshes, due to their location in the middle of the marshes or outside the urban area, are not served by basic sewage services, so it is recommended to look for alternative solutions for the disposal of wastewater (such as septic tanks or dry toilets, provided they are well maintained and allowed by law). The use of filters and barrier systems to prevent the entry of plastics and microplastics into the facility through the tides can be a good option. Research is ongoing on these issues, so it is recommended to be informed about developments.

3. **Noise or light pollution** caused by the operation of the saltworks: Reducing the use of heavy machinery as much as possible in critical times and areas for birds, especially avoiding disturbance during the breeding season; minimising the use of strong light sources, opting for low-energy bulbs -such as LEDs- whenever possible, which will also help to reduce electricity consumption.
4. **Environmental regulations:** Enforcing and complying with environmental regulations and standards to prevent and reduce pollution in salt flats. This may involve monitoring and controlling emissions (such as emissions of potentially polluting gases produced by machinery or furnaces used in the saltworks), ensuring proper waste disposal (in the right places and facilitating their separation and recycling), and protecting sensitive ecosystems, among others.
5. **Sustainable practices:** Adopting sustainable practices in salt production processes and site management, such as the use of renewable energy sources (see Factsheet 5) or environmentally-friendly technologies (e.g. in water use, wastewater management...), and minimising the use of potentially polluting mechanisms and substances. Recommended sustainable practices may also include promoting accessibility to the saltworks with low-impact transport systems, as well as the responsible procurement and management of services offered to visitors, trying to make them also environmentally friendly (such as food, drinks, souvenirs, services in visitor centres, accommodation, ...), especially in saltworks with a diversity of facilities and services.

Figure 15. Noise pollution caused by the use of machinery for maintenance work should be avoided or minimised during bird breeding seasons and in sensitive wildlife areas. Spillage of oil or fuel should also be avoided (left). Campaigns to clean up waste brought in by the tides can be organised (right). ©Salarte (left) and Viva Sevilla (right)

Examples

Installation and development of a water filtration system to reduce microplastics in Salina San Vicente: Within the framework of the call for subgrants for salinas of the MedArtSal project, Salina San Vicente (Cádiz, Spain), proposed the development of an innovative filtration system that would remove microplastic waste from the water entering the ponds by recreating a bubble barrier and increasing

oxygenation. Subsequently, reducing plastic pollution levels in the salt flats and preventing the quality of salt from being altered. This is an experimental prototype whose effectiveness will be tested in the coming months in the saltworks (see Factsheet 30A for more details).

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Factsheet 5: Energy Savings and Efficiency

Author(s): Natalie Beckett[1], Helena Clavero-Sousa[2] and Catherine Numa[2]
[1]Independent Consultant [2]IUCN Centre for Mediterranean Cooperation

Model Component: Environmental
Strategy: Environmental quality
Sustainability Components: Energy saving processes, Biodiversity maintenance / improvement, ecosystem services maintenance

Justification:
In order to protect nature, contribute to the fight against climate change and increase their sustainability, salinas, like all productive sectors, should reduce their carbon emissions. A wide range of new technologies are under development across the world to make the salt manufacturing industry more energy efficient, cost effective and sustainable.

How to save energy and make salinas more energy efficient?
The process of obtaining sea salt by artisanal and traditional methods, using the energy of the sea and solar evaporation, is itself generally very low in external energy. Some recommendations can help to make it more environmentally friendly, in the case of salt works with installations or technology that require electricity or fuel to operate.

In the day-to-day operation of the saltworks, measures can be taken to use less energy in processes by changing and adjusting our habits, as well as using new technologies and more energy-efficient systems that also reduce energy consumption and/or minimise or eliminate the use of conventional fossil fuels (such as fuel oil). A wide range of new technologies are available or are under development that may provide opportunities in terms of efficiency, cost reduction or sustainability of the salt manufacturing in salinas.

Efforts and, if necessary, investment of resources, should primarily be made to increase energy savings in saltwork facilities, as well as efficiency. The installation of solar panels or windmills for self-consumption in the salina itself is a good option, since in these places the sun and wind are abundant; moreover, they are usually located in places far from urban areas, where the electricity supply does not always reach. In addition, the adoption of good practices and energy saving and efficiency systems can help to consume less energy in the facilities, as in any productive activity or household, reducing energy bills and carbon emissions.

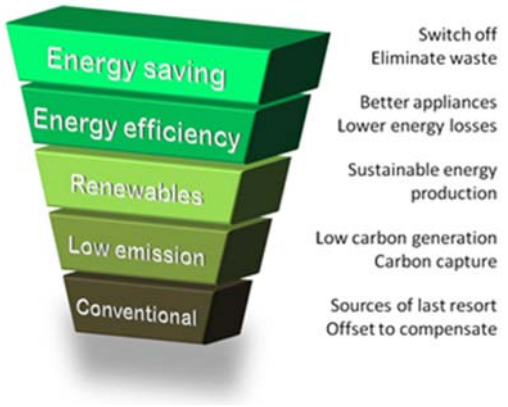

Figure 16. The Energy Hierarchy with the most favoured options at the top. By Philip R Wolfe - CC BY-SA 3.0 (https://commons.wikimedia.org/w/index.php?curid=24801433)

Key recommendations

1. **Improve insulation in facilities**, including doors and windows, where people are present, to maintain a comfortable temperature by reducing heat or cold loss. Normally in saltworks the desired objective will be to maintain a cool temperature, which can be favoured by **increasing shaded areas** outside, mainly by planting native trees and shrubs adapted to the environment (in areas adjacent to the saltworks building, for example, or where there is a more favourable substrate).
2. **More efficient machines and bulbs**: If the acquisition of new machinery (e.g. for packaging) is required, it is best to opt for the most energy efficient (with the best energy certificate, if available). The same applies to lighting bulbs. Consumption will also be reduced by switching off what is not in use (if it can be switched off completely instead of in stand-by mode).
3. **Renewable energy integration:** Incorporating renewable energy sources, such as wind or solar power (using solar panels or windmills to produce electricity or operate some mechanism) into salinas operations can significantly reduce reliance on fossil fuels. Renewable energy systems can power various aspects of the process, including transportation, machinery, and facility operations. See example of how solar panels have been installed in one of the salinas involved in the MedArtSal project below.
4. **Energy management and optimisation:** Implementing energy management strategies and conducting regular energy audits can help identify areas of energy inefficiency and develop targeted solutions. By optimising energy use and minimising energy losses, the overall energy efficiency of salinas can be improved.

5. Find out if there are, and how to access, **financial incentives or subsidies**, at local, regional or national level, to implement energy saving and efficiency measures and/or for the installation of renewables in your business.

Examples

Operating fully on renewable energy using solar power and traditional pumps: Sleiman Salinas (Anfeh, Lebanon) is committed to the preservation of the surrounding ecosystems and the environment and has, thanks to the MedArtSal subgrant, installed solar panels and replaced the fuel engine to pump the water to the salt pan with the renovation of the traditional windmill, now powered by solar pumps.

In the Salinas de Chiclana (Spain) solar panels were also installed, several years ago, to supply the facilities, including the restaurant, with their own green energy.

Figure 17. Traditional windmill restored (top, left), now running with a solar energy-powered pump; and solar panels being installed in the salina (top, right), Sleiman Salinas (Anfeh, Lebanon; MedArtSal project actions). Installation of solar panels (36 in total) on the roof of the car park in Salinas de Chiclana, Spain (below). ©MedArtSal project (above) and Salinas de Chiclana (below)

References and further information

- Article "MedArtSal at Sleiman Salinas in Anfeh: towards economic and ecological sustainability": https://www.enicbcmed.eu/medartsal-sleiman-salinas-anfeh-towards-economic-and-ecological-sustainability
- SME Guide to Energy Efficiency (only some of the points may be applicable to the premises of the salinas): https://www.seai.ie/publications/SME-Guide-to-Energy-Efficiency.pdf
- Renewable energy self- consumption. A Policy Brief: https://www.interregeurope.eu/sites/default/files/inline/Energy_self-consumption__Policy_brief_final.pdf

Factsheet 6: Increasing Resilience to Climate Change

Author(s): Elisa Ulazzi[1], Manuela Puddu[1] and Francesca Etzi[1]
[1]MEDSEA Foundation

Model Component: Environmental
Strategy: Ecosystem services accounting and enhancement
Sustainability Components: Biodiversity maintenance / improvement, ecosystem services maintenance

Justification
Natural wetlands are vital to climate resilience as they stabilise coastlines, buffer against extreme weather events, reduce soil erosion, and sequester carbon.

By augmenting natural wetland processes, well-managed artificially made salt flats, which are a unique form of coastal wetland, can also contribute to climate resilience. Salinas are a unique example of the sustainable use of natural resources. They rely on existing wetland dynamics, tidal cycles, and seasonal flooding-desiccation processes to support diverse ecosystems.

This factsheet provides examples for enhancing the resilience of traditional salt flats to climate change.

Why are healthy and well managed salinas more resilient to climate change?

The biodiversity values of artisanal salinas include:

- Serving as disaster management systems, alleviating floods and buffering against storms.
- Storing and purifying water, making them valuable in drought-prone regions.
- Effectively helping to reduce the impact of storm surges.
- Storing more carbon than any other ecosystem, and thus acting as exceptional carbon capture zones (see Factsheet 7).
- Enhancing their environmental attributes significantly contributes to carbon sequestration.
- They are nearly "zero emission" sites, relying primarily on solar and wind power (in coastal artisanal salt works, salt is extracted from seawater by the action of the sun and the wind, which allows the water to evaporate in the ponds).

Unlike natural wetlands, a well-managed salt flat can also increase its level of resilience to climate change. For example, by pumping out fresh water and pumping in salt water through its dykes and channels, the salt flat maintains the ecological processes of a complex wetland system, whilst simultaneously providing a unique habitat to hundreds of species.

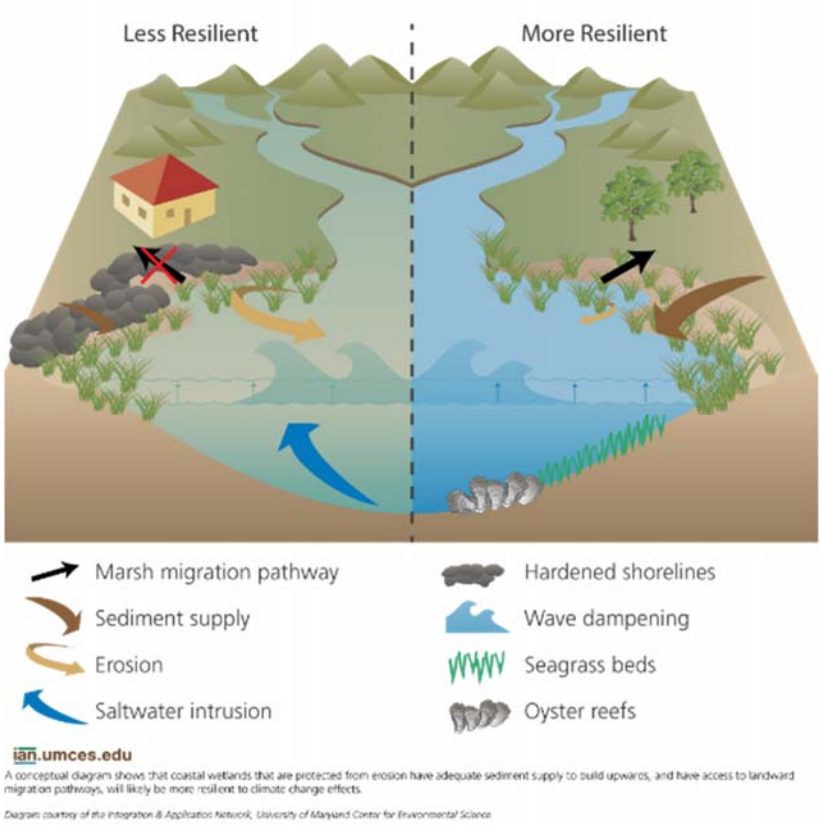

Figure 18. Conceptual diagram showing that coastal wetlands that are protected from erosion and have access to landward migration pathways are likely to be more resilient to the effects of climate change. ©ian.umces.edu

Key recommendations to increase climate change resilience in salinas

- Effective water management to reduce risk of flooding and maintain subsoil in salt flat ponds.
- Control and improve water quality to support the environment and biodiversity.
- Enhance the salina' environmental character and biodiversity.
- Transition to decarbonised processes by using green energy sources, alternative fuels and reducing fuel consumption.
- Sustainable use of natural resources, minimise waste and use by-products like seaweed.
- Diversify salt flat products and services for greater economic resilience.
- Engage the local community in a cross-sectoral and inclusive manner, harnessing the skills and potential of diverse individuals.
- Establish connections and partnerships with local communities.
- Implement monitoring activities and constant control to enhance salina resilience to climate change.

Examples:

1. **Repairing, maintaining and reinforcing pond embankments and walls** in salt flats, like in the Ettore & Infersa salt flat in Trapani, using local materials and traditional techniques, enhances the hydraulic circuit and boosts sea salt production by 10-15%. The embankments also provide opportunities for tourism activities and serve as pedestrian and bicycle paths. In the San Vicente salina (Spain) also, thanks to the grant, the wall facing the outer canal has been rebuilt and reinforced, as it was frequently eroded due to the action and the rising sea level.

Figure 19. One of the embankments recovered in the Ettore and Infersa salina (Italy) within the MedArtSal project pilot actions (above) and the rebuilt and reinforced wall in the San Vicente salina (Spain; below). ©MedArtSal project

In the face of climate change and the impacts of erosion, different interventions are being tested in various salt marshes and salt flats to help protect and regenerate this type of habitat. Another example is the technique of plant fibre protectors ("sausages") that have been installed in Colne Estuary in Essex, U.K. (see Reference [1]).

Figure 20. Installing "salt marsh sausages" of coconut coir to try to stabilise degrading coastal habitat. Image courtesy of Essex Wildlife Trust

2. **Implementing energy-saving measures and utilising renewable energy sources**, such as windmills and solar panels, can significantly reduce energy consumption and CO_2 emissions in salt production (more details in Factsheet 5). Examples include the Sleiman Sleiman salina in Lebanon, which achieved zero energy consumption for water pumping through wind power, and the Maison du Sel salt flat, which repaired its windmill. The use of wind and solar energy in the Malek's salt works exemplifies a complete transition to zero fuel energy, enhancing environmental conditions.

Figure 21. Traditional windmill repaired in Sleiman Sleiman Salinas (left). Solar panels installed in George Sleiman Salinas (right) (Lebanon, MedArtSal pilot actions). ©T.Campisi (left) and MedArtSal project (right)

3. **Cultivating macroalgae and microalgae**, such as the microalgae *Dunaliella salina*, in salina facilities is a feasible and environmentally sustainable practice. These microorganisms capture carbon and convert CO_2 into organic matter through photosynthesis. Microalgae offer potential

for producing nutritious food, feed, fertiliser, and biofuels, while contributing to climate change resilience. Among the macroalgae that can be cultivated are *Ulva* spp. or *Enteromorpha* spp.

Figure 22. Salt workers collecting macroalgae in Salinas de Chiclana (left) and the extracted macroalgae already vacuum packed for conservation (middle). (Right) Visit to the bioreactor pilot plant for microalgae production in the Preciosa and Roqueta salina (Spain, MedArtSal pilot action). ©Salinas de Chiclana and T.Campisi (right)

Figure 23. SAIDA researcher monitoring pilot action in SAIDA facilities (left) and micro algae by-products developed (middle and right) (Tunisia, MedArtSal case-study). ©SAIDA

4. Salt flats can enhance resilience to climate change acting as **carbon storage systems**. These water ecosystems overcome the limitations of terrestrial ecosystems by offering several advantages: they require less surface area, use less water, and can utilise wastewater for nutrient supply. Microalgae, a key natural component of salt flats, grows rapidly and efficiently without the need for stems or roots. They fix carbon at a higher rate than plants and thrive in CO_2-rich environments. *Chlorella*, another type of microalgae, shows exceptional resistance to environmental challenges like high CO_2 concentrations and pollutants.

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Factsheet 7: Improving Knowledge of Ecosystem Services in Salinas (including Blue Carbon storage)

Author(s): Elisa Ulazzi[1], Manuela Puddu[1], Francesca Etzi[1] and Tiziana Campisi[2]
[1]MEDSEA Foundation [2]CUEIM, University Consortium for Industrial and Managerial Economics

Model Component: Environmental
Strategy: Ecosystem services accounting and enhancement
Sustainability Components: Biodiversity maintenance / improvement, ecosystem services maintenance

Justification
Ecosystem services are the diverse benefits that humans derive from the natural environment and robust ecosystems such as, agroecosystems, forests, grasslands, and aquatic systems. Four types of ecosystem services have been identified:

1. Regulating services e.g. climate regulation, carbon storage and sequestration.
2. Provisioning services e.g. food, freshwater and medicine, contact with nature and sports activities.
3. Cultural services e.g. sites for leisure and inspiration for art, cultural heritage visits.
4. Supporting services e.g. water cycle and habitat provision.

As unique coastal wetlands, salt flats provide essential ecosystem services. By implementing effective management practices and enhancing the environment, biodiversity, and activities, salt flats can expand their range of services.

Why is it important to assess, account and enhance ecosystem services of the salina?

According to the MedArtSal Sustainable Management Model[1], enhancing ecosystem services in salt flats is key to sustainability. Sustainability is achieved through increasing or maintaining profitable salt production, diversification of products and services, and environmental and biodiversity enhancement.

Figure 24. Ecosystem services (the diverse benefits that humans derive from the natural environment): types and roles ©TEEB Europe

Among the ecosystem services they provide, salt marshes and salt pans sequester and store a considerable amount of carbon in their sediment — more per hectare than tropical rainforests. They are acknowledged to be "carbon hotspots" due to their capacity to trap and store large quantities of carbon. They also protect the land from storm surges and sea level rise, and provide shelter and food for a wide variety of birds, fish and crustaceans.

Ecosystem services can be monetised through various market approaches and amongst others, carbon sequestration has created concrete business opportunities in both terrestrial (green carbon) and coastal/marine ecosystems (blue carbon). Carbon markets facilitate the trading of carbon credits, where one credit represents the reduction or avoidance of one tonne of carbon dioxide or an equivalent greenhouse gas. Emissions trading systems (ETS) are compliance markets where businesses or countries trade permits to meet emission limits, operating on a "cap-and-trade" principle.

Specific actions to maintain or enhance ecosystem services in salt flats depend on understanding the processes, health status, and specific needs of the ecosystem. These actions can increase productivity, create new products and services, and unlock opportunities for monetising ecosystem services.

Key recommendations for maintaining and increasing ecosystem services in salt flats

- Reconstruct or maintain habitats to increase biodiversity and stabilise ecosystem services.
- Improve hydraulic circulation for flood risk reduction and water purification.
- Utilise plants for wastewater treatment.
- Transition to greener and bluer economy for decarbonization (e.g., cleaner energy sources, alternative fuels, reduced fuel consumption).
- Enhance carbon sequestration through seaweed production from nutrient residues and CO_2.
- Practice sustainable use of natural resources and promote a circular economy.
- Assess and assign monetary value to ecosystem services.
- Participate in carbon credit markets.
- Conduct regular monitoring and control activities to assess the salina's status and identify necessary actions.

Actions for increased sustainability of the salt flat can vary based on its characteristics. Some actions save money while others add monetary value. Regardless, any action aimed at enhancing ecosystem services contributes to the salt flat's sustainability.

Examples

1. **Blue Carbon and Salt Flats:** Salt flats play a vital role in blue carbon sequestration, capturing and storing organic carbon. A recent study (Haro et al, 2022[2]), within the MedArtSal project, has analysed blue carbon stock in an artisanal and in an industrial salt pan in the Cadiz Bay in order to quantify the difference of organic carbon absorption among salinas and pre-existing natural salt marshes. They found that active salt pans may store similar quantities of carbon than natural saltmarshes, so human-managed coastal habitats could represent a large pool of blue carbon stored over thousands of years. Thus, well-managed salt flats can contribute to global carbon mitigation efforts.

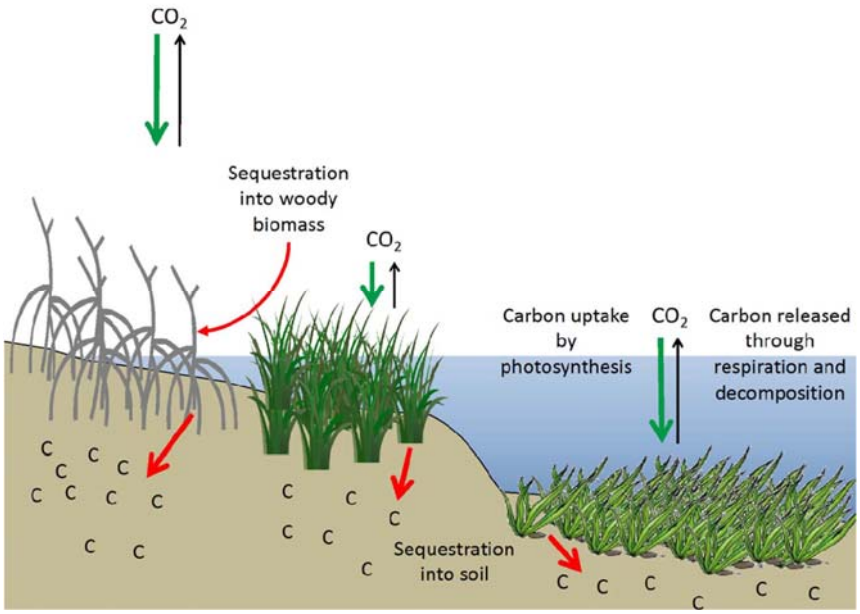

Figure 25. How carbon sequestration works in a healthy blue carbon ecosystem. The carbon stored within the biomass and sediments of salt marshes is called blue carbon. ©Howard et al., 2017 (dx.doi.org/10.1002/fee.1451)

In addition, the cultivation of algae in salt marshes, both macroalgae and microalgae, can help to enhance carbon sequestration. The MedArtSal project has successfully developed microalgae cultivation in several salt flats, along with macroalgae cultivation in Spain.

Figure 26. Macroalgae collected in the ponds (left) and microalgae extraction product (right) (Salina La Esperanza, MedArtSal case study). ©Ignacio Hernández (right) and MedArtSal project (right)

Figure 27. SAIDA facilities (Tunisia, MedArtSal case-study; above) and micro algae by-products developed (below, on the left cosmetic cream based on *Dunaliella* oil extract – on the right Scrub). ©SAIDA

2. **Salt flats as cultural heritage, nature conservation and recreational sites:** Historically used for salt production, salt flats are culturally significant in the Mediterranean, with very characteristic elements, such as architectural features, techniques and utensils used, intangible elements, etc. They also support relevant habitats and diverse waterbird species, offering opportunities for various recreational, nature and spiritual activities, and sports. The MedArtSal project promotes pilot actions, including tourism services and museums, to leverage the cultural and natural services of salt flats (see Section 4).

Figure 28. Tour on boat (Italy, Salina di Cervia - MedArtSal pilot action). ©Ufficio IAT Cervia

Figure 30. Traditional products (above) and bicycle touristic visit (below) in Les Diamants de la mer (Sodimer, Tunisia – MedArtSal pilot action). ©E.Ulazzi

Figure 29. Creation of the Museum at the Maison du Sel salina (Lebanon, MedArtSal pilot action). ©MedArtSal project

References and further information

- [1]UCA (2021). *MedArtSal Sustainable Management Model for Mediterranean Artisanal Salinas.* MedArtSal project deliverable. (Available at: https://medartsal.com/download/management-model/)
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Section 2 Socio-Economy

Section objective: To offer solutions that support the establishment of a sustainable marketplace that will provide ongoing economic and social benefits for Mediterranean artisanal salinas and their surrounding communities.

2A: Product Diversification (Goods)

The diversification of goods in Mediterranean artisanal salinas holds huge potential for improving the competitiveness and sustainability of these unique ecosystems. Section 2A explores the various tools, methods and resources that can be utilised to expand product options and create new marketing opportunities for salinas. From the cultivation of salicornia, microalgae and macroalgae to the development of cosmetic products and the creation of diverse salt products.

By harnessing the tools, techniques and resources discussed in this section, artisanal salinas can create a vibrant and sustainable marketplace that not only benefits the salinas themselves, but also enhances the economic prospects of the region.

The Section on Diversification of Goods covers the following themes:

8. Salt Diversification (Types and Forms of Salt Products)
9. Microalgae Cultivation
10. Macroalgae Cultivation
11. Cosmetic Product Development
12. Aquaculture in Salinas
13. Development of Mud-Based Products
14. Salicornia and other halophytic plants as a complementary product in salinas

Factsheet 8: Salt Diversification (Types and Forms of Salt Products)

Author(s): Nuria Martín Sanjuan[1], Andrea Forján Guillens[1], Patricia Marrero Larran[1] and Alejandro Pérez Hurtado de Mendoza[1]
[1]Central Research Service, Salinas La Esperanza, University of Cádiz

Model Component: Socio-economic
Strategy: Product diversification (goods)
Sustainability Components: Reaching innovation, supporting social equity, optimising sales strategies

Justification
To make artisanal salt economically viable, the market needs to specialise and differentiate itself through quality and product diversification. This requires studying various market niches and understanding different types of buyers. By doing so, a diverse range of consumer-tailored products can be developed and designed.

What is artisanal salt extraction?
The salt market has a long history dating back to the beginning of civilization. Artisanal salt extraction involves traditional tools and techniques passed down through generations. This extraction method yields a range of high-quality types of salt, such as *fleur de sel*, salt flakes, virgin sea salt, and sweet salt. Each type has unique characteristics and is used in various culinary applications:

1. ***Fleur de sel* and Salt flakes:** Delicately collected using a hand net, *fleur de sel* forms on the water's surface, while salt flakes settle at the bottom. Valued in haute cuisine for their delicate flavours, these artisanal salts require skillful production and harvesting.
2. **Virgin Sea Salt:** Extracted gently from the compacted layer at the crystalliser's bottom, virgin sea salt is abundant in production. This high-quality salt, rich in minerals like iodine, calcium, magnesium, and manganese, finds common use in kitchens.
3. **Sweet Salt:** Derived from traditional methods, sweet salt is the primary product of Cervia Salinas in Italy. Naturally dried and washed with concentrated saline mother water, it retains the osmotic properties and trace elements of seawater. This traditional salt production method is also prevalent in Spanish salinas.

The revaluation of traditional salt products and advancements in operational knowledge have led to adaptations in salinas to cater to these new products.

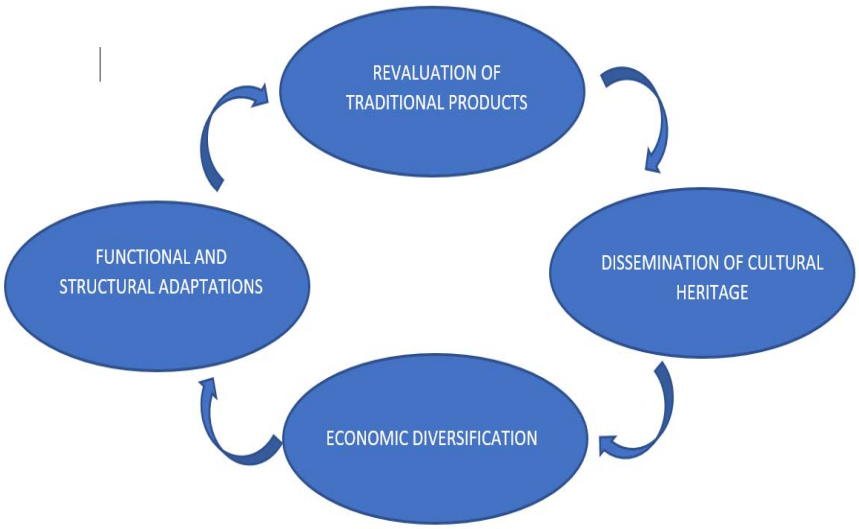

Figure 31. Diagram of the processes involved in the revaluation of traditional salt. ©SC-ISE. UCA

Figure 32. Salt worker in Salina de la Esperanza, Spain. ©SC-ISE. UCA

Key recommendations for the diversification of artisanal salt products for economic gain

- Promote and recognize the environmental values associated with these products, including potential certification as eco-friendly goods aligned with sustainable practices.
- Conduct a market study to determine optimal packaging, labelling, pricing, design, etc., as outlined in the marketing factsheets.
- Establish clear differentiation among the various salt types as individual products.

- Expand the salt offering by creating a range of new products, such as flavoured and aromatic salts achieved through blending with various spices for culinary purposes.
- Explore structural modifications tailored to the specific salt extraction methods, aiming to enhance efficiency and productivity.

Examples

1. **Diversification of salt types**

The enhanced knowledge of artisanal salt extraction, particularly in *Fleur de sel* and salt flakes, known for their delicate and prized texture in gastronomy, has paved the way for:

- The creation of salts infused with a blend of spices or essences, including black pepper, lemon, wine, thyme, paprika, oregano, and smoked variations.
- The development of bath salts and related products infused with fragrances like lavender, rosemary, orange, cinnamon, and mint.
- The commercialisation of hypersaline magnesium waters renowned for their proven benefits in alleviating muscle inflammation and joint pain.

Figure 33. Top to bottom and left to right: different types of *Fleur de Sel* from ©Salinas del Alemán; salt and salicornia products by ©Productos La Salá; bath salts and hypersaline magnesium water from © Salinas de Chiclana.

2. **Adaptation of functional structures of the salina for productivity improvements**

The enhancement and gastronomic value of *fleur de sel* and salt flakes have led to the adaptation of traditional salt pans for improved productivity. New adaptations include dividing

rectangles into smaller segments with deeper depths (15-20 cm) and higher, thicker dividing walls. This design change has significantly increased the production of *fleur de sel* and salt flakes by reducing water vibration, preventing breakage and precipitation of these salts.

Figure 34. Adapting pond structures to increase *fleur de sel* production, Salina La Esperanza, Spain.. ©SC-ISE. UCA

3. **Adaptation of tools and utensils to the users of the S.XXI**

   Tools and utensils must be adapted for modern users, prioritising ergonomics to minimise physical effort and enhance productivity. Improvements have been made to traditional tools like sticks, hoes, shovels, and wheelbarrows, making them smaller, lighter, and of higher quality. For instance, the use of lighter woods or carbon fibre in rod design can reduce weight by up to 40%.

   New tools are being designed specifically for extracting *fleur de sel* and salt flakes, enabling efficient and delicate extraction from the upper part of the water pond.

Figure 35. Some adapted tools and utensils for salt extraction (left). *Fleur de sel* harvesting process with the specific tool tool for it (right). ©SC-ISE. UCA (left) and La Tajería, Cádiz (right)

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Knowledge is gathered not only through the aforementioned bibliography, but also by experience and communication with veteran salt farmers.

Factsheet 9: Microalgae Cultivation

Author(s): Carmen Garrido Pérez[1]
[1]Environmental Psychotechnology Research Group, University of Cádiz

Model Component: Socio-economic
Strategy: Product diversification (goods)
Sustainability Components: Reaching innovation, supporting social equity

Justification
Artisanal salinas have faced economic stress in recent decades due to the salt crisis, leading to the abandonment of unprofitable facilities. Diversifying with algae aquaculture offers an opportunity to maintain biodiversity and expand product options.

Microalgae are vital unicellular organisms that perform photosynthesis, playing a crucial role in sustaining life on Earth. With a vast diversity of species, microalgae hold promise as a sustainable resource. They have uses in sunscreen, cosmetics, food for humans and animals, biofertilizers, and pharmacology.

Cultivating microalgae is appealing due to their rapid growth and high biomass production compared to other plant species. They can be harvested year-round using simple photobioreactors that seamlessly integrate into the salt flat environment.

This factsheet introduces microalgae cultivation to promote new production activities in salinas

How to cultivate microalgae?
Growing microalgae is relatively straightforward, but does require specific knowledge, skills, facilities, and equipment.

Small-scale cultivation in indoor facilities is needed to maintain and scale up healthy cultures. For mass culture in outdoor salinas, knowledge of aquaculture, agriculture, and engineering is essential.

Figure 36. Design of an experimental microalgae plant in salina. ©PROARTE

A complete saline microalgae facility includes:

- Laboratory for species cultivation, biomass measurement, nutrient media preparation, water treatment, and harvesting.
- Outdoor reactors of increasing volume for scaling up the culture. These bioreactors should enable photosynthesis and continuous movement to ensure light and nutrient distribution while preventing cell deposition.

Figure 37. 200-litre capacity raceway-type reactor built within the framework of the MedArtSal subgrant programme at the Preciosa y Roqueta salina (Bay of Cadiz, Spain). It is made of polypropylene on a metal support so that its location can be changed. ©MedArtSal project

To cultivate microalgae, species are selected from a collection or through isolation techniques. In the initial phase, a small number of cells are placed in a culture medium under optimal conditions of light, temperature, and agitation for growth. The microalgae reproduce and increase the biomass in the reactor. Small-scale studies can be conducted to optimise parameters, productivity, and cost-effectiveness, such as nutrient concentrations.

Once a sufficient and healthy volume of microalgae is obtained, cultivation can transition to natural environmental conditions, considering factors like light, temperature, wind, evaporation, and pathogen contamination. It is advisable to use greenhouse installations to minimise risks.

When the target biomass or desired composition is achieved, a portion of the microalgae is harvested, and the volume is replenished with fresh culture medium for the next cycle. This process can be optimised for each microalgae species by understanding their growth kinetics.

Key recommendations for cultivating microalgae

- Seek native microalgae strains with desired biochemical composition, adaptability to local climate, and ease of manipulation during costly cultivation phases.
- Prioritise native strains to prevent invasive species and protect the aquatic ecosystem of salinas.
- Identify sustainable locations for cultivation that do not interfere with other activities and minimise production costs.

- Use shading nets or partial shading during the initial days of outdoor culture with low cell concentration to regulate light intensity.
- Conduct a techno-economic study before starting microalgae cultivation, including facility and equipment costs, input expenses, personnel salaries, productivity estimates, and market prices of microalgae.

Examples

A **bioprospection of the microalgae present in the waters of** "La Esperanza" Salina (Cádiz) was conducted to establish a collection of viable species for cultivation in salt pans. This involved isolating and characterising species of interest, identifying them through DNA extraction, amplification and sequencing. From the water samples, ten species of microalgae and cyanobacteria were successfully isolated and identified, making up the **MedArtSal Collection of microalgae** (see Figures below).

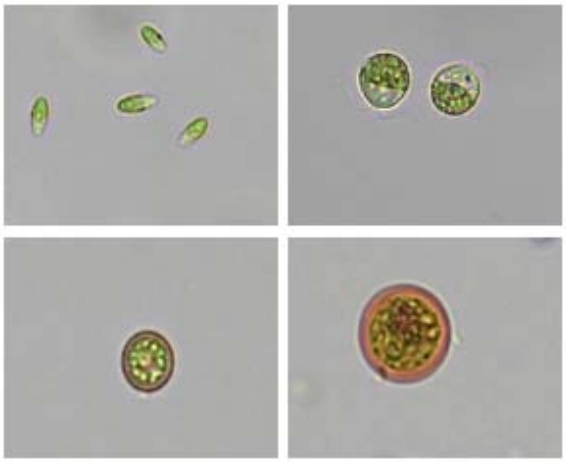
Figure 38. Experiments to isolate microalgae and cyanobacteria, in the framework of the MedArtSal actions. ©MedArtSal project

The MedArtSal Collection of microalgae (from salina La Esperanza, Cádiz, Spain):

01.CHLOROPHYTA — ***Dunaliella sp.***

Classification:

Empire *Eukaryota*
Kingdom *Plantae*
Subkingdom *Viridiplantae*
Infrakingdom *Chlorophyta infrakingdom*
Phylum *Chlorophyta*
Subphylum *Chlorophytina*
Class *Chlorophyceae*
Order *Chlamydomonadales*
Family *Dunaliellaceae*
Genus *Dunaliella*



Dunaliella sp. Optical Microscope 40x

01.CHLOROPHYTA — ***Halosarcinochlamys sp.***

Classification:

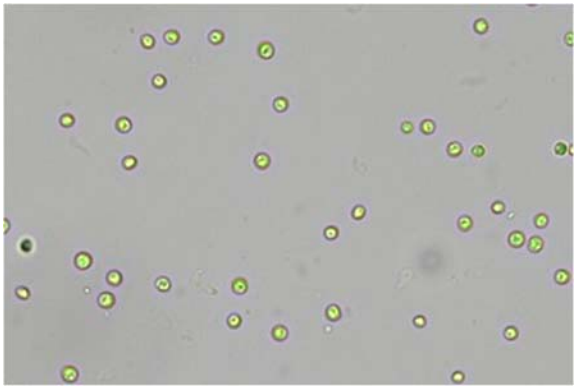
Empire *Eukaryota*
Kingdom *Plantae*
Subkingdom *Viridiplantae*
Infrakingdom *Chlorophyta infrakingdom*
Phylum *Chlorophyta*
Subphylum *Chlorophytina*
Class *Chlorophyceae*
Order *Chlamydomonadales*
Family *Chlamydomonadaceae*
Genus *Halosarcinochlamys*

Halosarcinochlamys sp. Inverted Microscope 40x

02. CHLOROPHYTA — *Parachlorella sp.*

Classification:

Empire *Eukaryota*
Kingdom *Plantae*
Subkingdom *Viridiplantae*
Infrakingdom *Chlorophyta infrakingdom*
Phylum *Chlorophyta*
Subphylum *Chlorophytina*
Class *Trebouxiophyceae*
Order *Chlorellales*
Family *Chlorellaceae*
Genus *Parachlorella*

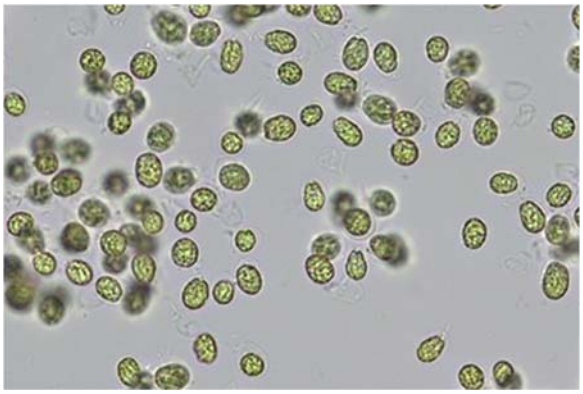


Parachlorella sp. Optical Microscope 40x

03. CHLOROPHYTA — *Tetraselmis sp.*

Classification:

Empire *Eukaryota*
Kingdom *Plantae*
Subkingdom *Viridiplantae*
Infrakingdom *Chlorophyta infrakingdom*
Phylum *Chlorophyta*
Subphylum *Chlorophytina*
Class *Chlorodendrophyceae*
Order *Chlorodendrales*
Family *Chlorodendraceae*
Genus *Tetraselmis*



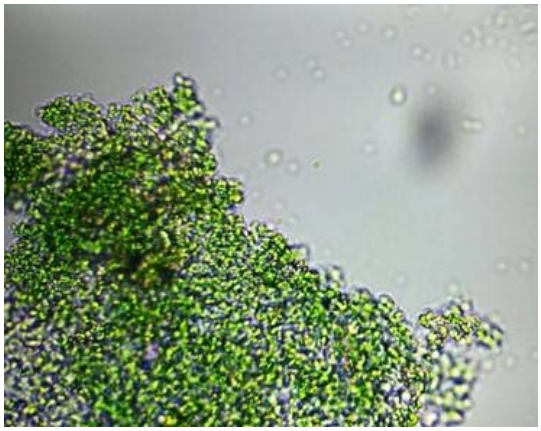
Tetraselmis sp. Optical Microscope 40x

05. CYANOBACTERIA

Synechococcus sp.

Classification:

Empire *Prokaryota*
Kingdom *Eubacteria*
Subkingdom *Negibacteria*
Phylum *Cyanobacteria*
Class *Cyanophyceae*
Subclass *Synechococcophycidae*
Order *Synechococcales*
Family *Synechococcaceae*
Genus *Tetraselmis*



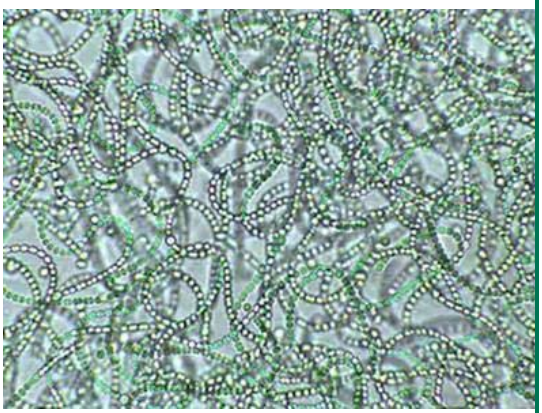
Synechococcus sp. Optical Microscope 40x

06. CYANOBACTERIA

Nostoc sp.

Classification:

Empire *Prokaryota*
Kingdom *Eubacteria*
Subkingdom *Negibacteria*
Phylum *Cyanobacteria*
Class *Cyanophyceae*
Subclass *Nostocophycidae*
Order *Nostocales*
Family *Nostocaceae*
Genus *Nostoc*

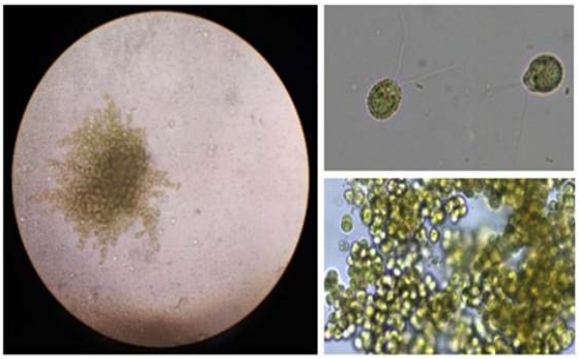


Nostoc sp. Optical Microscope 40x

07. HAPTOPHYTA	*Chrysotila sp.*

Classification:

Empire *Eukaryota*
Kingdom *Chromista*
Subkingdom *Hacrobia*
Phylum *Haptophyta*
Class *Coccolithophyceae*
Order *Syracosphaerales*
Family *Syracosphaeraceae*
Genus *Chrysotila*

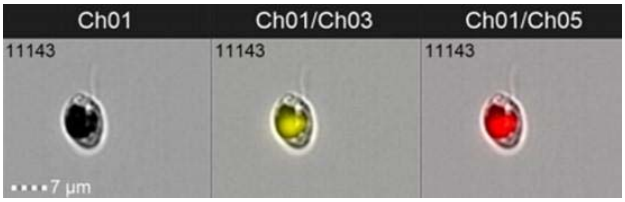


Chrysotila sp. Optical Microscope 40x

08. CRYPTOPHYTA	*Cryptomonas sp.*

Classification:

Empire *Eukaryota*
Kingdom *Chromista*
Phylum *Cryptophyta*
Class *Cryptophyceae*
Order *Cryptomonadales*
Family *Cryptomonadaceae*
Genus *Cryptomonas*

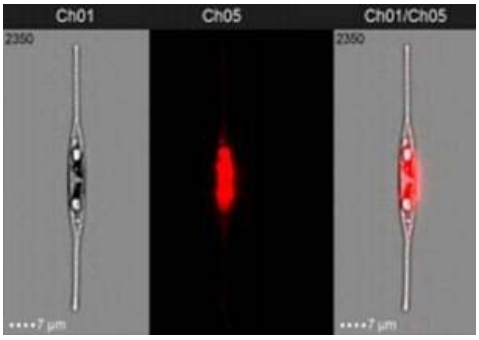


Cryptomonas sp. Photograph of *Cryptomonas* in clear field (Ch01) next to the composite image with the fluorescence in yellow due to the presence of phycobilisomes (Ch01/Ch03) and chlorophyll (Ch01/Ch05)

09. BACILLARIOPHYTA	*Cylindrotheca sp.*

Classification:

Empire *Eukaryota*
Kingdom *Chromista*
Phylum *Bacillariophyta*
Subphylum *Bacillariophytina*
Class *Bacillariophyceae*
Subclass *Bacillariophycidae*
Order *Bacillariales*
Family *Bacillariaceae*
Genus *Cylindrotheca*



Cylindrotheca sp. Photograph of Cylindrotheca in clear field (Ch01), chlorophyll fluorescence channel (Ch05) and composition of both (Ch01/Ch05).

10. BACILLARIOPHYTA	*Pleurosigma sp.*

Classification:

Empire *Eukaryota*
Kingdom *Chromista*
Phylum *Bacillariophyta*
Subphylum *Bacillariophytina*
Class *Bacillariophyceae*
Subclass *Bacillariophycidae*
Order *Naviculales*
Family *Pleurosigmataceae*
Genus *Pleurosigma*

Pleurosigma sp. Optical Microscope 40x

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- MedArtSal video (also available in Italian): A successful example of Spirulina (algae) cultivation by Micoperi Blue Growth | MedArtSal interview
- MedArtSal video (also available in French): Pilot Action: Production of Microalgae by SAIDA in Tunisia
- MedArtSal video: How to grow a microalgae plant in Salinas

Factsheet 10: Macroalgae Cultivation

Author(s): Ignacio Hernández Carrero[1]
[1]Structure and Dynamics of Aquatic Ecosystems Research Group, University of Cádiz

Model Component: Socio-economic
Strategy: Product diversification (goods)
Sustainability Components: Reaching innovation, supporting social equity

Justification:
In addition to cultivating microalgae (as featured in the Microalgae cultivation factsheet), the cultivation of macroalgae is another way of enhancing the economic viability of artisanal salinas.

Macroalgae play a vital role in the ecosystem by converting solar energy into chemical energy through photosynthesis. They provide sustenance to various organisms within the salt flat ecosystem and help in nutrient absorption and oxygenation of water, mitigating nutrient overload.

Seaweed aquaculture in salinas offers an opportunity for product diversification and biodiversity preservation. Researching and innovating algal-based products can lead to direct human consumption options and the development of cosmetics with beneficial properties such as photoprotection, antioxidants, and anti-inflammatory effects.

Figure 39. Workshop on the preparation of algae-based cosmetic products (Cádiz, Spain; left). Detail of *Ulva* sp., a seaweed that has various uses, such as in cosmetics or for cooking (right). ©UCA

Macroalgae can have several other uses, some of which are currently being investigated by research groups, such as serving as biomass, a source of renewable energy or for purifying water pollutants.

This factsheet introduces macroalgae cultivation to promote new production activities in salinas.

How to cultivate macroalgae?

Salt flat floodgates are ideal for cultivating commercially valuable macroalgae used in food, chemical, and pharmaceutical industries. The swift water flow during tides provides extra energy, promoting biomass growth. Species like *Chondracanthus teedei* and *Gracilariopsis longissima* can be cultivated on ropes and harvested multiple times a year. Larger macroalgae like *Ulva* spp. are harvested and consumed in restaurants. Cultivating seaweed in salt flats is an innovative and sustainable activity that complements salt production.

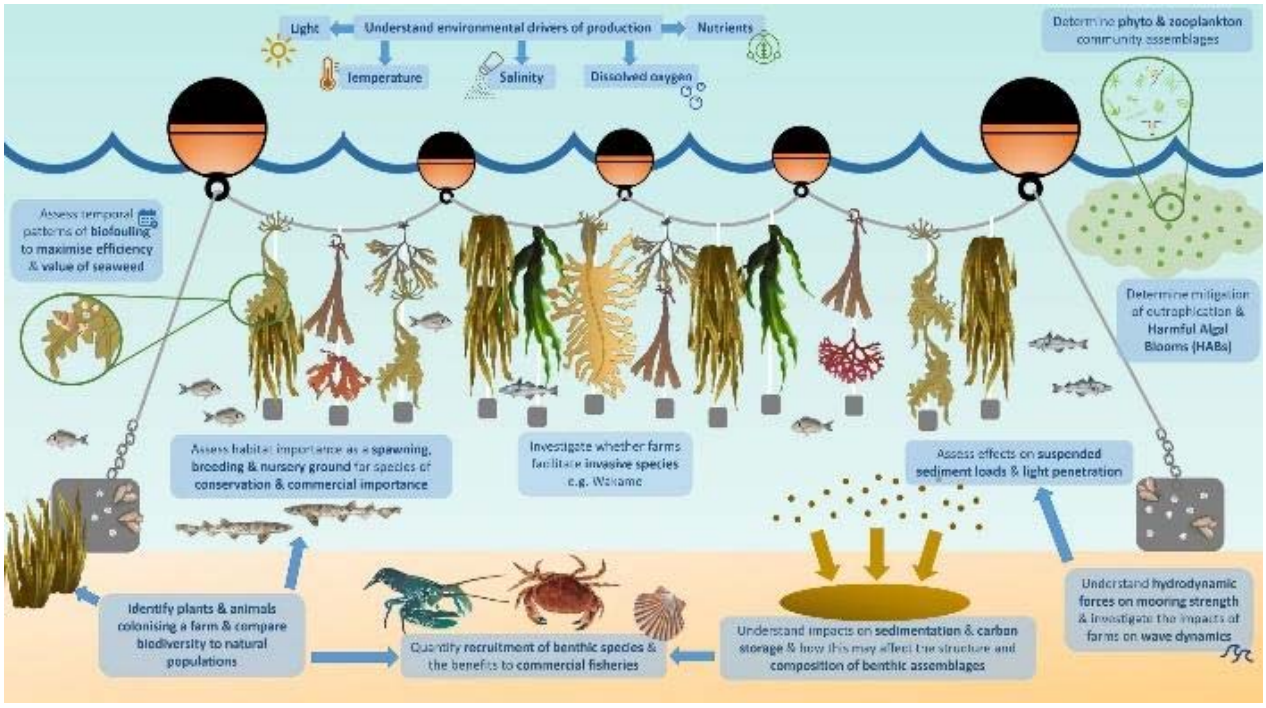


Figure 40. Key factors to consider when researching or setting up a seaweed farm in order to better understand interactions with the environment and maximise environmental and commercial benefits. Source: Sophie Corrigan

Algae can be cultivated by vegetative propagation using small fragments from wild specimens. These fragments are placed on ropes and grown under optimal conditions of light, temperature, and water flow. Harvesting can be done multiple times per year. Species like *Ulva* can be cultivated in tanks and ponds, especially if there is nutrient-rich water from nearby fish farms. Collaborating with research institutions allows for the growth of new algae from spores or tiny fragments in lab cultures, eliminating the need to collect algae from the wild.

Figure 41. Different methods to cultivate macroalgae in salt ponds. ©UCA

Key recommendations for cultivating macroalgae

- Choose native macroalgae species that are well-suited to the salt pan's environmental conditions (salinity, temperature, light intensity).
- Understand the biology of the species and the impact of environmental variables (light, temperature, seasonality, water flow, salinity) on growth rate for successful cultivation.
- Ensure a clean and contaminant-free cultivation zone, and make necessary adjustments such as constructing structures (tanks or ropes) and preparing the base for the crops.
- Consider the influence of seasonality on algae biomass in cultures.
- Provide constant care for macroalgae crops, including monitoring water temperature and salinity, removing competing algae and organisms, and pruning algae for growth promotion.
- Conduct a thorough economic analysis considering operating costs and biomass prices in the food market.
- Explore integrated multitrophic cultures to enhance profitability by combining algae and fish production.

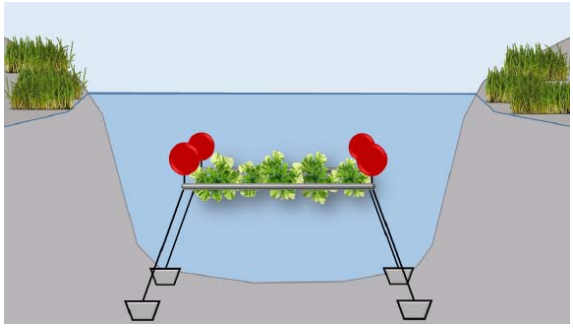
Examples

1. **Floating baskets**: used for the cultivation of *Ulva* spp. in estuaries and ponds of the salinas of the Bay of Cádiz.

Figure 42. Installing the floating baskets for macroalgae cultivation. ©EAlga project

2. **Cultivation on perpendicular ropes**: test different rope materials (nylon, cotton, hemp, polyester) for optimal results. Successful experiments have been conducted in Salina La Esperanza using this cultivation method, harnessing the tidal currents in the salt flat gates.

Figure 43. Detail of a rope of a macroalgae cultivation system. ©EAlga project



3. **Semi-floating raft**: The buoys allow the crops to be kept at the same depth against the rise and fall of the tide.

Figure 44. Scheme of a semi floating system of macroalgae cultivation. ©EAlga project

References and further information

- MedArtSal Internal report: Activity A.4.1.1. (unpublished). *New application of macroalgae cultivated in Salinas*. Available on request.
- Structure and Dynamics of Aquatic Ecosystems Research Group, University of Cádiz: https://produccioncientifica.uca.es/grupos/7847/detalle
- UCA Project 1FD97-1425: "Proyecto piloto de acuicultura integrada: disminución del impacto ambiental por la contaminación por nutrientes de una explotación de acuicultura mediante el

cultivo de macroalgas marinas autóctonas destinadas al consumo humano" del Programa de I + D FEDER. (https://produccioncientifica.uca.es/proyectos/51922/detalle)

- UCA Project RNM1235: "Optimización de la recolección y el cultivo al aire libre de macroalgas destinadas a la industria alimentaria en esteros de la bahía de Cádiz. Potencial nutricional/gastronómico e implicaciones ambientales (EAlga)". (https://produccioncientifica.uca.es/proyectos/52951/detalle)
- MedArtSal video: New applications of macroalgae grown in salinas
- MedArtSal video: How to grow macroalgae in salt flats
- TV video (in Spanish): Algas comestibles de la Bahía de Cádiz

Factsheet 11: Cosmetic Product Development

Author(s): Souid Belaid[1], Khaled Athmouni[1], Wassef Mnajja[1] and Hanène Medini[2]
[1]SAIDA S.A. [2]Faculty of Pharmacy of Monastir

Model Component: Socio-economic
Strategy: Product diversification (goods)
Sustainability Components: Reaching innovation, supporting social equity, optimising sales strategies

Justification

Microalgae, particularly the red form of *Dunaliella salina*, found in saltworks, have antioxidant properties and can be used in skincare products.

Various business models are suggested for saltworks interested in the cosmetic industry, including developing products based on salt alone, utilising microalgae for in-situ beauty treatments or extracting vegetable oil from microalgae for formulating cosmetics.

These products can be sold through local shops, e-commerce platforms, or in combination with tourism packages. This fact sheet outlines the process of producing microalgae oil extracts and formulating cosmetic products for saltworks.

What can salinas do in cosmetics?

The scheme presents opportunities for a salina in the cosmetic industry. It suggests developing various products using salt and microalgae as key ingredients.

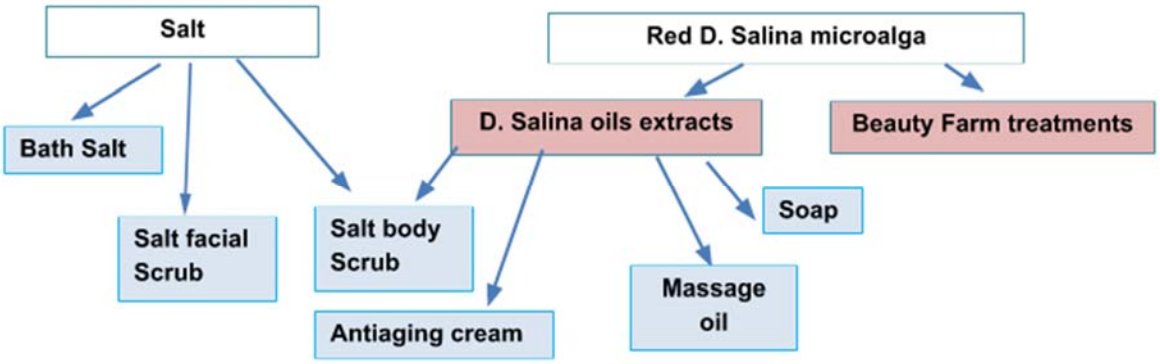


Figure 45. Overview of *Dunaliella salina* products developed at SAIDA's facilities in the framework of MedArtSal. Source: SAIDA S.A.

Carotenoid-enriched vegetable oils can be obtained by directly extracting wet *D. salina*. The extraction process is simple and requires basic tools like an air compressor, a glass bottle, and plastic pipes.

Figure 46. Device for *D. salina* carotenoids extraction by air bubbling at laboratory scale. ©SAIDA S.A.

A low-cost, larger scale device has been developed by the SAIDA scientific team. This device can process up to 3 kg of *D. salina* paste in under 2 hours, achieving an extraction yield of over 83%. It can produce up to 1.9 litres of oil with a carotenoids concentration exceeding 8%.

Figure 47. Pilot carotenoids extractor. ©SAIDA S.A.

During the MedArtSal project, fully formulated products were developed using carotenoids-enriched oils, including:

- ➔ Carotenoids enriched massage oil: Formulated with relaxing oils (sweet almond oil, jojoba oil, shea butter) and carotenoids-enriched sunflower oil, it promotes deep penetration into the skin and muscles, promoting relaxation and skin firmness.

- ➔ Carotenoids enriched salt scrub: With carefully selected salt granules and carotenoids-enriched sunflower oil, it gently exfoliates the skin, nourishes, and protects it against natural oxidants, leaving the skin regenerated, purified, hydrated, and smooth.
- ➔ Carotenoids enriched soap: Made through cold saponification of vegetable oils (coconut oil, sunflower oil, castor oil, and olive oil) with carotenoids-enriched oils from *D. salina* extraction, it has a natural red colour from beta carotene and performs comparably to gentle cleansing soaps in the market.
- ➔ Moisturising anti-aging cream: Formulated with carotenoids-enriched oils from *D. salina* extraction, fragrances, and emulsifying agents, it exhibits strong antioxidant power, reducing wrinkles, improving skin tone, and providing optimal hydration.

Key recommendations

The production of simple cosmetic products such as soap, scrubs, etc,. is easy and can be implemented with basic equipment.

- Select the appropriate crystal size (250-350 µm) for salt scrubs to achieve the desired exfoliating effect without skin irritation.
- Avoid overdosing the base in soap production to prevent the soap from being too aggressive. Slightly underdosing the base is recommended.
- Seek the support of specialised labs for more complex formulations, such as anti-aging creams.
- Develop attractive packaging and a communication strategy that highlights the unique characteristics of the artisanal salina producing or commercialising the product.
- Understand and comply with local regulatory requirements for production and commercialisation of cosmetics. Consult with specialists in the field if needed.

Examples

1. **Bath salt**: A simple product made by mixing salt with essential oils, colours, and flowers/herbs for a better bath experience.
2. **Body scrubs**: Salt-based scrubs for exfoliating and purifying the skin, using enriched oils from microalgae or sunflower oil.

Figure 48. Carotenoids enriched salt scrub prototype ©SAIDA S.A.

Salt-scrub formulation:

Ingredients	Weight (g)	Benefit
Salt (250 - 350 µm crystals' size)	50	Abrasive particles
Enriched sunflower oil*(≈5 % carotenoids)	50	Emollient and antioxidant
Grapefruit essential oil	1	Fragrance
Peach fragrance	1	Fragrance
Vit E	1	Preservative

*Can be replaced by cosmetic grade sunflow.
Source: Prepared by the authors.

3. **Massage oils**: Relaxation and skincare oils made with carotenoids-enriched oil and other beneficial ingredients.

Figure 49. Anti-ageing massage oil prototypes. ©SAIDA S.A.

Massage oil formulation:

Ingredients	Amount	Benefit
Shea butter	50 ml	Smoothing/lubricating/thickening
Sweet almond oil	25 ml	Emollient/softening
Jojoba oil	25 ml	Skin elasticity
Enriched sunflower oil (3% carotenoids)	20 ml	Antioxidant/anti ageing
Essential oils and fragrance	5 ml	Perfume and others (drainage, pain relief, anticellulite)
Vit E	200 µl	Preservative

Source: Prepared by the authors.

4. **Soaps**: Made from fatty acids and a strong base, including oil extracts from microalgae, with fragrance and colour options.

Figure 50. Carotenoids' enriched soap prototype. ©SAIDA S.A.

Formulation of prepared soap prototypes (g):

Ingredients (g)	Amount (g)
Enriched olive oil - 5.6% in carotenoids	40
Sunflower oil	20
Coconut oil	30
Castor oil	10
TOTAL AMOUNT OF OILS (g)	100
Total amount of Soda (NaOH)	14 *
Total amount of water	32
Essential oils mix**	2.15
α-tocopherol – Vitamin E-preservative	0.2
Total weight of formulation mix before reaction and drying	148.35

*Slightly underdosed vs. the calculated value of 14.87 g to avoid excess of soda.
**Composition:1/3 each of essential oils of rosewood, geranium and cloves.
Source: Prepared by the authors.

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- MedArtSal video: New applications of macroalgae grown in salinas
- MedArtSal video (French with English subtitles): SAIDA cosmetic workshop
- https://calc.mendrulandia.es/

Factsheet 12: Aquaculture in salinas: Extensive Production of Fish, Molluscs and Crustaceans

Author(s): Antonio Jesús Rivero Reyes[1]
[1]Aquaculture Consultant

Model Component: Socio-economic
Strategy: Product diversification (goods)
Sustainability Components: Reaching innovation, supporting social equity, optimising sales strategies

Justification

Unlike intensive aquaculture, where there is much more fish stocking in the ponds and supplementary feeding and sanitary treatments are given, in extensive aquaculture the fish that are reared are those that enter and feed naturally in the initial and deeper ponds of the salinas (those with salinity similar to that of seawater). Extensive aquaculture offers multiple benefits for improving the sustainability of the salina.

Firstly, it provides additional income sources, reducing reliance on salt production and increasing business resilience. From an environmental point of view, it helps to reduce waste by utilising by-products from salt production as nutrients and improves water quality through nutrient recycling. Moreover, it creates habitats for diverse aquatic organisms, promoting biodiversity and ecosystem services within the salina. Additionally, extensive aquaculture generates employment and income opportunities, supporting the livelihoods of local communities and contributing to social sustainability.

What is extensive aquaculture in salinas?

Extensive aquaculture in salt pans generates additional income by cultivating naturally entering fish, crustaceans and molluscs. In the Bay of Cádiz, fish and other species (usually juveniles) enter the salt ponds, with the inflow of seawater, during winter and spring, finding shelter and food in the salina for 7-8 months. Salt workers maintain water quality and prey availability to promote fish growth. Harvesting takes place, by hand, in September and October by draining the ponds and collecting fish using nets. The aim is to develop traditional aquaculture without introducing external fish fry or feeding, relying on the environment and proper water management in the salina.

Key recommendations

- Conduct a feasibility study to assess site suitability, market demand, and resource availability before implementing extensive aquaculture in a salt pan.

- Implement sustainable practices: minimise external inputs, recycle waste, and utilise renewable energy sources to reduce environmental impact.
- Avoid fishing fry and juveniles (return in case of capture) and do not introduce non-native species for breeding.
- Monitor water quality parameters (temperature, salinity, dissolved oxygen) for the health and growth of aquatic organisms and system success.
- Always comply with regulations and permits regarding water use, effluent discharge, and the selection of species allowed for exploitation, as well as quotas, if any, in the aquaculture system.

Examples

Aquaculture in the Bay of Cadiz (Spain) has become an important source of income for the region and has helped revitalise the local economy by providing employment and opportunities for local farmers and fishermen. In salt ponds it can be a complementary activity to salt production, with fish being reared in the deeper ponds (called *esteros*).

Figure 51. "Despesque" or "fishing out": is the process of removing fish from the pond. In the Bay of Cádiz it is done traditionally by hand. ©Salinas de Chiclana (left) and H.Clavero (right)

Traditional *estero* aquaculture in the Bay of Cádiz salinas primarily involves extensive farming of species such as sea bream (family Sparidae, e.g. *Sparus aurata*), sea bass (*Dicentrarchus labrax*), sole (*Solea* spp., e.g. *Solea senegalensis* and *Solea solea*), or European eel (*Anguilla anguilla;* although this species, once very abundant, is currently listed as Critically Endangered in the IUCN Red List of Threatened Species™ and its use in aquaculture is specifically regulated in the Andalusian region, with fishing being generally prohibited).

Different species of crustaceans or molluscs, such as shrimps, crabs or oysters, also enter and breed in the *esteros*, some of which can also be captured and used for food, increasing the diversification of resources provided by the salinas.

Figure 52. Most common fish species found in the salt flats of the Bay of Cádiz. Left to right: European seabass (*Dicentrarchus labrax*), Sea beam (*Sparus aurata*) and Sole *(Solea senegalensis).* ©Scandinavian Fishing Year Book (https://oceans-and-fisheries.ec.europa.eu/ocean/marine-biodiversity)

Figure 53. The estuary or estero is also used to breed other commercially valuable species such as crustaceans and molluscs. ©Estero Natural (top left), H.Clavero (top right) and Cristóbal Perdigones/Diario de Cádiz (below)

References and further information

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Factsheet 13: The Use of Mud for Cosmetic and Medical Purposes

Author(s): Yana Korneeva Abdulaeva[1]
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Model Component: Socio-economic
Strategy: Product diversification (goods)
Sustainability Components: Reaching innovation, supporting social equity, optimising sales strategies

Justification

Mud, with its rich composition of minerals, organic matter, amino acids, vitamins, and natural substances, has been used since ancient times for preventive healing and cosmetic purposes. It is an essential component of thalassotherapy, a therapy method using marine products for their therapeutic benefits. Additionally, mud has potential as a raw material for cosmetics and dermatological preparations. The growing interest in mud's benefits presents an opportunity for Salinas to diversify its products and support sustainable development in the natural and health markets.

What is mud used for?

Mud's components make it suitable for cosmetic and medical applications. It is used in bathing, topically, or as an ingredient in various cosmetic products such as soap, cleansers, scrubs, hair products, creams, and face masks.

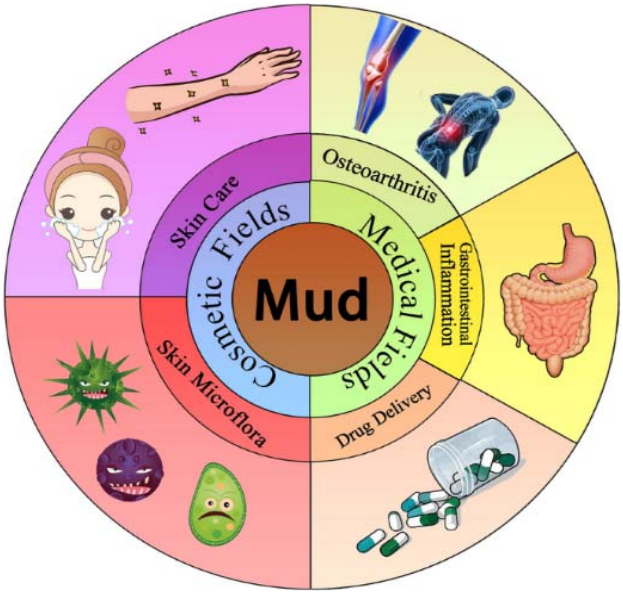

Figure 54. Different applications of mud in personal care. Source: Tian et al., (2022)

Mud has diverse properties and uses:

- It provides essential nutrients to the skin, improving elasticity and reducing wrinkles and pigmentation.
- It can be used as a form of massage and is commonly used in skincare products like creams, face masks, and mud baths.
- Mud is absorbent and effectively cleans oily or normal skin when added to soaps or cleansers.
- It moisturises and nourishes dry or cracked skin without leaving a greasy residue.
- Mud has antibacterial activity and can help strengthen the immune system, making it useful in treating inflammatory conditions and chronic skin disorders.

Key recommendations

- Check regulations about mud inspection for heavy metals and harmful bacteria.
- Investigate the different types of mud for a more suitable application depending on your purposes.
- Before commercialising, make sure you comply with current legislation on the manufacture and sale of natural cosmetics in your country.

Examples

1. Natural Spa: Mud baths have a long history and are popular worldwide. Tourists often indulge in smearing mud on their bodies, sourced from lakes, volcanic outcrops, and coastal clay deposits. Upscale resorts and spas offer mud baths as a premium service.

Salinas de Chiclana in Cádiz and Salinas del Alemán in Huelva are two examples of natural spas that provide mud baths. The clay-like mud used for skin treatment is completely natural, obtained by digging approximately 60 centimetres deep in the marsh. Visitors can relax near the estuary while enjoying another bath. Additionally, the mud is available for purchase at their shop.

Figure 55. Application of mud on the skin, Salinas de Chiclana (left) and mud bath, Salinas del Alemán (right) (Spain). ©lavozdelsur (left) and Salinas del Alemán (right)

Figure 56. Mud prepared for application (right) and installation in the salt spa of Salinas de Chiclana (right). ©lavozdelsur

2. Mud is versatile for **skin care products, such as soap**, which offers moisturising, exfoliating, and stimulating properties. By combining it with aromatic herbs or essential oils, its benefits can be further enhanced, making it an excellent choice for skin care.

Figure 57. Mud soap sold at Salinas del Alemán shop. ©Salinas del Alemán

References and further information

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- https://www.salinasdelaleman.es/servicios/
- https://salinasdechiclana.es/spa-salino-natural-chiclana/

Factsheet 14: Salicornia and Other Halophytic Plants as a Complementary Product in Salinas

Author(s): Susana Martínez Liébana[1] and Helena Clavero-Sousa[2]
[1]Productos la Salá [2]IUCN Centre for Mediterranean Cooperation

Model Component: Socio-economic
Strategy: Product diversification (goods)
Sustainability Components: Reaching innovation, supporting social equity

Justification
Commercialising edible halophytic (salt-tolerant) plants found in the salt pans, such as salicornia, means increasing the value of these products through its harvesting and sale. This activity holds significant natural, cultural, social, and economic importance, as it contributes to the diversification of activities in salt flats, improving their competitiveness and sustainability.

By creating a market for salicornia, the abandoned salt flats and the identity of the region are given value. This, in turn, leads to increased employment opportunities in the primary sector through plant harvesting and stimulates economic growth in the region.

Another plant that can be used for gastronomy and commercialised is rock samphire or sea fennel (*Crithmum maritimum*), also found in coastal areas of many Mediterranean countries (see Examples).

What is salicornia?
Salicornia (*Salicornia ramossisima*), also known as sea asparagus, is a halophyte plant that grows in salt marshes and areas with salty water. It has gained interest due to its health benefits and as a resilient crop for saline soil.

In countries like France, England, Spain, and Portugal, it is considered a gourmet product. It can be marketed and consumed both fresh and canned, and also in various preparations and forms, complementing other products. The plant's tips are used in salads, pickles, and as a seasoning vegetable.

As a halophyte that thrives in saline soil and seawater, it offers excellent health benefits. It is rich in proteins, antioxidants, fibre, minerals, vitamins A, D, E, K, and unsaturated fatty acids omega 3 and omega 6. Salicornia is also diuretic, depurative, and strengthens the immune system.

The plant has efficient salt-regulating mechanisms, retaining water while eliminating excess sodium chloride. Despite its adaptation to salty conditions, it is not excessively salty. Its tolerance to soil salinity makes it a sustainable food alternative that can withstand climate change and water shortages, relying on natural tides for seawater supply.

Figure 58. Salicornia in the Esperanza salt pan (Cádiz, Spain) flooded by seawater (left) and during maturation period (right). ©Susana Martínez Liébana

Key recommendations

- Harvesting of any plant, if in the wild, should always be done in a responsible, environmentally friendly and sustainable manner, without overexploiting or depleting wild populations. The existing legislation in each country on the protection of flora shall be respected, avoiding any collection if it is a protected species, as well as any other applicable legislation, such as health legislation on foodstuffs.
- If possible, sustainable cultivation of these plants is desirable, always of local native varieties, to avoid problems of overexploitation.

In the specific case of salicornia:

- Plants should be harvested multiple times a year, focusing on collecting the succulent green tips without damaging the stem or skeleton of the plant.
- The plant follows an annual cycle, with growth from May to October and matures into a reddish colour before scattering seeds for the next year. It is important to respect the plant's fast primary growth and preserve its annual cycle without causing harm.
- Salicornia will thrive in low salinity environments, showing better growth in marshes or estuaries as compared to areas with higher salinity, for example, near saltworks crystallisers.

Figure 59. Harvesting sea fennel in Lebanon (left) and salicornia in Spain (right). It is important to harvest wild plants responsibly and sustainably, without over-exploiting the populations. ©H.Clavero (left) and Productos La Salá (right)

Examples

1. **Productos La Salá** (www.productoslasala.com/) located in Puerto Real, Cádiz (Spain), is a company affiliated with the University of Cádiz. Their goal is to provide fresh and sustainable Salicornia, along with unique high-quality products like yoghurt, green salt, cheese, bread, and more. They cater to health-conscious consumers seeking to incorporate Salicornia into their diet.

2. **Salina La Esperanza**, spanning 39 hectares, is where wild Salicornia grows. The company has obtained permits from the Central Services of Research in Salinas (SC-ISE; which belong to the University of Cádiz, UCA) and the Cádiz Bay Natural Park to harvest, package, and market Salicornia. They combine traditional knowledge with scientific innovation, utilising laboratories, the internet, and social media, with support from the technical team of the Central Services of Research in Salinas. This team, led by Alejandro Pérez Hurtado and seasoned salt farmer Demetrio Berenguer, plays a crucial role in the success of Productos La Salá.

Figure 60. Harvesting (left) and presentation (right) of Salicornia in the Esperanza salt pan (Cádiz, Spain). ©Susana Martínez Liébana

Other examples of salicornia commercialisation can be found in other countries like France, for example, https://www.algues.fr/fr/algae-gastronomie.

Figure 61. Different salicornia products (from top to bottom, from left to right): canned, salt with salicornia, one of the possibilities in recipes and yoghurt with salicornia. ©Finistérienne GlobeXplore/Algaé (top left) and Productos La Salá

3. **Malek and Kamel Anjou Salina** (Salacia), Anfeh, Lebanon, are already commercialising the sea fennel, which can be found on these coasts.

Figure 62. Samples of samphire or sea fennel (*Crithmum maritimum*) in the MedArtSal Fair in Lebanon, 2023. ©H.Clavero

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2B: The Diversification of Services in Artisanal Salinas

The diversification of services in Mediterranean artisanal salinas presents an exciting opportunity to expand the economic potential of these unique ecosystems, connecting it to the growing sector of the visitor economy. The improvement and expansion of services offered by artisanal salinas in the Mediterranean region can contribute to their sustainability and viability (as evidenced by the MedArtSal Sustainable Management Model for Artisanal Salinas[2]) and enable surrounding communities to benefit from these local resources. Beyond this, offering guided or educational services, such as ecotourism-type services, in artisanal salinas, has the potential to raise awareness of the environmental and socio-economic value of preserving these ecosystems.

This section explores a range of activities and associated tools, and resources that can be used to diversify the services offered in salt flats. From ecotourism to gastronomy, wellness to cultural heritage events and accommodation, this section delves into the various possibilities for diversification of services in salinas.

The section on Diversification of Services covers the following themes:

15. Ecotourism Itineraries
16. Cultural and natural heritage
17. Gastronomy
18. Spa and wellness
19. Birdwatching
20. Environmental education services
21. Events and celebrations
22. Accommodation

[2]UCA (2021). *MedArtSal Sustainable Management Model for Mediterranean Artisanal Salinas.* MedArtSal project deliverables A.3.3.1., A.3.3.2 and A.3.3.3. Final report. (Available at: https://medartsal.com/download/management-model/)

Factsheet 15: Ecotourism

Author(s): Lucía Prieto Fustes[1] and Arnau Teixidor[1]
[1]IUCN Centre for Mediterranean Cooperation

Model Component: Socio-economic / Governance
Strategy: Product diversification (services) / Adequate governance framework
Sustainability Components: Optimising sales strategies, supporting social equity / Identify best practices in governance, cultural aspects

Justification

Tourism represents an important source of revenues and employment in the Mediterranean area. Sustainable tourism development in artisanal salinas can generate new sources of income and broadens the consumer base for other products.

At the same time, it very often leads to significant negative impacts on nature and society. However, demand is growing for tourism experiences that provide positive impacts to destinations and their communities, as more tourists seek to experience nature and local culture in a responsible way. A sustainable model for tourism in salt flats should ensure that tourism's impact on nature can be well managed, local cultures are respected and economic benefits are distributed among local communities, while ensuring a quality experience for visitors. Thus, the development of responsible ecotourism activities and products in artisanal salt pans is proving to be one of the activities with the greatest potential for diversification.

Figure 63. From left to right, top to bottom: Guided tours and visits in Sleiman Salinas (Lebanon), Salinas Grupo Belén-Estero Natural, Salinas de Chiclana and Salina Preciosa y Roqueta-Marambay (Spain). ©MedArtSal project (top left) and H.Clavero

What is an ecotourism product?

A tourism product is composed of both tangible (e.g., food) and intangible components (e.g., a guided walk). Ecotourism is the "environmentally responsible visiting of relatively unspoilt natural areas, in order to enjoy and appreciate nature (and any accompanying cultural features - both past and present), that promotes conservation, has low negative visitor impact, and provides for beneficially active socio-economic involvement of local populations[3]". In the context of artisanal salinas, often in fragile coastal ecosystems, ecotourism principles should guide tourism development. These activities can include gastronomic experiences, nature-based experiences (such as guided walks or wildlife watching), soft adventure, educational visits or workshops, wellness activities or cultural and historical heritage visits (all of which are presented in the following factsheets in this section).

[3] Ceballos-Lascurain, H. (1996). *Tourism, ecotourism, and protected areas: The state of nature-based tourism around the world and guidelines for its development*. Gland, Switzerland and Cambridge, UK: IUCN. https://doi.org/10.2305/IUCN.CH.1996.7.en

When designing ecotourism products, the impact on nature and local communities should be robustly measured and managed, following international best practices. Different ecotourism activities and services (visits, gastronomy, accommodation, transport, etc.) can be bundled together in single or multi-day packages, which can mobilise the whole tourism value chain in the destination, expanding its benefits, and should be implemented with careful itinerary design.

Key recommendations for developing an ecotourism product or package

- Conduct a comprehensive assessment of the destination, including the surrounding communities, to understand its unique natural, cultural, historical and culinary strengths.
- Highlight, promote and preserve these features to differentiate your product from others in the region. Ensure that the product provides a meaningful interpretation of the natural and cultural values of the area.
- Understand your target market segments and their travel preferences. Decide if you are targeting domestic or international visitors.
- Provide high-quality, immersive activities that actively engage tourists and educate them about conservation and the importance of natural areas.
- When bundling different products in one package, be selective in choosing the elements of the itinerary that best suit market and traveller demands.
- Ensure sustainability throughout the entire value chain, including accommodations, restaurants, and transportation.
- Determine a competitive price for your product by surveying or benchmarking similar offerings in the market, while considering the perception it creates.
- Invest in high-quality visuals and compelling marketing materials to effectively describe and market your product.
- Manage clients' expectations by delivering what you promise, and aim to exceed their expectations when possible.

Examples

Ecotourism Activities in Salt Pans

The following examples demonstrate different types of activities in salt pans and surrounding areas that could be developed into an ecotourism product. When packaging different products, also consider how to include low-impact transport options (to, from and within the destination), responsible accommodation services (see Factsheet 22) and linkages with other services such as Education (see Factsheet 20) and Events and celebrations (see Factsheet 21). Note that all these activities should offer meaningful interpretation of the natural and cultural values of the area, while establishing respectful interactions with local people and communities.

- **Soft adventure:** A popular set of activities that involves low-risk physical activities suitable for individuals with little or no prior experience. The focus is on comfort and convenience rather than the difficulty of the activity. Examples include walking, cycling, hiking, and still-water kayaking, which should be accompanied by local guides.

Figure 64. Soft adventure activities in the salt flats of Cadiz (Spain; left and middle) and Kerkennah (Tunisia; right).©Lucía Prieto Fustes (left), rutasyfotos.com (middle) and MedArtSal project (right)

- **Gastronomy and culinary activities:** Immersing oneself in the *cuisine* of salinas products, from fish to salicornia (see Factsheet 17 for more details on Gastronomy, and Factsheets 12 and 14). Always think about immersing the visitor in the process, through fishing, a cooking workshop or salt tasting experiences.

Figure 65. Exhibition of fishing with traditional methods in the ponds of the salinas (above), fish being cooked using traditional methods as well (bottom left), and culinary workshop (bottom right) (Cádiz salinas, Spain). © H.Clavero and Françoise Thurel (top right)

- **Nature and Bird watching:** The observation of local flora and fauna, particularly birds (see Factsheet 19 for more details on Birdwatching), is a popular niche within nature-based tourism, with increasing popularity. Salinas often provide a unique environment for the observation of waders and other aquatic species. Make sure that this activity is led by professional guides and does not disturb habitats or species.

Figure 66. Ornithological visit (left) and kentish plover (*Charadrius alexandrinus*) observed (middle), at Salina La Esperanza; *salado* (*Limoniastrum monopetalum*) in flower (Cádiz, Spain). © Silvana Pol (left), SC-ISE UCA (middle) and H.Clavero (right)

- **Cultural heritage:** Salinas often have an important built heritage, such as archaeological remains and historical monuments, which provide rich resources on the history of the place or the evolution of cultural practices used in and around the salt flats (see Factsheet 19).

Figure 67. Two examples of old tide mills in Cádiz: “Zaporito”, in San Fernando (top left) and "El Caño", in El Puerto de Santa María (top right); visit to the archaeological ruins at the Preciosa and Roqueta saltworks (below), Spain. ©Lucía Prieto Fustes (top left), Jardelasierra/Wikiloc (top right) and H.Clavero (below)

- **Wellness activities:** Wellness-related experiences in salt pans and the use of cosmetics produced in salinas have a substantial market in the Mediterranean region, and connect with the growing role of natural areas as providers of health benefits to their visitors (see Factsheets 11, 13 and 18 for more details).

Figure 68. Visit and bath in the salt spa of Salinas de Chiclana (Spain). ©Françoise Thurel (left) and Salinas de Chiclana (right)

- **Citizen science and conservation activities:** Ecotourism products at salinas can incorporate practical and non-invasive conservation activities for visitors, immersing them in the efforts made at these sites to preserve their natural resources, ensuring that they provide a benefit (economic or otherwise) to conservation activities.

Figure 69. Educational activity on birds and ringing (Salina La Esperanza, Spain). ©Françoise Thurel (left) and H.Clavero (right)

Designing an ecotourism itinerary in the Bahía de Cádiz Natural Park

The Mediterranean Experience of EcoTourism (MEET Network) is a network of Mediterranean protected areas engaged in developing and commercialising low-impact, high-quality ecotourism experiences. The association has developed a standard that guides product development and ensures that the result delivers a satisfactory level of quality and sustainability that matches traveller's expectations. This methodology[1] can be applied to develop an ecotourism package in a natural area.

Figure 70. The MEET Ecotourism Development Model. ©MEET Network

In this context, the experience in the Spanish salinas of the Bahía de Cádiz Natural Park (in the province of Cádiz) illustrates this approach. There, thanks to the contribution of the MedArtSal partners IUCN and UCA in partnership with the MEET Network, an ecotourism package has been designed that promotes the unique landscape of these salt pans. This has been possible thanks to the collaboration established (applying the MEET methodology and materialised in a local cluster) between local stakeholders, such as the managers of the natural park, the salt pans themselves and local businesses.

The ecotourism package is designed in an itinerary that takes the visitor to a wide range of experiential activities developed in and around salinas, ensuring the visitor's immersion in the Bahía de Cádiz Natural Park and in the different natural and cultural values of the area. This package can be commercialised by local operators in different formats depending on the target market. In this package, visitors can participate, among others, in:

- **Wildlife watching:** birdwatching in the Laguna Dulce and Salina La Esperanza, and enjoying boat trips to the marshes to discover the diversity of animal and plant species, with a special emphasis on birds.
- **Cultural heritage:** exploring the old tide mills that still exist, some of which are restored and open to visitors (unfortunately others are in a state of neglect and ruins and cannot be visited), such as the Zaporito Tide Mill; other types of mills such as the one restored in the Salina San Vicente; learning about the rich history of the area and its traditional activities; or visiting the Saltworks Museum in Salinas de Chiclana.
- **Wellness:** discovering the saltwater pool of Salinas de Chiclana, and enjoy wellness treatments using natural ingredients and products sourced from the salina.

- **Traditional practices and culinary activities:** workshops on how a salina works and how salt is harvested, on traditional aquaculture, tastings of fish and seafood from the salt pans, and workshops on algae cosmetics, highlighting the cultural and culinary uniqueness of the area, as in Salina San Vicente, Marambay or Estero Natural.
- **Conservation activity:** learning about conservation efforts in the protected area and actively participating in bird ringing and release activities, contributing to scientific research.

References and further information

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- https://www.meetnetwork.org/
- MEET/MedArtSal video: Ecotourism in the salinas of the Bay of Cadiz Natural Park
- MedArtSal article: Discovering the new ecotourism itinerary of MedArtSal in the artisanal salinas of the Bahía de Cádiz Natural Park (Spain)

Factsheet 16: Cultural and Natural Heritage

Author(s): Tiziana Campisi[1], Valentina Oliviero[1] and Helena Clavero-Sousa[2]
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Model Component: Socio-economic / Governance
Strategy: Product diversification (services) / Adequate governance framework
Sustainability Components: Optimising sales strategies, supporting social equity / Identify best practices in governance, cultural aspects

Justification

The natural and cultural heritage of the Mediterranean region, including salt pans, has gained recognition for its value in building a sustainable and greener economy. Salt pans offer a unique cultural and natural landscape, attracting visitors who contribute to the maintenance of artisanal salt production. While cultural heritage has been studied from a tourist perspective, little research has focused on natural elements as cultural heritage. Salt pans represent both a remarkable natural and cultural heritage, providing a habitat for rare species and reflecting centuries of life and work on Mediterranean coasts.

Figure 71. Flamingos at Parco della Salina di Cervia (Ravenna, Italy; left). Anfeh Salinas (Lebanon; right). Since the earliest Phoenician records, salt ponds have existed on the rocky shores of Anfeh. (MedArtSal pilot actions). ©Parco della Salina di Cervia (left) and Rabih Zihri (Facebook source; right)

Encouraging cooperation between salt pan managers, heritage conservationists, and policymakers can address common challenges and strengthen the protection and management of these sites. The cultural and natural heritage of Mediterranean salinas encompasses eco-museums, birdwatching, historical routes, eco-tourism, landscapes, traditional salt harvesting, cuisine, and the preservation of history, techniques and traditions, old buildings, objects and language associated with salt pans.

How can salinas capitalise on their cultural and natural heritage?

Salt pan managers can maximise the potential of their sites by considering key aspects such as the area and origin of the saltworks, exploring tourism opportunities, and effectively managing cultural and natural heritage. Coastal salt pans in the Mediterranean encompass built, natural, and living cultural heritage, offering a unique tourism experience. Sustainable utilisation of natural resources and community involvement are crucial for preserving these sites when they are exploited for tourism.

Figure 72. Five aspects for the valorisation of salt and salinas as heritage. ©T.Campisi

The attractiveness of natural heritage lies in factors such as product quality, visitor awareness, service views, sustainability, uniqueness, accessibility, community involvement, and effective management. The relationship between tourism and cultural heritage management is best viewed as a continuum rather than a conflict, with different levels of maturity in destination management. Ecologically sustainable tourism practices and initiatives should be implemented to address management challenges (see previous Factsheet on Ecotourism).

Cultural and natural heritage in salinas should not solely rely on tourism but also be celebrated and promoted through dedicated actions. Museums, exhibitions, fairs, and experiential activities can showcase the culture, traditions, and storytelling associated with salt production. Local collaboration among diverse stakeholders is essential for protecting and promoting the unique nature of salt production and preserving traditions.

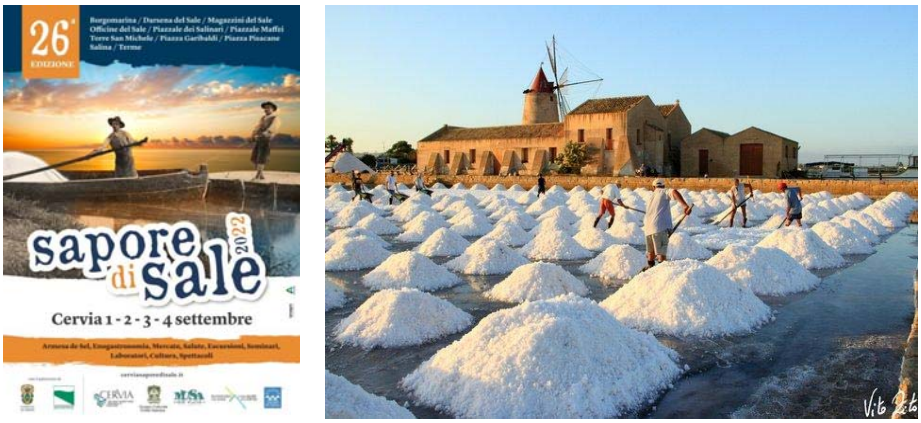

Figure 73. (Left) "*Sapore di Sale"* (Taste of salt) event poster (Cervia, Ravenna, Italy). (Right) "*Salinari per un giorno*" (Salt workers for a day) experience at Saline Ettore e Infersa (Marsala, Trapani, Italy) – MedArtSal pilot action. ©Sapore di sale (left) and Saline Ettore e Infersa (right)

Key recommendations for implementing cultural and natural heritage aspects in salinas

1. Foster dialogue, stakeholder involvement, and awareness-raising through coordination with local authorities, partnerships with educational institutions and schools, and collaboration with environmental and cultural associations.
2. Develop integrated management plans for large, complex, or protected sites, outlining objectives and measures for heritage protection, maintenance, restoration, and promotion.
3. Integrate natural and cultural heritage features into business plans to leverage their value and appeal, always being well informed beforehand about the protection figures of the existing elements in the salina (both natural and cultural) and the possible applicable legislation, before carrying out any action.
4. Explore opportunities for resource combination and enhancement, addressing the chronic lack of human and financial resources for studying, planning, implementing actions, and capitalising on heritage values.
5. Share experiences among salt pan managers to learn from each other's practices and challenges.
6. Utilise local culture and history to enhance the attractiveness of salt pans, highlighting their unique origin story.
7. Establish alliances with cultural associations to create cultural routes, ecomuseums, and collect relevant information for preservation and presentation.

Examples

1. **Recovery of old mills in salinas**

In Salina San Vicente (Spain), the MedArtSal grant has helped to rebuild the **old salt mill** to preserve the cultural heritage of the salt pan and to transform it into a new space for the sale of salt products and for the enjoyment of the public (see Factsheet 30A). Traditionally, the mill was used to grind coarse salt and, being situated on the canal bank, boats could load the ground salt directly for transport out of the saltworks. The mill used to grind with the movement of grinding stones, driven by a fuel engine.

These practices and the mill were abandoned, until it was rebuilt with new wood, maintaining its original position and morphology. Nowadays, salt is also milled at San Vicente, but with stainless steel machines and electric motors, in the shed, as the salt is shipped by road and not by boat (the canals are no longer navigable).

Figure 74. Archive image of the old salt mill in use (left); current state of the mill after reconstruction in Salina San Vicente (Spain - MedArtSal pilot action). ©San Vicente (left), H.Clavero (middle) and V.Oliviero and E.Ulazzi (right)

Traditional old mills are quite widespread constructions in Mediterranean salt pans, and although in most cases their initial function has been lost and they are in a state of abandonment, they are still outstanding elements of cultural and architectural heritage whose rehabilitation, maintenance and use as a tourist resource (see Factsheet 15) should be promoted. They can be of various types, depending on the energy that makes them work or their function. Among the functions are the aforementioned grinding of salt or in some cases they were also used to grind cereal from nearby fields. They could also be driven by animals, by the action of the tides (in this case on the coasts influenced by the Atlantic Ocean, with strong tides), or by the wind, using wind power, for example, to move the water towards the interior of the salt pan.

The MedArtSal project has also supported the repair of **traditional windmills on the coast of Anfeh (Lebanon)**, as in the case of the Georges Salinas.

Figure 75. Windmill in Georges Salinas, whose function was to bring water from the sea into the ponds (Lebanon; left). Landscape in Salina Ettore e Infersa (Italy; middle) with a salt windmill. Abandoned tide mill in the Bahía de Cádiz Natural Park (Spain). ©H.Clavero (left and right) and T.Campisi (middle)

2. **The Eco-museum of salt and the sea in the Salina of Cervia (Italy)** aims to protect and showcase the unique natural and cultural heritage of the area. It serves as a bridge between the past and the future, involving the community and offering opportunities for locals and tourists.

Figure 76. The Salt Eco-museum -MUSA- building, in an old archive image (left), and salt worker harvesting with traditional tools (right) (Parco della Salina of Cervia, Italy) – MedArtSal pilot action. ©Parco della Salina of Cervia

3. **The Maison du Sel eco-museum in the salina of Hafez Dib Jreij (Lebanon)** focuses on sustainable development and revitalising the salt pans' productivity and tourism value. It serves as a tourist attraction, promoting alliances with environmental, cultural, educational, tourism, and commercial associations.

Figure 77. *Maison du Sel*, the Eco-museum in Anfeh (Lebanon; above) and some of the information material displayed (below) – MedArtSal pilot action. ©MedArtSal project (above) and V.Oliviero (below)

References and further information

- MedArtSal project deliverable A.3.1.1. *State of the Art*. (Available at: https://medartsal.com/download/state-of-the-art/)
- MedArtSal Factsheets "Salinas restoration and management" and "Salt diversification (types and forms of salt products)"
- https://medartsal.com/salinas/
- For inspiration: https://ecomuseocervia.it/en/ecomuseum/what-is-an-ecomuseum.html https://www.turismo.comunecervia.it/it/scopri-il-territorio/arte-e-cultura/musei-gallerie/musa-museo-del-sale
- Video (in Italian): Progetto "MedArtSal", la presentazione dei risultati finali - YouTube

Factsheet 17: Gastronomy: Salt and other Salt pan Food Products

Author(s): Tiziana Campisi[1] and Valentina Oliviero[1]
[1]CUEIM, University Consortium for Industrial and Managerial Economics

Model Component: Socio-economic
Strategy: Product diversification (services)
Sustainability Components: Optimising sales strategies, supporting social equity

Justification
Salt serves multiple roles in the food we consume, extending beyond its familiar use as a preservative and seasoning.

- Food Preservative: Salt draws moisture out of food, inhibiting the growth of spoilage-causing microbes. It has been used for centuries to preserve meat and other foods.
- Texture Enhancer: Salt influences the texture of various foods. It affects yeast fermentation and gluten formation in bread, gelatinization of proteins in cheese and processed meats, and adds a crunchy texture when used as a garnish.
- Flavour Enhancer: Salt intensifies sweetness, counters bitterness, and enhances overall flavour. It helps release aromatic molecules in food, making it more flavourful.
- Nutrient Source: Sodium, a key component of salt, is essential for muscle function, nerve impulses, and maintaining mineral-water balance. Iodine is often added to table salt to prevent thyroid disorders.
- Binder: Salt aids in the formation of protein gels, making it useful as a binding agent in processed meats.
- Colour Enhancer: Salt promotes and maintains vibrant colours in processed meats and enhances caramelization in bread crusts.

Figure 78. Fish dish prepared with salt to enhance the food properties "Mattonella di puro Sale Dolce di Cervia" - Parco della Salina di Cervia (Ravenna, Italy) - MedArtSal pilot action. ©Parco della Salina di Cervia

The diverse uses of salt offer opportunities for creativity in developing and promoting salt-based products by salinas. This includes aromatic salts, salt-cooked dishes, and utilising local ingredients like herbs, spices, plants, and macroalgae, to be mixed with salt (see Factsheets 8 or 14). Showcasing the versatility of salt can increase the value of salinas and bring socio-economic benefits to communities. It also has implications for the local and export markets in the culinary sector.

As highlighted in Section 2A, salt pans also offer a wide variety of other gastronomic products, the sustainable exploitation of which can be an additional or main source of income in addition to salt exploitation. Among these products are the various species of fish and crustaceans, as well as molluscs that are raised in the salt ponds, algae (both macroalgae and microalgae) and halophyte plants for human consumption. All of these are products of high nutritional value and of great added value if they can be offered for sale or included in the menus of the salt ponds or local restaurants.

Can salt and other salina products be considered a friend of gastronomy?

Promoting the diverse uses of locally harvested salt and salina products, such as fish, herbs, and macroalgae, can drive awareness and increase the availability of these products in local shops and restaurants which in turn, enhances the socio-economic benefits of the salina as well as, creating new business opportunities. The possibilities in terms of products offered by the salt pans are diverse and varied, and their sustainable exploitation can feed and enhance the local gastronomic offer.

More and more chefs and restaurants are incorporating the specific products of the salt marshes and estuaries in their recipes, as a distinctive and in many cases gourmet product with high added value. In some cases, it is the salinas themselves that open restaurants or catering establishments on their own premises.

Figure 79. Restaurant Mamma Caura at Saline Ettore e Infersa (Trapani, Italy; MedArtSal pilot action; left). Show-cooking in Salina San Vicente (right). ©Saline Ettore e Infersa (left) and H.Clavero (right)

Key recommendations for creating gastronomic products in salinas

1. Select the new product and develop a business plan.

2. Assess the feasibility of algal cultures in the ecosystem and ensure sufficient volume and quality for trade or restaurant use.
3. Determine the market potential for processed salt, such as locally appreciated aromatic salts.
4. Verify the compliance of harvested products with country-specific regulations on food processing.
5. Establish collaborations with strategic partners like chefs, restaurants, and local shops for effective promotion.
6. Decide on the implementation approach for new gastronomic products, considering your own resources or collaboration with experts.
7. Determine the desired level of innovation, such as using natural-growing seasonal plants or cultivation in open areas or pilot plants.
8. Identify necessary facilities and equipment, including nets, greenhouses, laboratories, kitchen equipment, or dedicated restaurant spaces.
9. Define the company structure for the new products, considering integration within an existing company, creating a new company, or involving associated partners

Examples:

1. **Sustainable cultivation of microalgae and seafood in Preciosa and Roqueta Salina restaurant (Spanish MedArtSal pilot action):** The Marambay restaurant utilises salina products such as fish, macroalgae, and newly cultivated microalgae (*Spirulina* spp.) to prepare its dishes. The MedArtSal grant has supported the installation of this new microalgae cultivation plant, thus enabling the exploitation of a new product that can be used in food, cosmetics, and health sectors. The raceway machine for microalgae cultivation is already operational, undergoing optimisation for the cultivation of different species. This new resource is also an additional attraction to visit in the salina. The restaurant is testing new dishes incorporating microalgae, with collaboration from the local university (University of Cadiz). Gastronomic and experimental activities, including green algae (*Ulva* spp.) cultivation and harvesting are being implemented.

Figures 80. A tank used for the microalgae cultivation, shrimp harvesting and a typical dish prepared with microalgae at Marambay restaurant (Preciosa y Roqueta Salina, Cadiz, Spain) – MedArtSal pilot action. ©MedArtSal project (left) and Marambay restaurant

2. **Aromatic salts in Salina of Cervia (Italy, MedArtSal pilot action):** Salina di Cervia has produced a range of aromatic salts by combining the quality of Cervia's sweet salt with the fragrant herbs grown in the salt pans. Five aromatic salts were created for use in the kitchen. As part of the MedArtSal project, Salina di Cervia developed a sixth aromatic salt called "smoked salt with local beech tree flavours". Testing of the new smoking salt was carried out in collaboration with the Gastronomy School of Cervia. A batch of smoked salt was prepared for market testing through workshops and provided to seven restaurants. The Acervum restaurant, owned by the salina, tested the salt on various dishes and monitored customer satisfaction.

Figure 81. Aromatic salts (Parco della Salina di Cervia, Ravenna, Italy – MedArtSal pilot action). ©T.Campisi (left) and Parco della Salina di Cervia (right)

References and further information

- UCA (2021). *State of the Art.* MedArtSal project deliverable A.3.1.2. Final report. (Available at: https://medartsal.com/download/state-of-the-art/)
- MedArtSal Internal report: Activity A.4.1.1. (unpublished). *New application of macroalgae cultivated in Salinas*. Available on request.

- https://medartsal.com/salinas/
- For inspiration: https://www.marambay.com/
  https://salinasdechiclana.es/restaurante/
  https://www.salinadicervia.it/prodotti/sali-aromatici
  https://www.locandacervum.it/
  https://www.facebook.com/Salaciabeachresort/
- MedArtSal video: Cooking with Salinas Resources

Factsheet 18: Spa and Wellness

Author(s): Tiziana Campisi[1] and Valentina Oliviero[1]
[1]CUEIM, University Consortium for Industrial and Managerial Economics

Model Component: Socio-economic
Strategy: Product diversification (services)
Sustainability Components: Optimising sales strategies, supporting social equity

Justification

Salt, brine and mud from salt pans are utilised in spas and wellness for their cosmetic and healing properties.

The historical practice of using salt and mud from salt pans for treating muscle pain and skin ailments dates back to ancient Roman times. SPAs (*Salus/Sanum/Salutem per aquam* -Health through Waters-*;* according to some of the theories about the etymology of this word) in Imperial Rome were renowned for their use of thermal waters and mud for hygiene, healing, and well-being, as well as being social spaces. Salt pan locations near spas, such as Cervia and Margherita di Savoia in Italy and Camargue in France, offer Thalassotherapy treatments using local salt, known for its anti-inflammatory properties.

Collaboration with local spa facilities or partnerships with cosmetic companies can provide additional income for salt producers and raise awareness about the value of salt. An excellent example of this is the Dead Sea, which is recognized globally for its mud and spa products. Mediterranean salt pans have the potential to achieve similar recognition by utilising their rich resources for cosmetics, skin diseases, anti-cellulite treatments, and more.

Salt rooms, or salt caves, have gained popularity in recent years as a treatment option. These rooms mimic natural salt caves found in countries like Germany, Austria, Poland, and Slovakia, where they are recognised as licensed medical therapies. Salt rooms provide a highly saline environment for prolonged periods, offering numerous health benefits for the respiratory system, skin, and mental well-being. In areas without natural salt caves, artificial salt rooms are created in spas or beauty centres.

Other options, developed for example in recent times in the south of the Iberian Peninsula, are open-air salt spas, with some of the ponds in the salt pans themselves converted into ultra-saline pools. In addition, salt, mud, brine or other saltpan products such as microalgae and macroalgae offer potential uses for the development of various cosmetic products, which can be developed and/or marketed by the salina itself (see Factsheets 9, 10, 11, 13 and 30D). As a complementary service, increasing the benefits for clients and the salt flats, massages can be offered, even with salt or mud.

Figure 82. Salina muds at Terme di Cervia in the 1950s (Ravenna, Italy; left). Users in hypersaline baths (Salinas do Grelha, Portugal; right). ©MUSA Comune di Cervia and Duarte Drago/www.publico.pt (right)

While studies on halotherapy (or salt therapy) are often limited in size, proponents highlight its benefits for respiratory conditions like asthma, chronic bronchitis, allergies, and various skin conditions such as psoriasis and acne.

Figure 83. Three aspects of the Salt SPA & Wellness. ©T.Campisi - MedArtSal project

The use of salt and salina products for beauty and health. Own business or collaborative approach?
Opening new markets for salt-based and mud-based beauty and healthcare products can benefit medium-sized enterprises. Collaboration with local spas and wellness centres is valuable for smaller enterprises to introduce wellness product lines. The presence of wellness establishments near salt pans attracts customers and fosters collaboration. Salina facilities can also establish salt rooms or open-air salt spas for halotherapy, using specific salts and other salina products, which offer various health benefits.

Figure 84. Salt Room, Castello di Sale, Italy (top left). Prototypes of cosmetic products with microalgae (SAIDA S.A., Tunisia – MedArtSal case study; top right). Cosmetic products such as soaps, and magnesium oil or shampoo, by Biomaris-Salinas del Alemán (bottom left). Natural salt spa user (Salinas del Alemán, Spain; bottom right). ©Castello Di Sale (top left), SAIDA S.A. (top right), H.Clavero (bottom left) and Salinas del Alemán (bottom right)

Key recommendations

- Select and plan new products with a business strategy.
- Collaborate with existing spa centres for partnerships, studying which products from the salt pan might be of interest to them.
- Carry out a study of the potential users (market and demand study), adapting the services to them, in the case of considering opening facilities such as a salt room, spa or salt bath in the salina. Determine target market and regulations for cosmetic production and sales.
- Develop a beauty routine using salina products, emphasising salt properties and salina identity.
- Design logos and labels for beauty products, such as "Coccole di Sale" or SAIDA.
- Decide on sales channels for new beauty products, such as in-house services.

Examples:

1. Salacia Beach and Salinas, in Kamel Anjoul Salinas (Lebanon), **combine salt production rehabilitation with saltwater therapy**. The salinas owner educates visitors about the salt

production process through a tourist banner. This collaboration integrates beach, sun, food, and salt businesses, working with nearby salinas. The salt pan offers spa facilities with saltwater pools surrounded by the sea and other salinas.

Figure 85. Salt water pools (Anfeh, Lebanon) – MedArtSal pilot action. ©MedArtSal project

2. In Italy, the partnership between Terme of Cervia and Salina di Cervia involves the **use of salts and muds for therapy and treatment**. The mud, known as *liman*, is sourced from the nearby Roman-era salina and is comparable in composition and effectiveness to that of the Dead Sea. Terme di Cervia offers personalised wellness programs and attracts over 30,000 visitors annually by utilising this mud for treatments. Salina di Cervia also produces a range of skin and beauty products called "Pinch of salt" (*Coccole di sale*), including soaps, shampoo, and scrubs.

Figure 86. Liman mud and products (Parco della Salina di Cervia - Ravenna, Italy) – MedArtSal pilot action. ©Terme di Cervia

Also in the south of Spain, and in Portugal, there are several salinas that offer hypersaline and mud baths among the services of their facilities as well as cosmetic and health products (see Examples in Factsheet 13 and 30D).

3. SAIDA S.A. from Tunisia conducted a case study for the MedArtSal project, focusing on cultivating the **microalgae *Dunaliella salina* for cosmetic applications**. The study resulted in the development of 5 cosmetic prototypes, such as creams, massage oils, salt scrubs, soaps, and carotenoid-enriched oils. These prototypes were showcased at the MedArtSal Fairs and attracted

interest from cosmetic companies and salinas. SAIDA is now exploring the commercial needs of potential customers for *Dunaliella salina* and its extracts.

Figure 87. Presentation of cosmetic product prototypes at the MedArtSal Fair in Tunisia by SAIDA S.A. ©MedArtSal project

References and further information

- For inspiration: https://www.terme.org/en/cervia-and-saltpans/
  https://www.facebook.com/Salaciabeachresort
  https://salinasdechiclana.es/spa-salino-natural-chiclana/
  https://www.salinasdelaleman.es/servicios/
- "Terme di Cervia" videos: https://www.youtube.com/watch?v=frH4bg2QqSg
  Terme di Cervia 2016 - YouTube
- SAIDA video: Results and our progress - YouTube
- UCA (2021). *State of the Art.* MedArtSal project deliverable A.3.1.2. Final report. (Available at: https://medartsal.com/download/state-of-the-art/)

Factsheet 19: Birdwatching

Author(s): Macarena Castro Casas[1] and Yana Korneeva Abdulaeva[1]
[1]University of Cádiz

Model Component: Socio-economic
Strategy: Product diversification (services)
Sustainability Components: Optimising sales strategies

Justification

Birdwatching in salinas is a popular activity attracting a growing number of people each year. Offering birdwatching services can enhance the competitiveness of a salina, as evidenced by the significant demand for birdwatching trips and the inclusion of bird tourism by European tour operators. Guided tours for bird observation not only generate additional income but also contribute to biodiversity conservation by raising awareness about important and vulnerable species in the habitat.

On the other hand, contact with nature has proven mental health benefits[4]. In particular, contact with birds has been proven to have benefits for mental wellbeing, according to recent studies[5], so there is also a benefit for those who practise it.

What is birdwatching?

Birdwatching, a popular nature tourism activity, involves observing birds in their natural habitat as a hobby, a feature of the natural environment that has captivated humans over the centuries. Some birdwatchers enjoy spotting different bird species, while others combine birdwatching with photography. It offers various modalities in diverse habitats and promotes an interest in birds, their habitats, and the preservation of biodiversity. Birdwatching is a versatile activity suitable for families, couples, or individuals, requiring curiosity, patience, and a desire to learn. Once immersed in the world of birds, the fascination with discovering new species becomes endless.

Depending on their location, salt pans can be a very important point of concentration of birds and a key habitat for their conservation. They provide feeding, resting and nesting sites for a variety of species. Some species are resident, and can be observed all year round; others stop over in these ecosystems during their migratory route; others use them only for breeding. Therefore the species observed may

[4] Bratman, G.N. et al. (2019). 'Nature and mental health: An ecosystem service perspective'. *Sciences Advances* 5:7. https://doi.org/10.1126/sciadv.aax0903

[5] Hammoud, R., Tognin, S., Burgess, L. et al. (2022). 'Smartphone-based ecological momentary assessment reveals mental health benefits of birdlife'. *Sci Rep* 12, 17589. https://doi.org/10.1038/s41598-022-20207-6

change seasonally and bird watching activities will need to adapt to changes in the bird species present and their behaviours and needs.

Figure 88. The salinas can be a good place for birdwatching (top left). Common terns resting in a salt pan pond, through a telescope (top right) (Cádiz, Spain). Different species of birds, such as flamingos, use the salt pans for feeding or resting (Murcia; below). ©H.Clavero (above) and Turismo Marinero Murcia (below)

Key recommendations for establishing the salina as a destination for birdwatching

- Provide observation materials and set up birdwatching spaces, such as an observatory, for participants' convenience.
- Hire an expert guide in ornithology and biodiversity to ensure informative and engaging experiences.
- Prioritise the well-being of the birds by respecting their feeding, breeding, and resting areas, and educating participants about bird-friendly behaviour.
- Adhere to international and local regulations regarding the protection of birds, especially those classified as rare or threatened.
- Enhance the birdwatching experience by offering complementary ecotourism activities, such as culinary, sports, or cultural experiences in salinas, to create a more dynamic and enriching visit for visitors.

Examples

1. At **Salina La Esperanza in Spain**, guided tours include birdwatching activities for school children, university students, and adults. Participants learn about the salt flat's history, culture, unique

biodiversity, and the importance of environmental protection. An expert biodiversity technician guides these educational visits.

Figure 89. Birdwatching activity in Salina La Esperanza. ©UCA (left) and Nuria Martín/SCI-SE UCA (right)

2. At **Salinas de Chiclana in Spain**, birdwatching groups have the opportunity to enhance their visit by enjoying local products at the restaurant and witnessing traditional salt extraction techniques. The salina also welcomes school visits and other interested groups.

Figure 90. Guided group visit and bird watching in Salinas de Chiclana. ©Salinas de Chiclana

References and further information

- MedArtSal video: BirdWatching in the Cadiz Salinas
- Avibase - The World Bird Database: https://avibase.bsc-eoc.org
- Waterbirds in the Mediterranean region: https://www.medwaterbirds.net (some of these groups of birds can be observed in the salt flats)

Factsheet 20: Environmental Education

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Model Component: Socio-economic / Governance
Strategy: Product diversification (services) / Adequate governance framework
Sustainability Components: Supporting social equity, optimising sales strategies / Cultural aspects

Justification

Traditional salt pan ecosystems face abandonment due to a lack of awareness about their ecological significance and the socio-economic benefits they offer. Environmental education programs in salinas aim to showcase the potential of these ecosystems, raise awareness, and encourage preservation and investment. Such programs have a powerful impact, especially when targeting children and young people.

What is environmental education?

Salinas, created from marshlands for salt production, have a long history and strong cultural ties. Environmental education aims to highlight the importance of preserving these salt pans for the benefit of local communities and biodiversity. The primary focus is on children and young people, who may be unaware of their significance. By educating them, we also reach a wider network of friends and family.

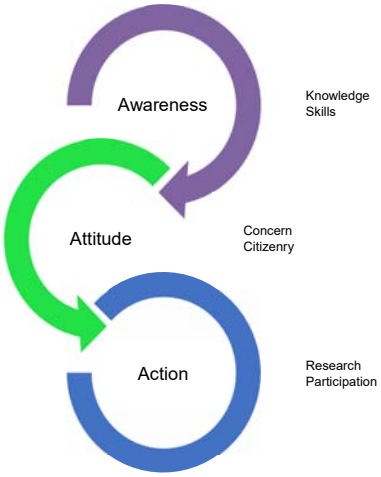

Figure 91. Diagram of environmental education values. ©SC-ISE, UCA

Key recommendations

To ensure effective environmental education programs for salt pans:

1. Understand the holistic impact: Comprehend the influence of salt pans on culture, economy, and the environment.
2. Skilled instructors: Employ qualified educators to conduct visits and workshops.
3. Promote to schools: Actively advertise activities, with a focus on schools.
4. Obtain necessary permissions: Seek appropriate authorization for conducting programs in protected salt pan areas.
5. Consider sensitive periods: Be mindful of avoiding overloading salt pans during crucial periods like bird breeding seasons.

Examples

To engage the public in environmental education, practical workshops can be conducted in salinas, focusing on their cultural, historical, environmental, and economic significance. Proposed workshops include:

1. **"Salt farmer for a day" Workshop**: Participants experience the real tasks performed by salt farmers, such as salt extraction and cleaning salt pan crystallisation ponds, using authentic tools.

Figure 92. Public participation in the extraction of salt during a day to be a “Salt farmer for a day”, Salina La Esperanza, Spain. ©SC-ISE. UCA

2. "**Woodwork" Workshop**: Crafting salt pan elements like gates and tools using wood.

Figure 93. Building of salt pan wood gates by workshop participants. ©SC-ISE. UCA

3. **"Salt art" Workshop**: Children engage in creative activities with mud and salt, decorating jars and canvases to take home.

4. **"Know your salt lexicon" Workshop**: Participants play a modified version of the game "Guess who," matching salt pan terms with their corresponding tools.

Figure 94. Different tools used in salt pans to harvest the salt, and public workshop (Salina La Esperanza, Spain). ©SC-ISE. UCA

5. **Birdwatching Workshop**: Participants use bird watching equipment to identify the diverse bird species that inhabit salinas.

Figure 95. Teaching children about the different species of birds present in the salt pans. ©SC-ISE. UCA

6. **"Halophyte plants identification" Workshop**: Participants learn to recognize and identify unique plant species that thrive in highly saline environments found in salt pans.

Figure 96. Interpretative visit on the vegetation of the salt pan (La Esperanza, Spain). ©H.Clavero

References and further information

- Rivero Reyes, A.J., Sanchez Barea, A. and Perez Hurtado de Mendoza, A. (2015). *Maestros de la sal*. Cádiz, Spain: Editorial UCA. ISBN: 978-84-9828-493-5.
- Aguilera Aguilera, P. et al. (2004). *Salinas de Andalucía*. Sevilla, Spain: Consejería de Medio Ambiente. Junta de Andalucía. ISBN: 84-96329-23-2

Knowledge needed for the creation and functioning of these workshops is gathered not only through the aforementioned bibliography, but also by experience and communication with veteran salt farmers.

Factsheet 21: Events and Celebrations

Author(s): Tiziana Campisi[1] and Valentina Oliviero[1]
[1]CUEIM, University Consortium for Industrial and Managerial Economics

Model Component: Socio-economic / Governance
Strategy: Product diversification (services) / Adequate governance framework
Sustainability Components: Optimising sales strategies, supporting social equity / Cultural aspects

Justification

Salt pans are often named after the towns they are located in, showcasing the strong connection between the two. These salt pans hold significant natural and cultural heritage and have historically contributed to the growth of local towns. Celebrations related to salt harvesting are usually held between May and September, attracting visitors and tourists.

In some of the Mediterranean salt pans, salt producers collaborate with municipalities and institutions to organise dedicated visits and events during the harvest, managing the influx of tourists. Additionally, salt pans can serve as versatile locations for various events, including concerts, educational tours, research studies, birdwatching, photography workshops, food tastings, and wellness retreats. This fact sheet focuses on events and celebrations organised by salt pan managers in collaboration with other organisations, aiming to provide customised experiences and create lasting benefits for the salina and its surroundings.

Figure 97. School visits to the salina – Kerkennah salinas (Tunisia) and Salina di Cervia (Italy) - MedArtSal pilot actions. ©Parco della Salina di Cervia (left) and MedArtSal project (right)

What kind of events and celebrations can be offered by a salina?

Themed or thematic events offer several benefits:

- They help all parties achieve their goals and create cohesion among brands.

- They capture the attention of target audiences and generate buzz and excitement.
- Simplifie event planning by providing guidance for decor and design.
- Encourage social media sharing and interaction during and after the event.
- Make the event memorable through entertainment and unique experiences.

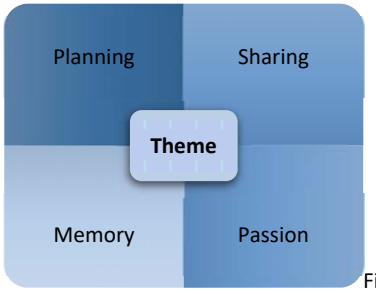

Figure 98. Four goals of Having A Themed Event. ©T.Campisi

Furthermore, event themes provide a starting point for caterers to design menus that align with the theme and create memorable dining experiences. Overall, a theme serves as a reflection of the event's goals and objectives, conveying its purpose in a concise and impactful manner.

The salinas can also host **open days or workshops**, where specific aspects that are developed in the salt works can be presented or to promote activities offered to the public, as has been the case of the open days organised by all the salinas sub-granted by the MedArtSal project, in order to present their results. **Concerts, dances, markets and historical re-enactments** are also organised in some salt pans, especially on summer evenings.

Figure 99. Concert by the city orchestra of Cervia in the salina to celebrate the harvesting season - Parco della salina di Cervia (Ravenna, Italy; left). Poster to announce the open day event organised to show and make the Preciosa y Roqueta-Marambay salina known to the public (Cadiz, Spain; right). MedArtSal pilot actions. ©Parco della salina di Cervia (left) and Marambay (right)

Salinas can also specialise in hosting celebrations such as **weddings, birthdays or other anniversaries or social events**, which can be a good source of income, as well as a showcase for their other services and products. Indeed, these spaces are perfect for this type of event, due to their great beauty, uniqueness and originality.

Key recommendations for implementing celebrations and events in salinas

To ensure successful events in salt pans, consider the following:

1. If you opt for themed events, define a theme that reflects the salina's history and the wider area, such as incorporating local songs or unique flavours of salt.
2. Develop integrated management plans that combine salt harvesting and productivity with special events, including collaboration with external parties.
3. Create a comprehensive communication plan and strategy for the events.
4. Launch a social campaign to increase event attendance and sign-ups.
5. Share the event experience with local stakeholders.
6. Collaborate with cultural associations and key local players to enhance the event's impact.
7. Merge field experiences in the salt pans with food-related experiences, creating a holistic event that combines nature and gastronomy.
8. Make sure that events and attendees respect nature by avoiding excessive noise that may disturb wildlife (especially during the breeding season), choosing environmentally friendly materials (e.g. avoiding single-use plastic cutlery), avoiding waste in the environment, or limiting the capacity to avoid possible nuisance.

Examples

1. ***Saliturismo* at Saline Ettore e Infersa (SEI; Italy)**: *Saliturismo* (neologism for the events dedicated to tourism at SEI salinas) offers experiential tourism activities linked to salt culture and marshes. It includes walking tours, salt harvesting experiences, cocktails at Mamma Caura terrace, wellness paths, dinner under the stars, and island aperitifs. The attraction peaks in September with magical sunset views of white salt piles.

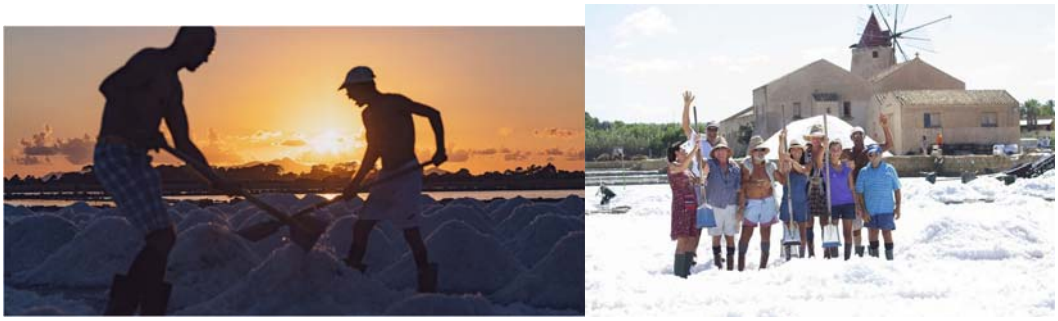

Figure 100. Professional salt workers and tourists – Saline Ettore e Infersa (Marsala, Trapani, Italy) – MedArtSal pilot action. ©Saline Ettore e Infersa

2. **Festival *Sapore di Sale* in Cervia (Italy)**: The annual festival celebrates the Salina di Cervia with historical re-enactments and the ritual distribution of salt. The festival includes boat arrivals, salt distribution to the public, cooking shows, workshops, exhibitions, and guided tours. It attracts people from neighbouring villages and important personalities, carrying on an ancient tradition.

Figure 101. Festival *Sapore di Sale i*n Cervia - Parco della salina di Cervia (Ravenna, Italy) – MedArtSal pilot action. ©Comune di Cervia

3. **Eden Garden at Salina of Sabkhet Lâadhibet by Tunisel (Tunisia)**: Tunisel Salina has created Eden Garden, a playful garden within the salinas area, aimed at educating people about the saltworks' socio-economic role. The garden features playgrounds, benches, and tables, and events will be organised to attract a wide audience.

Figure 102. Setting up of the Eden Garden for future events – salina of Sabkhet Lâadhibet (Tunisia) – MedArtSal pilot action. ©MedArtSal project

4. **Open-air concerts and dances (*Verbenas*) at sunset in Salinas de Chiclana (Spain):** every summer this salina organises a series of open-air concerts and dances to liven up sunsets and summer evenings. Sometimes they are complemented with dinners in their restaurant, with tastings of products from the salina or with gastronomic markets.

Figure 103. (Left) Poster announcing the concert days at the Salina de Chiclana (Spain; left). (Right) During one of the concerts in the salina. ©Salinas de Chiclana

5. **Events and celebrations at the San Vicente salina (Spain)**. This salina specialises in holding events and celebrations such as weddings, birthdays or social gatherings in its facilities, with a gastronomic offer based on seafood products. It also participates in events organised by the town

council and other local businesses, such as gastronomic tours, offering visitors special tapas with its own products.

Figure 104. (Left) Poster announcing gastronomic tour "*Ruta de los esteros*", where San Vicente participates. (Middle and right) details of celebrations at the salina. ©Salina San Vicente

References and further information

- UCA (2021). *State of the Art.* MedArtSal project deliverable A.3.1.2. (Available at: https://medartsal.com/download/state-of-the-art/)
- MedArtSal Factsheets "Salinas restoration and management", "Ecotourism" and "Cultural and natural heritage"
- For inspiration: Saliturismo – SEI (seisaline.it)
  26° Sapore di Sale - Cervia - 1/2/3/4 Settembre 2022 (cerviasaporedisale.it)
  https://www.facebook.com/salinaschiclana
  https://www.facebook.com/salinasanvicente
- Salina's video (in Italian): Progetto "MedArtSal", la presentazione dei risultati finali - YouTube
- MedArtSal video: Saltworks activities awarded by MedArtSal in Tunisia: Interview with Director of TUNISEL - YouTube
- https://medartsal.com/salinas/

Factsheet 22: Accommodation

Author(s): Tiziana Campisi[1] and Valentina Oliviero[1]
[1]CUEIM, University Consortium for Industrial and Managerial Economics

Model Component: Socio-economic / Governance
Strategy: Product diversification (services) / Adequate governance framework
Sustainability Components: Optimising sales strategies, supporting social equity / Identify best practices in governance, cultural aspects

Justification

Salt pans offer a spacious and captivating environment where nature, colours, sunlight, and wind merge. The coastal areas with active salinas provide opportunities for outdoor leisure and a sociable, healthy lifestyle.

Accommodation options around the salina can enhance the local tourism experience, encouraging longer stays. By combining the saltworks' tourism offerings with other forms of cultural, natural, beach, sport, or leisure tourism in the surrounding areas, the region can benefit from diverse income streams.

This includes revenue from restaurants, hotels, museums, and leisure facilities. Salinas can also consider providing additional services such as large car parks for caravans or transfer services to cater to different types of visitors, from couples to large families or foreign tourists.

Figure 105. Hotel in the salina – Hotel Ficocle at Parco della salina di Cervia (Ravenna, Italy) – MedArtSal pilot action. ©Hotel Ficocle website

Figure 106. Breakfast at Saline Ettore e Infersa (SEI) resort (Marsala, Trapani, Italy) – MedArtSal pilot action. ©Saline Ettore e infersa

How can accommodation options be established in a salina?

Saltworks managers can offer accommodation services in two ways:

a. establishing accommodation within existing salina facilities (e.g., B&B in the windmill);
b. building new accommodations such as a Salt Resort.

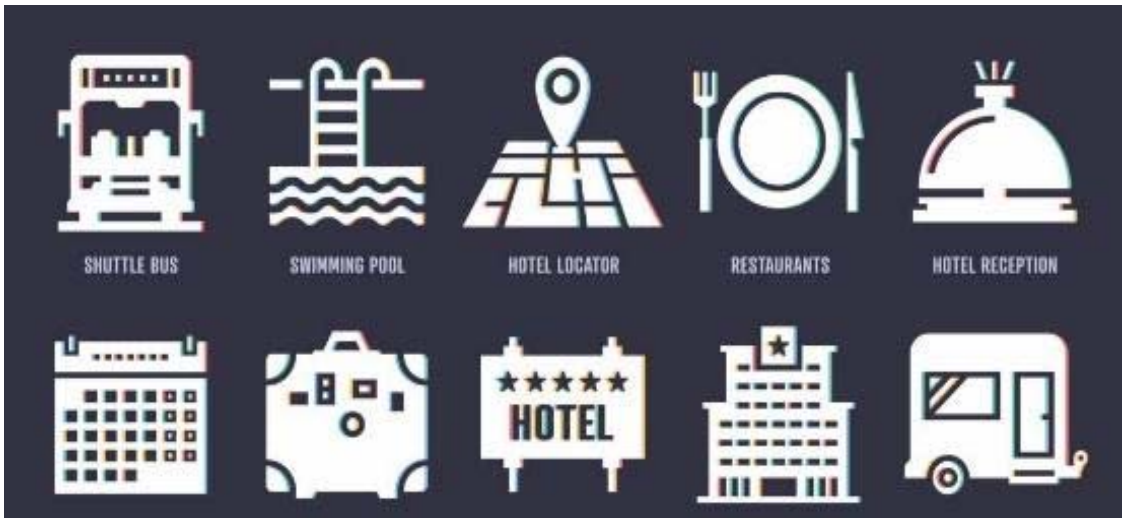

Figure 107. Accommodation and services for all types of visitors. ©Adapted by T.Campisi from GettyImages library

Alternatively, they can form partnerships with local hotel managers to promote joint initiatives and tourism packages, combining accommodation with dedicated salt and cultural experiences.

It should be noted that the possibility of establishing an accommodation service on the salina will depend on the legislation and regulations existing in each country or region. In the case of Spain, for example, it is not permitted to open an establishment to spend the night in the salt pans, due to the current legislation that regulates uses in the maritime-terrestrial public domain (where the coastal saltworks are located). Therefore, in these cases, the viable option would be the latter to collaborate with hotels and other nearby accommodation.

Key recommendations

1. Determine the business plan: Decide whether to handle the accommodation service in-house or outsource it.
2. Choose the location: Consider offering accommodation within existing saltwork facilities or outside the saltworks (when possible), or constructing new facilities.
3. Always respect the environment and the natural and architectural elements of the salina: Avoid impacts or minimise them to the maximum, on the natural environment, on the landscape and/or

on the historical heritage, both in the case of using and adapting existing buildings, as in the case of building new facilities, respecting existing legislation.

4. Form alliances with tourism associations: Collaborate with tourism associations to create comprehensive tourism packages (see Factsheet 15).
5. Develop a communication plan: Define a strategy to promote the new accommodation service effectively.
6. Launch a social media campaign: Utilise social media platforms to generate awareness and interest in the offers.
7. Establish partnerships with local hotels: Offer special prices or discounts on salina products to customers of partner hotels.
8. Engage with the local tourism network: Become an active participant in the local network of tourism services.

Examples

1. ***Saliturismo* at SEI - Saline Ettore e Infersa**: *Saliturismo* is a neologism created by SEI managers, combining salt and tourism. It offers experiential activities linked to salt culture. The Salt Resort provides exclusive accommodations on a private island with breathtaking views and all-inclusive packages.

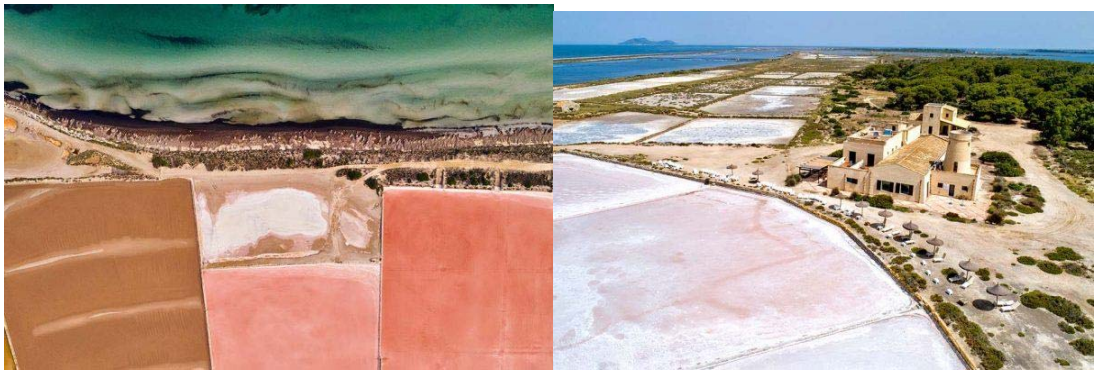

Figure 108. Salinas Resort - SEI -Saline Ettore e Infersa resort (Marsala, Trapani, Italy) – MedArtSal pilot action. ©Saline Ettore e infersa

2. ***Cultura Pack* at Palazzo Doglio**: Guests at Palazzo Doglio in Cagliari can purchase the *Cultura Pack* to explore the salt pans. Developed in collaboration with *Fondo Ambiente Italiano* (Italian Environment Fund; FAI), it offers immersive experiences, natural pools, salt mountains, and flamingoes. The package includes a FAI card valid for a year, discounts at local restaurants, and an excursion to Cagliari.

Figure 109. Salt pans of Cagliari: a journey through the history of white gold (Italy). ©Andrea Mariniello

3. **Anfeh tourism services and the salt pans**: Anfeh in Lebanon is known for its pristine waters and windless Tahet el Rih beach. The picturesque village features white-and-blue cottages, clear waters, and windmills along the rocky Mediterranean coast. A variety of accommodations are offered to the visitor, with the nearby salt pans being a further tourist attraction in the area.

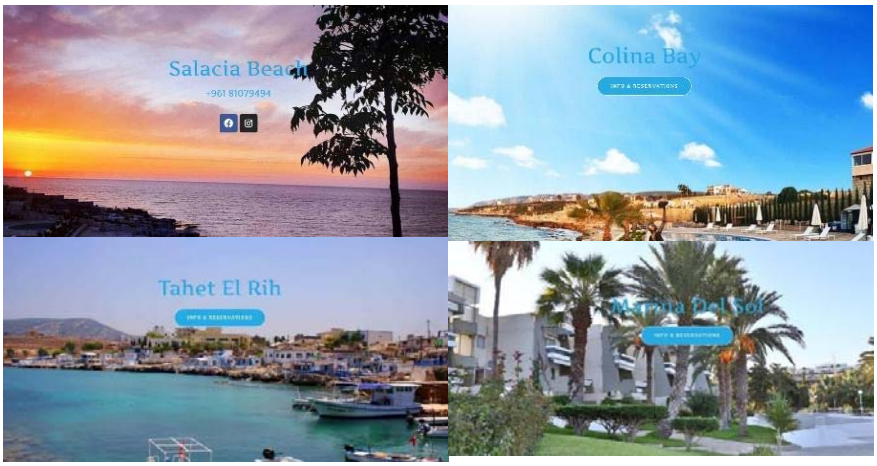

Figure 110. Accommodation offers in Anfeh around the salinas – (Lebanon). ©T. Campisi - source website - Tourism Anfeh

References and further information

- UCA (2021). *State of the Art.* MedArtSal project deliverable A.3.1.2. Final report. (Available at: https://medartsal.com/download/state-of-the-art/)
- MedArtSal Factsheets "Salinas restoration and management", "Ecotourism" and "Cultural and natural heritage"
- https://medartsal.com/salinas/
- For inspiration: Saliturismo – SEI (seisaline.it)
  https://visitanfeh.com/beaches-resorts-spa-wellness/

2C: Marketing Strategies

Section 2C looks at the essential tools and resources for effectively marketing goods and services in Mediterranean artisanal salinas, and to achieve greater added value, benefits and outreach. This section covers a range of topics, including marketing analysis, defining commercial goals, branding, and the potential benefits of specific certifications.

By implementing strategic marketing techniques and leveraging resources, Mediterranean artisanal salt flats can unlock their full potential in the market. Specifically, through the improved commercialisation of goods and services, salinas can generate the necessary revenue to support their sustainability goals and contribute to a thriving and environmentally conscious salt industry.

The section on Marketing Strategies covers the following themes:

23. Improving the commercialisation of goods and services
24. Conducting marketing analysis
25. Establishing commercial goals
26. Creating a brand strategy
27. Certification benefits, such as Fair Trade Certification

Factsheet 23: Improving the Commercialisation of Goods and Services

Author(s): Juan José Mier-Terán Franco[1]
[1]Marketing and Communication Department, University of Cádiz

Model Component: Socio-economic
Strategy: Marketing
Sustainability Components: Optimising sales strategies, improving productivity

Justification

An effective marketing plan or strategy is vital for improving sales and profitability. By successfully commercialising goods and services, you generate additional financial resources that can be directed towards developing a more sustainable salina. A well-crafted marketing plan guides your efforts in reaching a wider customer base, driving revenue growth, and ultimately supporting sustainability initiatives that contribute to the long-term success and environmental responsibility of the salina.

What is a Marketing Strategy?

A marketing strategy is a comprehensive plan that guides your business in achieving its marketing objectives. It focuses on improving sales and profitability, which, in turn, enables you to generate additional funds to invest in sustainability actions within the salina. By implementing an effective marketing strategy, you can attract more customers, increase market share, and drive revenue growth. The enhanced financial resources gained from successful marketing efforts can then be utilised to support and advance sustainability initiatives, ensuring the long-term viability and environmental responsibility of your business.

Figure 111. An effective marketing strategy will guide the business in achieving its marketing objectives and will help to improve sales and profitability. Source: Imam Fathoni/Vecteezy.com

Key recommendations

A marketing plan should include several key components to effectively guide your business strategy:

1. Market situation: Analyse market trends, competitors, and customer needs to identify opportunities and challenges.
2. Target group, segmentation, and positioning: Define your target audience through segmentation and positioning strategies to tailor your marketing efforts.
3. Commercial goals: Set specific and measurable goals that provide a focus for your marketing activities and serve as benchmarks for success.
4. Product strategy: Consider factors such as brand name, packaging, key product benefits, flavour combinations, and brand reinforcement to differentiate your product and enhance sales margins.
5. Price strategy: Determine the pricing approach by combining low-price strategies for volume and high-price strategies for premium brands. Consider factors like brand positioning, packaging, certifications, salt origin, and different states of matter.
6. Distribution strategy: Decide on the distribution channels and logistics for delivering your products to customers. Consider potential international shipping and the costs associated with distribution.
7. Communication strategy: Develop advertising, promotional activities, public relations, and sales actions to effectively reach consumers, suppliers, and intermediaries. Utilise various marketing channels, including digital platforms and social media.
8. Sustainable strategy: Consider incorporating sustainability practices into your marketing plan to maintain long-term success. Prepare souvenirs or other sustainable initiatives to enhance customer engagement and brand loyalty.

By addressing these key questions and including these essential components in your marketing plan, you can create a roadmap for successful marketing and business growth.

Examples

Here are different examples of salt product strategies, especially based on packaging, labelling and branding:

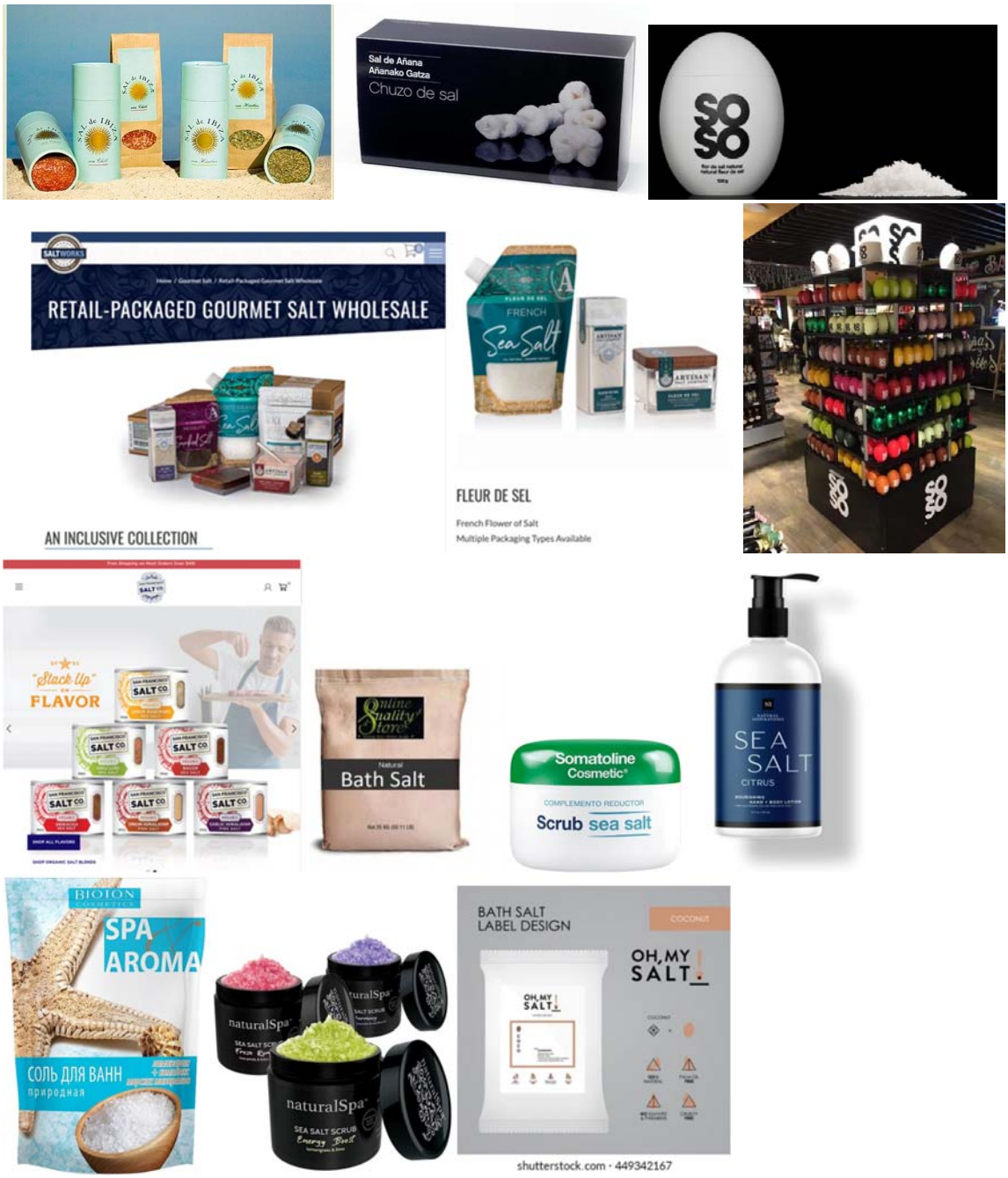

Figure 112. Different examples of marketing strategies: product, branding, communication and packaging, for the case of different types of salts and manufactured products made from salt. Source: Multiple images, taken from the websites of each brand, or taken by the author.

Figure 113. Some of the components developed in the marketing strategy for MedArtSal branded products. Source: Prepared by the author.

References and further information

- https://medartsal.com/b2b/
- https://druidadelmarketing.com/ (in Spanish)

Factsheet 24: Marketing Analysis

Author(s): Juan José Mier-Terán Franco[1]
[1]Marketing and Communication Department, University of Cádiz

Model Component: Socio-economic
Strategy: Marketing
Sustainability Components: Optimising sales strategies, improving productivity

Justification

The market offers various types and flavours of salt, with different colours, textures, packaging formats, etc., which respond to different needs (see Factsheet 8). The salt market will be segmented according to these types of salts (coarse salt, *fleur de sel*, pink or black salt, smoked salt, salt for industry, etc.). Segmentation can also be defined based on other criteria such as potential uses of salt (for meat, seafood, desserts, sauces, etc.) and the target geographic area (Europe, South Asia, etc.). Each segment will have its own niche, among which high-quality or gourmet salts can be highlighted. The term "gourmet" could be defined as a gastronomic product with exceptional or exquisite qualities, where a series of requirements must be met, such as the quality of the product itself, its selection process and even the packaging. Sustainable coastal artisanal saltworks can certainly position their salts, or some of them, as gourmet products, with proper marketing.

Gourmet salt has a great potential to increase its added value and profits for salinas. Consumer demand for exotic and sophisticated dining and ingredients, healthier alternatives and clean-label products, as well as increased awareness of product diversity through various social media platforms, is driving the increased demand for gourmet salt. The artisanal gourmet salt market is a growing niche with lucrative business opportunities. Companies are expanding through acquisitions and collaborations to compete in this fragmented and competitive market.

Conducting marketing analysis can enhance business profitability and enable investments in sustainability actions. This practice facilitates information to create a commercial strategy based on scientific data so that you can improve sustainability in your business using logic and reliable criteria.

What is a Marketing Analysis?

Before designing a marketing strategy, it is essential to know as much information as possible about the market in which we want to market our products (goods, services,...). To this end, there is a process known as market research which, although it does not eliminate the risk of making mistakes in your business plans, it can reduce them considerably. Thus, we call market research the procedure through which we seek reliable information about the target market in order to make decisions about that market.

Market analysis is a large part of market research and an important component of a business plan. It is a detailed assessment of your business's target market and the competitive landscape within a specific industry. This analysis lets you project the success you can expect when you introduce your brand and its products to consumers within the market. Market analysis includes quantitative data such as the actual size of the market you want to serve, prices consumers are willing to pay, revenue projections, and qualitative data such as consumers' values, desires, and buying motives.

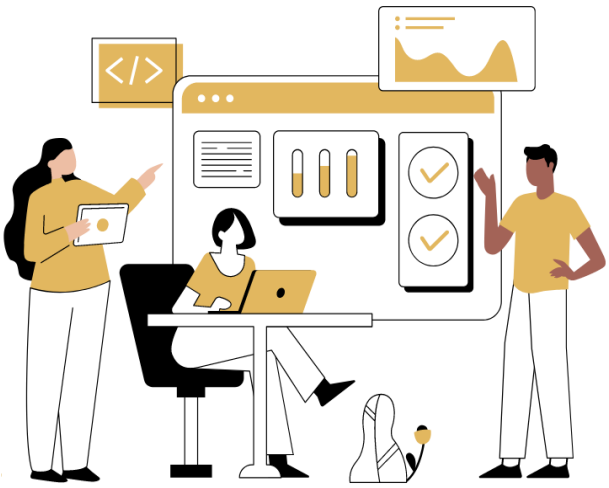

Figure 114. Before designing a marketing strategy, it is essential to know as much information as possible about the market in which we want to market our products, through a market analysis. Source: ruralhandmade.com

Gourmet salt is an increasingly popular choice and, to optimise its commercialisation and profitability, a prior market analysis will be very useful. This analysis can also be applied to any other type of product from the salina. Market analysis should consider at least (and, therefore, information on these issues should be collected):

- Data on global and local markets.
- Consumer preferences: What do they want? Where, when or how do they buy? What are the most important factors influencing the decision to buy one salt or another (price, quality, packaging…)?
- Competition: Who are my competitors? What are they doing to sell (advertising, promotions, new packaging, discounts, focus on certain quality products ....)?
- Supplier and distribution options: Who are the best suppliers of packaging or other items? Which distributors or distribution channels can I use for my products?
- Market segmentation: What is the profile of my consumer or target group? How is the market divided? Are there specific criteria that define each market segment? What segment or

segments will my product/service focus on? Once selected, define different marketing actions for each segment.

- Brand positioning: What is my brand positioning and the one I want to achieve? What do I want to focus my brand on? Brand positioning can focus, for example, on artisanal, traditional, premium, geographical, health, ecological or organic attributes, on online or physical sales or on recycled or original packaging.

Conducting online research (with keyword searches, for example, or in different languages) and exploring government databases and industry associations can provide valuable insights for market analysis (see some of the resources available below, in "References and further information").

Key recommendations for conducting a market analysis

1. Seek secondary information from reliable internet sources if you have limited funds.
2. Consider interviews or surveys if you have some budget.
3. Clearly define research goals, such as analysing salt sales, competitors, and consumer preferences.
4. Rely on trustworthy sources for data and insights.
5. Key market drivers include increased spending on fine food and growing use of gourmet salt in exotic cuisines.
6. Market trends include demand for clean label specialty products and attractive packaging for new gourmet salt varieties.

Examples

Below are some examples, in the form of graphs, of the **results obtained from a global market research** for the gourmet salts market (study period: 2019 - 2029).

Figure 115. Global gourmet salts market value and volume (in US$ and megatonnes (MT), respectively), for 2019 and the projection for 2029. Sales revenue is expected to increase at a CAGR of 4.8% during the forecast period. Source: Persistent Market Research

(CAGR): Compound annual growth rate

Results of the segmentation study of the gourmet salt market according to different criteria: region, product type (types of salt) and end use, for 2019:

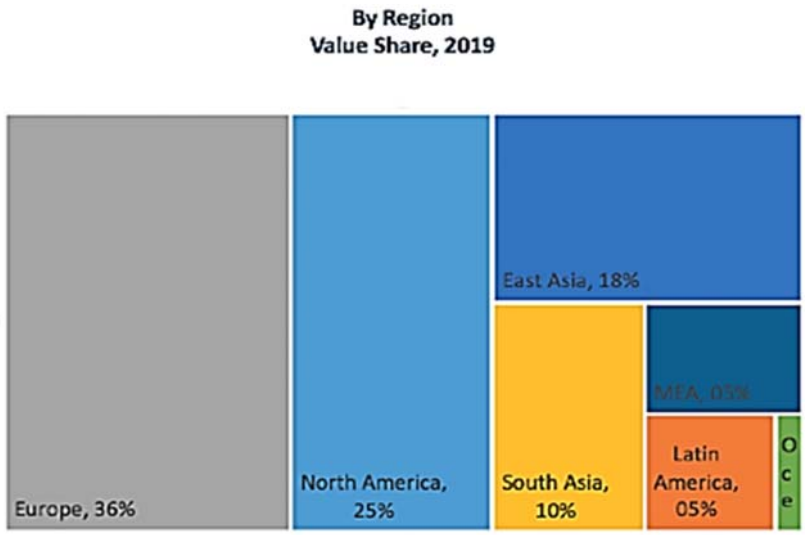

Figure 116. Market share of the gourmet salts by region, for 2019, with Europe and North America accounting for the largest shares. Source: Persistent Market Research

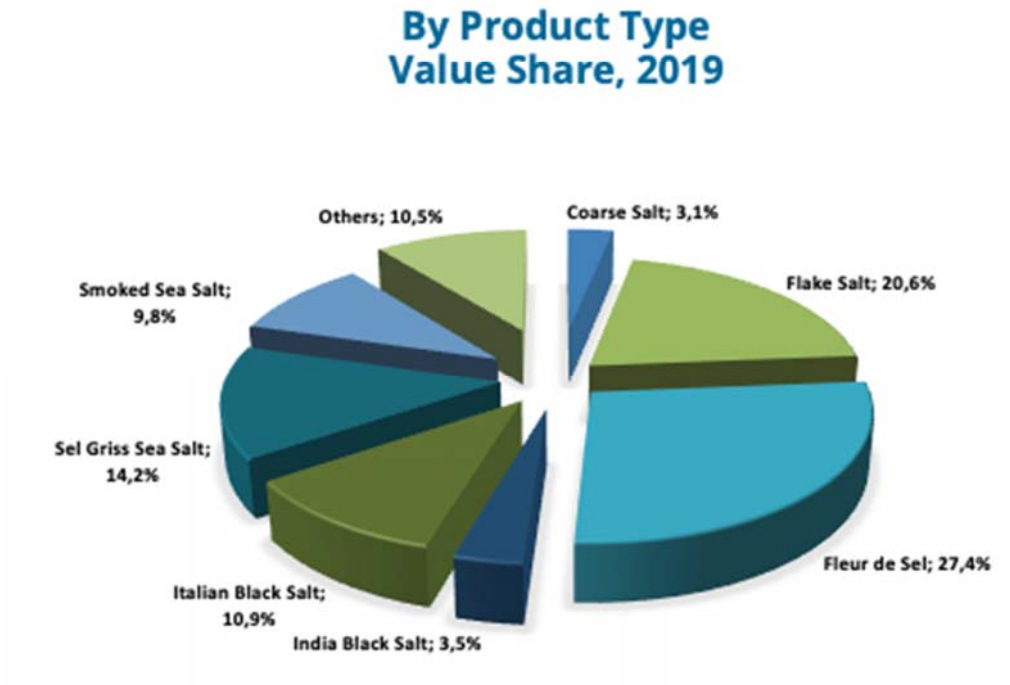

Figure 117. Market share of the gourmet salts by type, for 2019. Source: Persistent Market Research

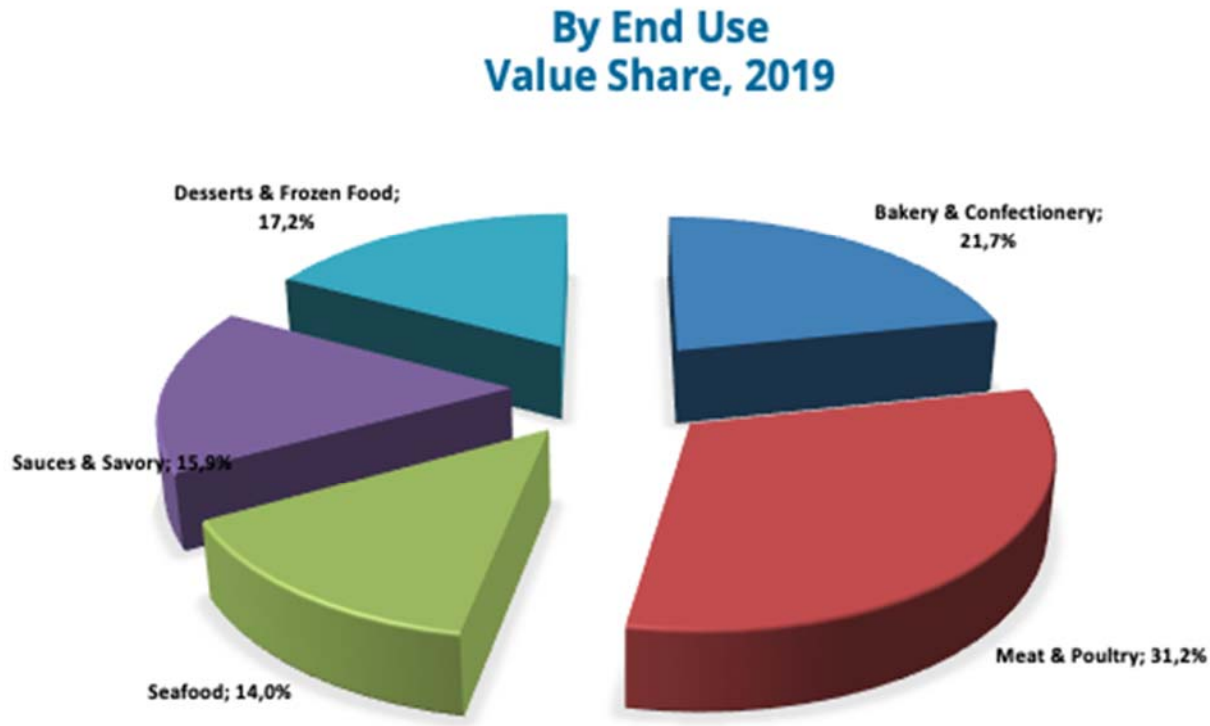

Figure 118. Market share of the gourmet salts by end use, for 2019. Source: Persistent Market Research

Analysis of the attractiveness in the global market of gourmet salts, by region, product type and end use:

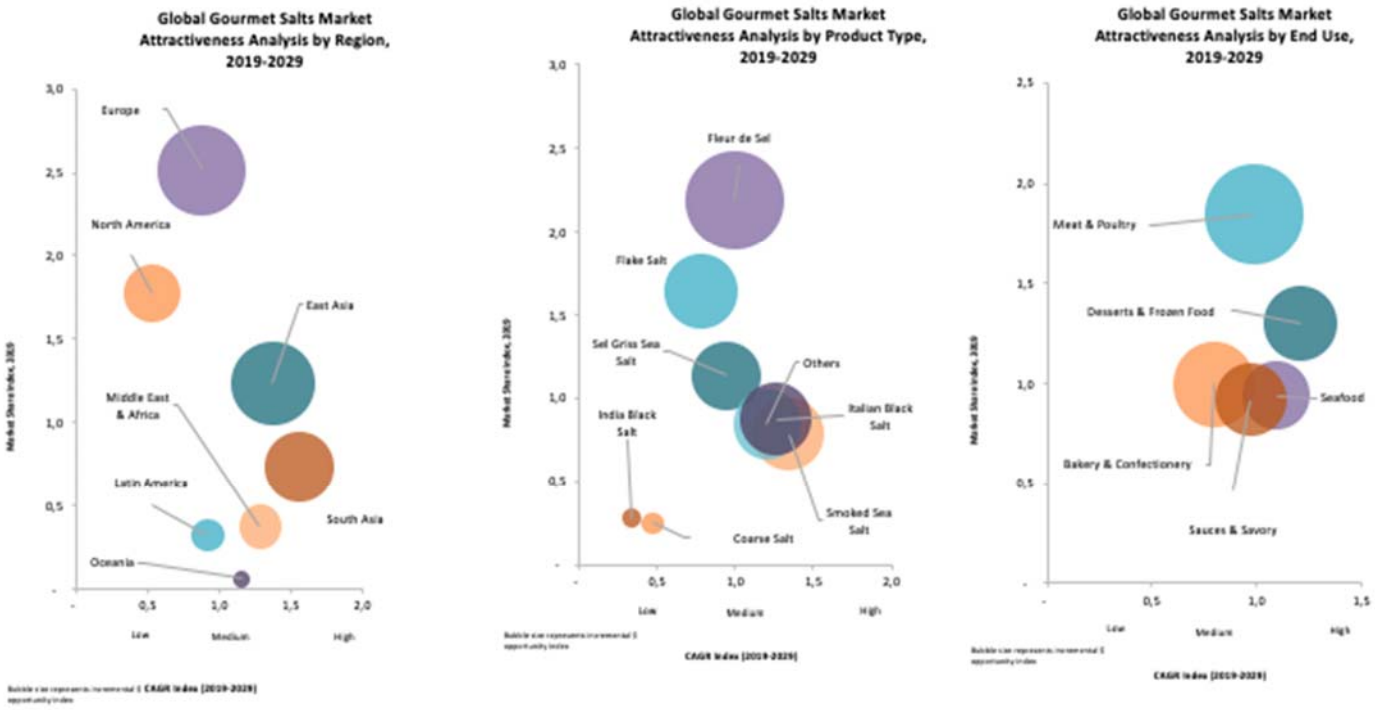

Figure 119. Gourmet salts market attractiveness analysis for the period 2019-2029. Source: Persistent Market Research

Key factors to be considered in the gourmet salts market, according to the presented market research:

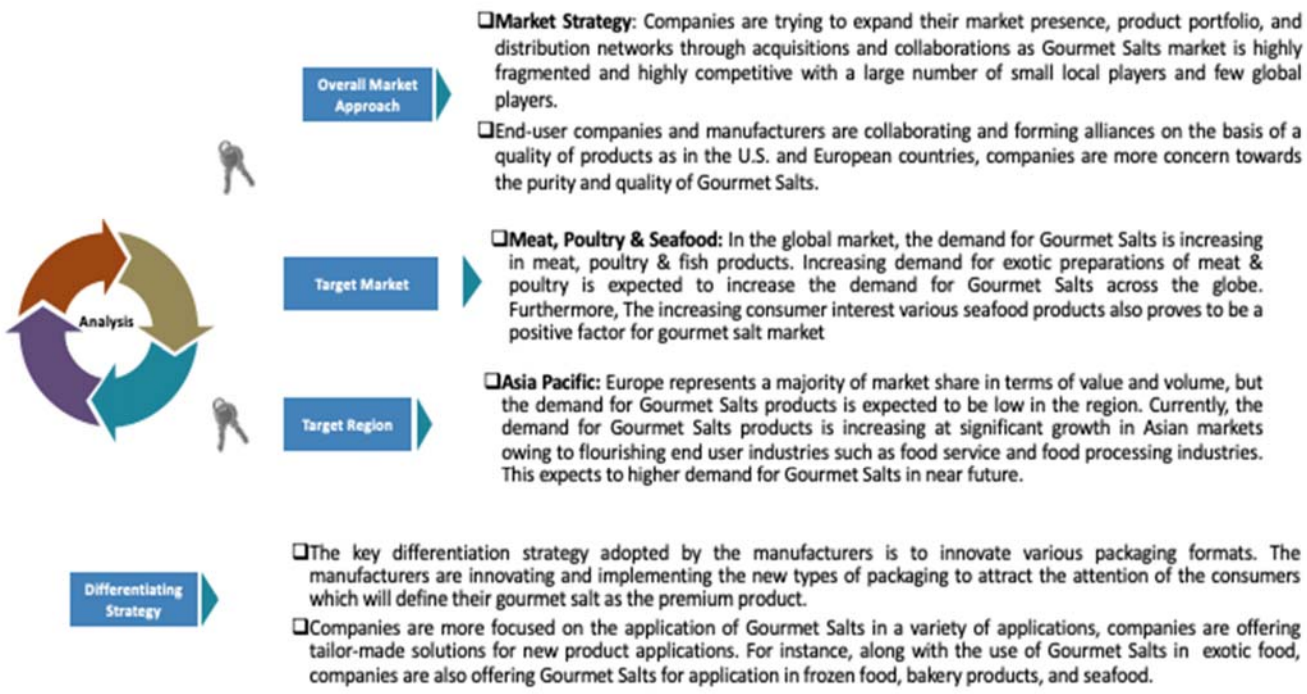

Figure 120. Gourmet salts market key factors. Source: Persistent Market Research

The following is an example of **product positioning in the market**. It is advisable to carry out an exercise of this type in order to have a good vision of the market, to decide on the key criteria and to position the brands.

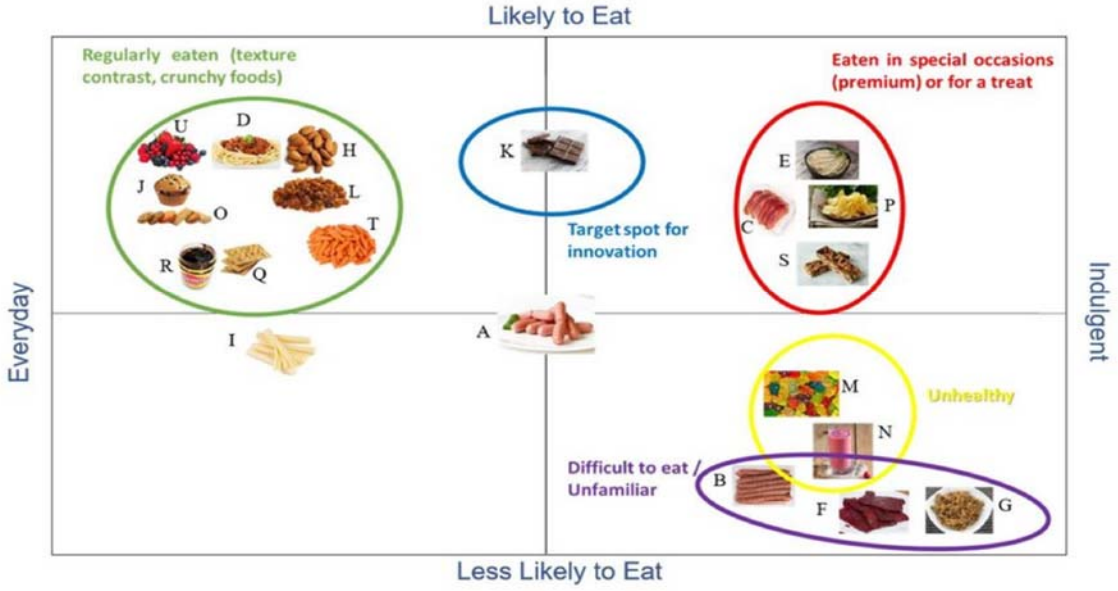

Figure 121. Example of a perceptual product positioning map. Source: Prepared by the author.

References and further information

- https://medartsal.com/b2b/
- https://druidadelmarketing.com/ (in Spanish)
- MedArtSal Presentation on Marketing: https://druidadelmarketing.com/wp-content/uploads/2022/02/WP5_MARKETING_PRESENTATION.pdf
- Persistent Market Research, on gourmet salt market: https://www.persistencemarketresearch.com/market-research/gourmet-salts-market.asp
- Salt: 2023 World Market Review and Forecast to 2032: http://mcgroup.co.uk/researches/salt
- List of salt producers: http://salt-partners.com/salt_producers.htm
- List of resources of the Ecosal Atlantis network (in several languages): http://ecosal-atlantis.ua.pt/index.php?q=es/content/lista-de-enlaces

Factsheet 25: Establishing Commercial Goals

Author(s): Juan José Mier-Terán Franco[1]
[1]Marketing and Communication Department, University of Cádiz

Model Component: Socio-economic
Strategy: Marketing
Sustainability Components: Optimising sales strategies, improving productivity

Justification

In the context of artisanal salinas, defining commercial goals is essential, both for sustainability and to achieve effective management.

These goals provide a clear direction for operators, guiding the efforts towards achieving specific objectives that contribute to the long-term viability and success of the salt production operations. By setting realistic and actionable commercial goals, salt flat operators can navigate the unique challenges they face and work towards creating a sustainable and thriving business.

What is a commercial goal?

A commercial goal is an objective or target that a business sets to achieve in terms of its commercial activities. It is a specific outcome or result that the company aims to accomplish within a defined timeframe. Defining objectives is one of the most complex, but also important, issues that must be carried out in the field of marketing, so it is necessary to dedicate enough time and effort to it. Commercial goals encompass various aspects of a business's operations, such as sales, marketing, profitability, market share, customer acquisition, product development, and more.

Figure 122. Defining commercial goals is essential for the success of the business and the sustainability of the salinas. Source: (CC) Marciano Graphic/Vecteezy.com

When developing a marketing plan, two types of goals should be defined: strategic and research goals. Strategic goals refer to what the company ultimately wants to achieve with its marketing strategy (e.g. improve profitability by 3% in 3 years), where it wants to get to. Whereas, research goals define the necessary information to support those strategic objectives. In order to achieve the latter, market research will indeed be necessary. Research goals define the information needed to develop that market research. Each strategic goal entails several research goals, which must generate sufficient reliable information to achieve the proposed strategic goal.

Key recommendations for defining commercial goals in artisanal salinas

- Strategic goals should be specific, measurable, achievable, realistic, and time-bound (SMART), and also as purpose-oriented as possible.
- Begin by defining strategic goals and then research goals, the SMART goal framework is a useful tool for establishing your commercial goals.
- Strategic goals should focus on increasing sales, improving distribution, or communication strategies.
- Research goals involve understanding consumer profiles, quantifying sales trends, or determining pricing strategies.
- Strategic objectives should be disaggregated as much as possible. The more specific the research objectives, the better.
- Clear commercial goals guide decision-making and resource allocation for business growth and success.

Examples

Some **strategic goals**, for a salina, could be the following:

1.- Increase sales of *fleur de sel* by 18% during the first half of 2023 in the north of the country.
2.- Get 20 new clients during 2023.
3.- Carry out 2 promotions a year with virgin sea salt during March and September 2023.

Some **research goals** could include, for strategic goal 1 (related to *fleur de sel*):

1.1.- Understand the growth of the market in the last 3 years.
1.2.- Analyse the evolution of the price of *fleur de sel* over the last 3 years.
1.3.- Study consumer preferences in relation to salt.
1.4.- Analyse the importance of the packaging in the consumers' choice of salt.

Figure 123. Research goals involve understanding consumer profiles, the importance they give to packaging and their preferences, or determining pricing strategies, in relation to the *fleur de sel* market, for this example. Different product presentations. ©SalROCHE, Salina San Vicente and Les Terres Blanches (left to right)

Other examples of strategic goals:

- To sell online through a common collaborative e-commerce platform.
- To create a new packaging format gourmet-oriented.
- To be innovative with colours, textures, forms, packaging and flavours.
- To create clean label speciality products.
- To have a high price point that aligns with product quality.
- Improve distribution systems: channels and logistics.
- Communication strategy according to positioning values selected.

And research goals:

- Quantify the potential intermediaries for the distribution of *fleur de sel.*
- Identify the consumer profile of spiced salts.
- Analyse the optimal price for the product.
- Quantify sales of spiced salts in the last 3 years.
- Who is my main competitor?
- Why do people buy products from saltworks?
- What are the most important factors to consider when buying salt?
- How much money is a consumer prepared to pay for the salt?
- What should be the most important message to convey to consumers?

Table 1. Example table with disaggregated strategic marketing goals. Source: Prepared by the author.

Marketing strategic goals						
	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6
1.- Increase sales of *fleur de sel* in the province of Cádiz by 68 clients during 2022	X%	X%	X%	X%	X%	X%
Seller 1						
Seller 2						
……						
2.- Sell 1,200 units of spiced salt in Lebanon during 2023	Region 1			Region 2		
	Area 1	Area 2	Area 3	Area 1	Area 2	Area 3
In food markets						
1. Hypermarkets	X%	X%	X%	X%	X%	X%
2. Supermarkets	X%	X%	X%	X%	X%	X%
3. Cash and Carry	X%	X%	X%	X%	X%	X%
4. Local business	X%	X%	X%	X%	X%	X%
In hotels, restaurants and catering (Ho.Re.Ca)						
1. Restaurants	X%	X%	X%	X%	X%	X%
2. Hotels	X%	X%	X%	X%	X%	X%
Etc.	X%	X%	X%	X%	X%	X%
In own store						
	X%	X%	X%	X%	X%	X%

References

- https://druidadelmarketing.com/objetivos-de-comercializacion/
- https://medartsal.com/b2b/

Factsheet 26: Branding

Author(s): Samia Sadaka[1], Zeina Tohme[1] and Maya Masri[1]
[1]Fair Trade Lebanon

Model Component: Socio-economic / Governance
Strategy: Marketing / Adequate governance framework
Sustainability Components: Optimising sales strategies, improving productivity / Identify best practices in governance

Justification

Branding is key for increasing sustainability by raising consumer awareness and demand for salinas products. Through branding and packaging, salt producers can communicate with consumers about the characteristics of their product, its quality, the way it is produced, or its respect for the environment. It establishes trust and encourages support for eco-friendly practices. Consumers' level of demand and their desire to support brands that relate to criteria such as fairness or sustainability are growing, even if it means a higher price; hence the importance of creating a recognisable brand image that conveys these values. According to a Forbes report[1], approximately 70% of 30-40 year olds are willing to pay more for brands that support a cause they care about.

Designing an effective brand identity should be an essential part of a good marketing strategy. Sustainable packaging materials and a recognised brand enhance customer trust and attract larger customers. Strong branding opens opportunities in new markets, improving profits and overall sustainability for salinas.

What is branding?

Branding encompasses creating a unique name and image for a product, service, or organisation, generating positive outcomes such as recognition, loyalty, increased sales, and improved customer service. It builds trust, sets a company apart, and creates a unique identity.

For the salinas, branding salt as sustainable offers several benefits:

1. Unique identity: Differentiates the salt and attracts customers seeking high-quality, sustainable products.
2. Trust-building: Assures customers of sustainable production, addressing environmental concerns.
3. Sales growth: Expands into new markets focused on sustainable products, driving increased sales.
4. Positive image: Enhances the region's reputation for sustainable agriculture and ecotourism.

Overall, branding salt as sustainable supports export opportunities, boosts sales, and showcases the salinas' commitment to sustainability.

Figure 124. The importance of branding. Source: geektonight.com (https://www.geektonight.com/brand-management/)

Key recommendations for establishing a good brand identity

To establish a strong brand identity for salinas, focus on the following:

- Define brand identity: Craft a mission statement, design a strong logo, choose representative colours, and create visually appealing packaging.
- Gather customer feedback: Collect data to understand customer perceptions and improve branding efforts accordingly.
- Prioritise quality packaging: Ensure visually attractive, eye-catching, and memorable packaging.
- Tell a compelling story: Develop a brand story that resonates emotionally with the target audience and encourages engagement.
- Implement an effective marketing strategy: Utilise various channels such as digital advertising, print media, events, videos, and social media to promote the brand effectively.

Examples

Branding plays a crucial role in distinguishing businesses and increasing consumer loyalty. In the case of salt packaging, effective branding has transformed consumer behaviour.

1. **Poor branding examples** feature plain and unremarkable salt packaging, leading consumers to choose based on price or convenience without brand loyalty.

Figure 125. Poor branding examples: plain bag or container with basic text labelling. ©Chalupa, Ibersal and Proasal Salinera de Andalucía

2. **Good branding examples** showcase distinctive and attractive salt packaging that stands out on shelves and evoke characteristics such as quality, purity, and naturalness, attracting health-conscious consumers. To achieve this, companies invest in a good branding strategy and in creating unique packaging.

Figure 126. Good branding examples: brands invest in creating unique packaging designs that stand out on shop shelves and attract consumer attention. Creative designs, such as La Baleine's blue and white striped packaging, which evokes the image of the ocean, as well as quality, purity and naturalness. ©Sal D'Es Trenc, La Baleine and Sal de Añana

Overall, effective branding has changed how consumers perceive and purchase salt, allowing brands to differentiate themselves and charge premium prices. It is clear that branding is essential for success in today's competitive marketplace.

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- [1]https://www.forbes.com/sites/deeppatel/2017/07/28/the-millennial-marketplace-and-the-propagation-of-the-triple-bottom-line/?sh=37fb8ad4d04a
- Keller, K.L. and Lehmann, D.R. (2006). 'Brands and branding: Research findings and future priorities'. *Marketing Science* 25(6):740-759.

Factsheet 27: Certification benefits, such as Fair Trade Certification

Author(s): Lamia Karaki[1] and Maya Masri[1]
[1]Fair Trade Lebanon

Model Component: Socio-economic
Strategy: Marketing
Sustainability Components: Optimising sales strategies, supporting social equity

Justification

Obtaining a certification such as Fair Trade certification can provide the traditional Mediterranean salt flats with access to new markets, strengthen its commitment to social and environmental causes, and enhance its reputation among ethical consumers. It can serve as a valuable tool in diversifying the product offering and positioning the salt flat as a responsible and sustainable producer in the marketplace.

To obtain these seals, it is necessary to go through a certification process and meet different requirements, which must be maintained over time, as well as to pay fees to the certifying body. However, it is a good strategy to position a product with more added value in the market, to broaden market segments and to convey certain values to potential, more demanding consumers (see Factsheet 26).

What is Fair Trade?

The globally recognised definition, agreed by the main international Fair Trade networks (WFTO, Fairtrade International and European Fair Trade Association) is as follows: "Fair Trade is a trading partnership, based on dialogue, transparency and respect, that seeks greater equity in international trade. It contributes to sustainable development by offering better trading conditions to, and securing the rights of, marginalised producers and workers – especially in the South. Fair Trade Organisations have a clear commitment to Fair Trade as the principal core of their mission. They, backed by consumers, are engaged actively in supporting producers, awareness raising and in campaigning for changes in the rules and practice of conventional international trade."

Fair Trade Organisations (also known as Fair Trade Enterprises) are social enterprises that adhere to the principles of Fair Trade and can be recognised by the WFTO Mark. These enterprises drive local community transformation and form a global community within the new economy, supporting and trading with each other, and promoting transparency, accountability, and open communication across the supply chain.

Fair Trade operates based on 10 principles (see Figure 127) that encompass fair trading practices, payment of fair prices, non-discrimination, good working conditions, and respect for the environment. The World Fair Trade Organization (WFTO) supports Fair Trade Enterprises by providing a platform for sharing and

learning, raising awareness, creating market access opportunities, and enhancing the organisation's ability to serve its members.

Figure 127. 10 principles of Fair Trade. Source: Prepared by Fair Trade Lebanon

Key recommendations for certification

To obtain certification, companies or salinas must first submit an internal monitoring system (IMS) to the WFTO certification body, such as Fair Trade Lebanon in the case of Lebanon. The TEQ (Transparency, Ethics, and Quality) certification can be a good initial step towards Fair Trade certification, as it is a simpler process. TEQ incorporates fair trade principles with a focus on quality and safety, particularly important for food products.

To support the certification process and maintenance of the seal, training can be provided, and external audits are conducted by WFTO to ensure compliance with certification standards.

Figure 128. TEQ logo for Lebanon (left) and WFTO logo (right). Source: Fair Trade Lebanon (left) and WFTO (right)

For more information on how to join WTFO and obtain certification, you can visit the website (www.wfto.com), where it is explained step by step how to do it and what information needs to be submitted.

Examples

The case of AfriCraft

AfriCraft is an NGO committed to promoting sustainable living and fair-trade practices in Tanzania. Established in 2004, it has a mission to empower poor communities by providing employment and income generation opportunities, thus supporting a sustainable future and a circular economy.

At AfriCraft, they believe that every person should have the opportunity to earn a fair wage for their work. As a member of the World Fair Trade Organization, they adhere to strict principles and practices that promote fair trade and sustainable development. By purchasing salt under the brand "The Essence of Zanzibar" made by AfriCraft, the consumer can support their mission and contribute to the economic development of marginalised communities in Tanzania.

Figure 129. Salt marketed by AfriCraft and some of the certificates with which the NGO has been awarded. ©AfriCraft website

Other types of certification

In addition to WTFO certification, there are other certificates and seals, at global, national or regional level, which also guarantee that food or cosmetic products are, among others, worker-, livelihood- or environmentally friendly. Organic certification can be a good option for salt or other products from saltworks, such as cosmetic products, as consumers are becoming increasingly aware of the need to respect the environment and take care of their health. Other types of certificates, such as designations of origin, serve to designate an agricultural or food product, whose quality or characteristics are fundamentally and exclusively due to the geographical environment with its natural and human factors, and whose production, processing and preparation take place in the defined geographical area. These certifications depend on existing legislation and certifying bodies at national or regional level, so the salina should inquire about their existence and the possibility of obtaining them.

Figure 130. Detail of some salt products certified with different seals. ©H.Clavero (salts of Salinas del Alemán), Le Paludier de Guérande, Bras del Port and Ecco Verde (from top to bottom, from left to right)

References and further information

- www.wfto.com
- www.fairtradelebanon.org
- Contact: l.karaki@fairtradelebanon.org

Section 2D: Wellbeing and Healthy Working Conditions

This section focuses on existing resources for promoting wellbeing and ensuring healthy working conditions in Mediterranean artisanal salt flats, with a specific emphasis on skin cancer prevention. Indeed, salinas are harsh environments, which can pose a high risk to workers, mainly due to the high exposure to sunlight.

Maintaining health and wellbeing should be a priority for workers and employers alike in any business, as good performance and productivity depends to a large extent on it. Health is an asset closely associated with a person's quality of life and longevity, as well as their ability to work. A safe working environment is a key factor in competitiveness and sustainability.

Implementing effective measures, such as the use of protective clothing, sunscreens, regular health screenings, and creating shaded areas, can foster a safe and healthy working environment that promotes the wellbeing of salt workers.

The section on Wellbeing and healthy working conditions covers the following theme:

28. Skin Cancer prevention

Factsheet 28: Skin Cancer Prevention

Author(s): Ximena Montoya Wiedeman[1], Alba Rodríguez Martínez[1], Andras Subert[1], Nuria Blázquez Sánchez[2] and Magdalena de Troya Martín[2]
[1]Research and Innovation Unit, Costa del Sol Hospital, Marbella [2]Dermatology Clinical Management Unit, Costa del Sol Hospital, Marbella

Model Component: Socio-economic
Strategy: Wellbeing and healthy working conditions
Sustainability Components: Supporting social equity, improving productivity

Justification

Solar radiation, particularly ultraviolet (UV) radiation, has both beneficial and harmful effects on health. It plays a role in vitamin D and serotonin synthesis, but excessive exposure can cause harmful effects on the skin, eyes or immune system, leading to health problems such as skin cancer, actinic keratosis, and cataracts. Photoprotection training, skin self-checks, measurement of UV exposure of salina workers and worker health surveys and monitoring are effective measures to prevent these problems.

Saltworks pose a high-risk environment for outdoor workers due to factors such as the albedo effect, which increases the risk of skin cancer, daily exposure to peak UV radiation hours, and limited shaded areas. Every day they are exposed not only to direct sunlight, but also to the reflection of the sun's rays off salt, water and other surfaces, which increases the amount of UV radiation the skin receives. In addition, workers are outdoors and exposed during the hours of highest UV radiation and salt harvesting occurs in summer, which increases the risk.

Figure 131. Workers in salinas are exposed to very high levels of ultraviolet radiation for a large part of their working hours and must therefore take measures for photoprotection and to cover as much of their body as possible. Saline Ettore e Infersa (Italy; left) and Salina El Águila (Spain; right). ©Saline Ettore e Infersa (left) and H.Clavero (right)

Despite these risks, salt workers have developed a culture of photoprotection to ensure their safety. Photoprotection is a fundamental component in the health of salt workers and, therefore, in the sustainability and maintenance of these environments. Salt works operators must commit to making these places safe for workers, visitors and other users.

What is prevention and how to achieve it?

Preventive health practices help us to protect, promote or maintain health and wellbeing and at the same time help to prevent diseases and health problems.

Primary prevention through education is crucial for protecting workers' health in saltworks. Both individual worker responsibility and company policies play a role in ensuring good photoprotection practices and reducing the risk of skin cancer from UV radiation.

To achieve this we propose the following steps (Figure 132):

- A baseline study should be conducted to assess workers' knowledge and practices, as well as company policies, possible gaps and existing inadequate practices;
- Training programs should be implemented to improve photoprotection policies and practices, targeting workers, institutions, and companies and;
- Personalised communication strategies within the workplace are also important to raise awareness and promote the use of photoprotection among workers.

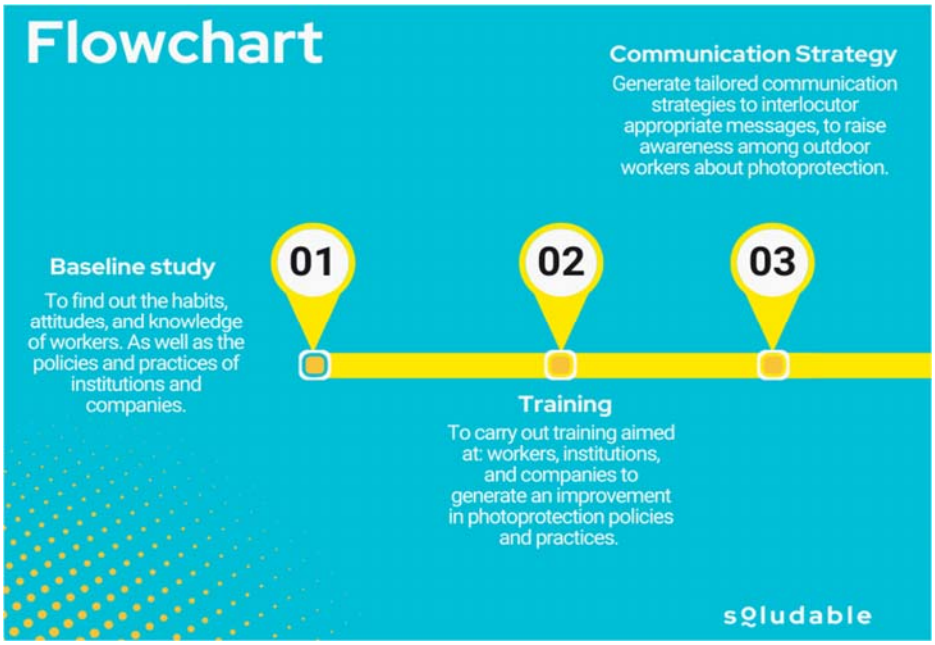

Figure 132. Model Intervention Flowchart to improve prevention. ©Soludable (2023)

Key recommendations for sun protection and disease prevention

There are ten measures that are basic and necessary when it comes to **implementing photoprotection**. These are known as the decalogue of photoprotection:

1. Avoid using ultraviolet sunbeds. Artificial tanning lamps accelerate skin ageing and increase the risk of melanoma in people under 35.

2. Limit sun exposure to midday. Between 12:00 and 16:00 noon, the risk of sun damage is greatest and the time to sunburn is shortest.

3. When your shadow is shorter than your body, take cover. The best shade is provided by natural vegetation.

4. Cover up with a hat, sunglasses, and appropriate clothing. Wear wide-brimmed hats and cover-up clothing made of breathable fabrics that ensure high sun protection (Ultraviolet Protection Factor, UPF 40+). Use sunglasses with a wide design and approved lenses (category 2, 3, 4 CE or equivalent categories).

5. Apply a UVA/UVB sunscreen that is water and sweat resistant. Choose a sunscreen suitable for your skin type and SPF 30+. Spread enough cream (2mg/cm^2) and repeat the application every 2 hours.

6. Drink plenty of water as well as fruit and vegetable juices. These will help you fight heat stroke, dehydration and repair oxidative damage induced by the sun's radiation.

7. Check the solar ultraviolet index (UVI). Start taking precautions when the UVI reaches a value of 3. Don't let your guard down on cloudy days. Reflected radiation from the sea, sand, water or snow increases the risk of sun damage.

8. Extreme sun protection in childhood. Infancy is a critical stage of risk. Babies under 1 year of age should not be exposed to direct sunlight.

9. Know your skin phototype. If you are phototype I or II, increase your precautions regarding ultraviolet radiation.

10. Keep a regular eye on your skin. If you notice any recent changes in a mole or warning signs (asymmetry, irregular edges, uneven colour, diameter ≥6mm, elevation), consult your doctor.

Skin surveillance is a subject on which there is a great lack of knowledge. It is therefore crucial to teach salt workers and other users the ABCDE rule (Figure 133) to check their moles and skin spots, attending to the 5 warning signs of melanoma:

- A for Asymmetry
- B for irregular Borders
- C for Color
- D for Diameter greater than 6 millimetres
- E for Evolution

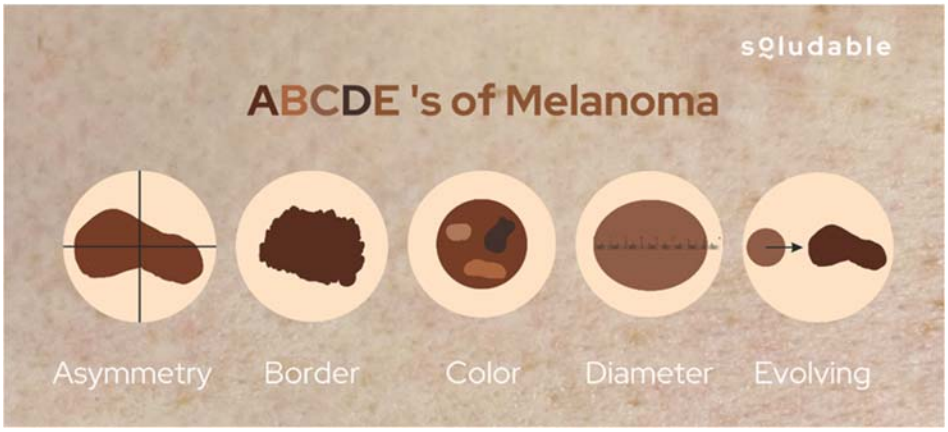

Figure 133. The ABCDE of melanoma, rule for skin surveillance. Source: Soludable project (2023) based on Friedman et al., 1985

By learning this rule they can perform self-checks, and if they detect any abnormalities, it is a priority to encourage them to visit the doctor.

Examples

Communication materials, placed at points visible to workers, can be used to convey useful information on the issue, such as the following examples. The necessary protective materials, in order to be able to follow the recommendations, must be made available to workers.

This poster contains **suggested personal protective equipment for outdoor workers** including, wide-brimmed hat, appropriate sunglasses, long-sleeved shirt, long trousers, and sunscreen on uncovered parts

(Figure 134). The poster can be placed in work areas so the workers at the saltworks can check if their clothing is photoprotective:

Figure 134. Example of Photoprotective Personal Equipment poster. ©Soludable (2023)

The **UV index** is a measure of the level of UV radiation (Figure 135). This scale contributes to alert people about the need to adopt protective measures. Workers should follow these **recommendations** and even adapt their working hours accordingly. At the highest levels (>8), extreme protection is necessary.

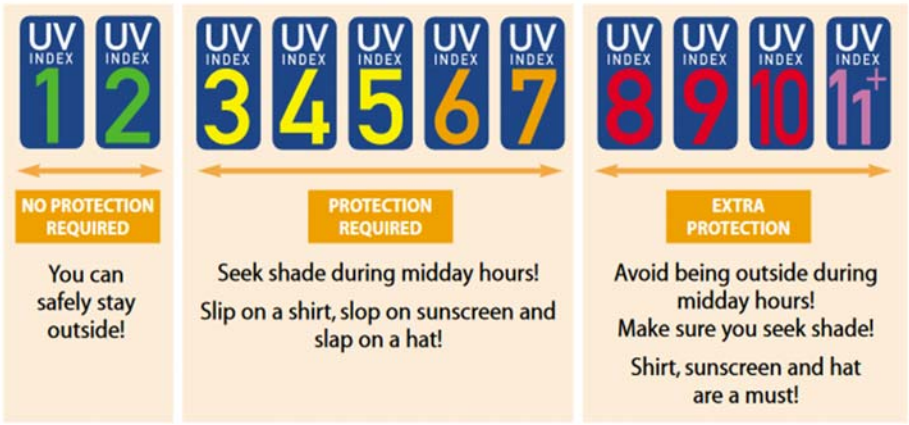

Figure 135. UV Index recommendations. Source: WHO, 2002

To ensure the use of **chemical photoprotection** on uncovered areas of the body, sunscreen dispensers should be set up in work areas with instructions on how to apply the cream as in the following poster:

Figure 136. Example of Workplace Sunscreen Dispenser Poster. ©Soludable (2023)

References and further information

The recommendations and material presented here have been developed within the framework of the Soludable project, a health promotion project launched by the Hospital Costa del Sol for the region of Andalusia.

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- Soludable Project Dossier: https://soludable.hcs.es/wp-content/uploads/2023/06/Dossier_Soludable_2023.pdf
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Section 3
Governance

Section objective: To offer solutions that support best practices for governance in Mediterranean artisanal salinas.

Governance

Mediterranean artisanal salt pans face a number of challenges to their survival and sustainability, including challenges related to the regulatory framework and to the governance and management systems of both the activity itself and the territories where the salt pans are located. Challenges can be region-wide, or specific to a country or area, and include regulatory complexity, excessive bureaucracy, the wide variety of competent bodies, and limited public support or expertise and resources.

Salt making is a complex activity from the point of view of planning and management, as it needs to comply with numerous regulations. Good governance of salinas is therefore not only focused on the internal aspects of their functioning, but also on strong, stable, horizontal, and transparent relations with other stakeholders in the area, as well as on appropriate regulatory and legislative frameworks that facilitate salt activity and ensure their sustainability.

Overcoming the challenges is crucial for the viability and sustainable development of salt flats. This section includes practical guidance on how to support effective governance by strengthening social networking and cooperation between salt sector actors, which could enable salt works to thrive while ensuring environmental management and socio-economic benefits. Other good practices that relate very directly to improving governance and management systems in salinas are also included in the previous section.

The section on Governance covers the following theme:

29. Social networking and cooperation

Factsheet 29: Social Networking and Cooperation

Author(s): Hiba Fawaz[1]
[1]Association for the Development of Rural Capacities

Model Component: Governance
Strategy: Adequate governance framework
Sustainability Components: Identify best practice in governance, cultural aspects

Justification

Networking is important for Mediterranean salt producers, offering multiple benefits for business sustainability. It provides access to valuable information and resources (on sustainable production practices, market trends, product prices, etc.), improving methods and profitability. Collaboration and knowledge sharing foster innovation and the application of best practices, enhancing product quality, efficiency, and sustainability.

Networking can also facilitate stronger market positioning and access to new markets, expanding customer reach and boosting sales. It also empowers producers to advocate for supportive policies and regulations, ensuring long-term viability.

Overall, networking is a powerful tool for enhancing the sustainability of artisanal salt producers.

What is a network of producers?

Business networks consist of interconnected individuals, organisations or other stakeholders who interact with a specific business. They may include business partners, suppliers, customers, investors or employees. They can be formal (such as trade associations or industry groups) or informal (such as online communities or social media platforms), local or global, and serve various purposes like development, knowledge sharing, or support.

Networks are particularly beneficial for small and medium-sized enterprises, as they can help them overcome some of the constraints they face, such as limited resources, lack of expertise or difficulty in accessing markets. By connecting with other companies and stakeholders, these businesses can access new markets, find new suppliers or partners, increase their visibility, and learn from the experiences and knowledge of other companies in their sector. Very often large salt producers form associations or other networks to defend their interests, but due to different contexts, small and medium-sized producers are often more reluctant to collaborate and group together, which can leave them at a clear disadvantage compared to large producers in many respects when it comes to positioning themselves in the market.

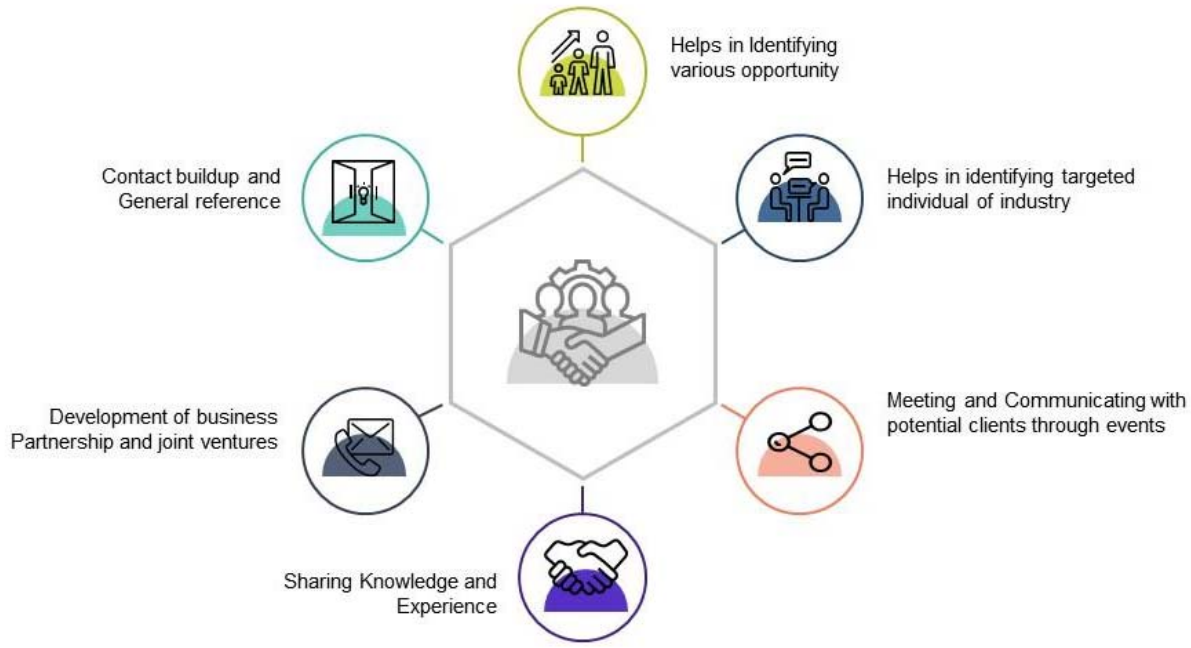

Figure 137. Six advantages of networking in business. ©SlideTeam (https://www.slideteam.net/six-advantages-of-business-network.html)

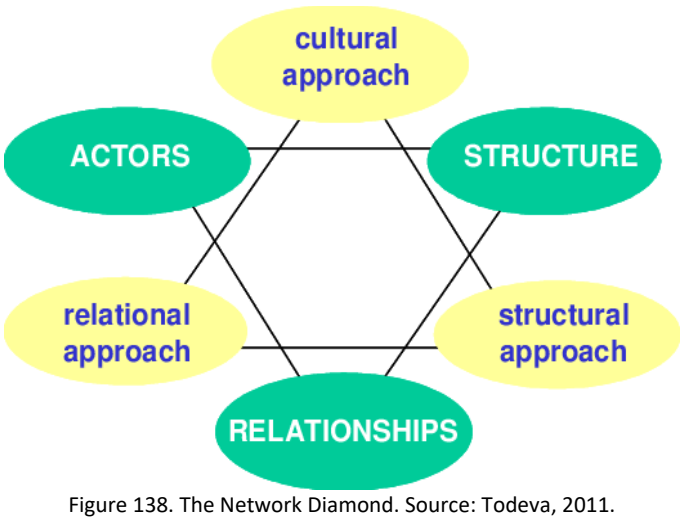

Figure 138. The Network Diamond. Source: Todeva, 2011.

Creating a network involves first defining its purpose, including identifying the target audience, the benefits to members and its objective. The next step would be to determine its structure and governance, setting out the criteria for membership, the roles and responsibilities of members, and the functioning of

decision-making processes. This may involve creating a more formal structure (such as a non-profit organisation or a cooperative), or establishing a more informal network. Next, identifying and attracting members is key to the success of the network, through outreach and marketing efforts and the development of a membership application process and acceptance criteria.

Once the network is established and members identified, network activities and services will be launched. This may include the organisation of networking events, the development of training programmes and resources, participating in gastronomy fairs, or the creation of online platforms for collaboration and knowledge sharing. Regular evaluation ensures the network remains effective and adaptable to member needs, for active and lasting engagement. To this end, it is important to collect feedback from members and to monitor the results achieved and expected.

Overall, business networks foster collaboration, knowledge sharing, and growth.

Key recommendations for a successful producers' network

- Clearly define the network's purpose and goals to align all members and foster commitment.
- Establish effective governance and decision-making structures to ensure transparency and member participation.
- Cultivate strong relationships and trust among members to facilitate collaboration and knowledge sharing.
- Invest in capacity-building to enhance members' skills and knowledge for sustainable operations.
- Develop a sustainable business model to support the network's financial viability.
- Regularly evaluate and adapt the network's activities and services to meet members' needs and achieve goals.

Examples

The following are some successful examples of salt producer networks:

1. **The Salt Producers Network "Red de Productores de Sal" in Mexico** consists of over 80 small-scale salt producers who collaborate on knowledge sharing, marketing, and the implementation of sustainable practices. They have improved production quality and efficiency, increased sales, and advocated for policies supporting sustainable salt production.

2. **The French Association of Atlantic Sea Salt Producers network "Association Française des Producteurs de Sel" (AFPS)** comprises small-scale producers on the French Atlantic coast who use traditional artisanal methods to produce high-quality sea salt. They work together to share resources and market their products globally, preserving cultural heritage and attracting customers with the unique flavour and texture of their salt. This salt is well known and appreciated

by chefs and consumers alike. This is a clear example of the benefits of networking for small producers.

Figure 139. Detail of the AFPS website. ©AFPS

3. **The Marine saltworks association SALIMAR in Spain** brings together five of Spain's most important salt companies as founding members, as an example of a union of large salt operators. They account for 85% of the national market share of sea salt, for different food and industrial uses. The association has, for example, promoted the creation of the "100% sea salt" label at national level and is an important lobby for large industrial salt operators.

Figure 140. “100% sea salt" label promoted by SALIMAR and certified by AENOR. ©AENOR

References and further information

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- https://revista.aenor.com/389/produccion-de-sal-marina-con-garantia-de-sostenibilidad.html

Section 4 Case studies (MedArtSal subgrants)

Section objective: To present an overview of the effective on-the-ground practices implemented by the awarded salinas in the framework of the MedArtSal call for proposals for sub-grants in the four countries: Spain, Italy, Lebanon and Tunisia. This call for grants represents in itself a good practice to be developed by institutions wishing to support and promote traditional artisanal saltworks, as existing financial support and grants are scarce.

©MedArtSal

Practical examples of the MedArtSal Model in Spain

Grants process managed by:

IUCN Centre for Mediterranean Cooperation

https://www.iucn.org/news/mediterranean/202101/medartsalt-call-proposals-small-grants-artisanal-salinas-mediterranean

Factsheet 30A: Adaptation to the environment and salt production at Salina San Vicente, San Fernando, Spain

Author(s): Helena Clavero-Sousa[1]
[1]IUCN Centre for Mediterranean Cooperation

Model component: Socio-economic / Environmental / Governance
Strategy: Product diversification (Services), marketing / Environmental quality / Adequate governance framework
Sustainability Components: Optimising sales strategies, reaching innovation / Ecosystems services maintenance, waste and pollution management / Cultural aspects

Description of the action

Thanks to the financial support of the MedArtSal grant, the old salt mill at the Salina San Vicente has been reconstructed, which holds cultural value and is a tourist attraction. The previously damaged structure has been restored, and a new shop for salina products can now be established on the premises. Thanks to its proximity to the production hall, this is likely to enhance daily sales. Additionally, by leveraging the stunning views of the Natural Park, the hope is that the mill can now also be enjoyed by the public and the salina will see a boost to visitor numbers.

The adjoining wall of the mill and the external floodgate overlooking the tidal channel, have also been repaired. It is expected that the reconstruction of the sluice gate and the reinforcement of the wall with suitable materials will ensure the external structure of the salt pan is better maintained and less maintenance work is necessary. A better functioning of the water circuit inside the saltworks and the better protection of the structure against tidal action and sea level rise are also expected. Therefore, increasing productivity and improving the sustainability of the saltworks and the internal ecosystem for years to come.

Project funding has also made it possible for the salina to acquire the necessary equipment for installing and testing an experimental microplastic filtration system. Thanks to the materials purchased, it will be possible to test the effectiveness of the filter in the coming months. If the new filtration system is effective, the quality of the salt produced by the salina is expected to improve.

Results

- Rebuilt old mill (25 m^2), with a new wooden structure, as well as a new roofing and electrical system. Wood and traditional techniques have been used for the structure of the mill.
- A new shop space has been set up in the reconstructed mill building.

Figure 141. The old mill building before restoration, during reconstruction works and after the intervention (front and back). Salina San Vicente, Cádiz, Spain. ©Salina San Vicente (top left and middle), H.Clavero (top right and below)

- The mill wall (40 m long) and sluice gate have been rebuilt with new reinforced concrete structure to secure both. This reinforcement will help to preserve the ecosystem as a working salina.

Figure 142. Wall and sluice gate prior to the intervention (above) and after the reconstruction (below). ©Salina San Vicente (above) and H.Clavero (below)

- A water pump and electrical materials have been purchased for the development of an experimental microplastic filtration system, which will be tested in the coming months.

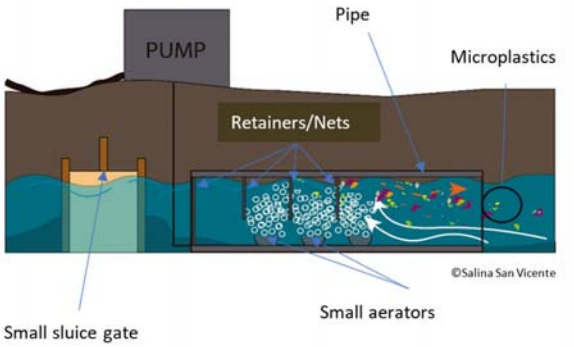

Figure 143. Prototype microplastic filter designed by the salina. ©Salina San Vicente

Challenges and lessons learnt

The work of the salina in general, and the reconstruction of elements such as the gate and mill, requires specific knowledge and specialisation and it is difficult to find specialist workers who can carry it out. In the case of this project, the work has been carried out by the workers of the saltworks itself.

As this is a small family business, it does not have many staff and the limited time and resources have made it difficult to follow up and complete all the necessary project requirements. It has been a big effort to get to this point.

In terms of purchasing materials, it has been necessary to plan ahead as they are not always readily available. Additionally, between the initial budget preparation and the purchase of the materials, there has been a significant increase in costs. Therefore, a revision of the budget has been necessary.

Further information and contact

Company's website: http://www.salinasanvicente.es
https://www.facebook.com/salinasanvicente/
Interview with the managers of the salina: https://www.youtube.com/watch?v=h0UmakSI8MQ

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Factsheet 30B: Restoration of the Marchamalo Salinas, Region of Murcia, Spain

Author(s): Helena Clavero-Sousa[1]
[1]IUCN Centre for Mediterranean Cooperation

Model Component: Environmental
Strategy: Biodiversity and ecosystem conservation, ecosystem services accounting and enhancement
Sustainability Components: Ecosystems services maintenance, biodiversity maintenance/improvement

Description of the action

The aim of the project, implemented by the Spanish NGO *Asociación de Naturalistas del Sureste* (ANSE), has been to recover part of the Marchamalo salinas and ensure the supply of water from the sea, flooding 8 hectares of artisanal salt ponds. These salinas have been abandoned for more than 25 years. With the restoration of this part of the saltworks, recovery and re-establishment will begin, which will reactivate the ecosystem services and biodiversity components that have been disadvantaged by the situation of abandonment in which it has been in recent years.

ANSE acquired the concession for the salt extraction of the eastern sector of the Salinas de Marchamalo in October 2019 and has been working on the restoration project ever since.

Results

- Installation of a water pump and associated installation to control the level of water in the salt ponds. This is an essential component of water management within the salina and thus, is also essential to reactivate salt production and support the recovery of ecosystem services.

Figure 144. Water pump installed at the Marchamalo salinas, Region of Murcia, Spain. ©ANSE

- Connection and installation of electricity in the hut where the pump has been installed, so that the pump can operate.
- Fifty metres of the filling canal, which was damaged, has been rebuilt with stone to improve the water circuit and its passage to the interior of the salina. This is a first step towards restoring the entire saltworks. The salt pans are an asset of cultural interest and the structures were therefore

rebuilt by hand with stone and finished off with a special mortar. The existing stones in the canal have been reused, maintaining the original configuration.

Figure 145. The salt pan's canal before the intervention (top left); during the renovation (top right) and after the renovation work (below). ©ANSE

- Three sluice-gates were rebuilt to control the filling of the salt ponds from the canal. The gates are made of pine wood, as wood is the only material resistant to salt. Each sluice has a frame fixed to the canal with waterproof mortar.

Figure 146. The sluice gates before and after the reconstruction. ©ANSE

- Four of the salt ponds have been cleaned with machinery, removing the mud that covered them. As a result, they are now back in working order and can be used for the production of salt. The perimeter of the ponds has also been reconstructed, reinforcing the walls and widening one of the paths. The walls have been crowned with the mud cleaned from the ponds, as this material gives consistency and also creates a nesting habitat for numerous laro-limicolae species. This work has been carried out with machinery but minimising the impact on the environment as much as possible.

Figure 147. One of the salt ponds (crystalliser) before the intervention (top left), during the works (top right) and once cleaned (below left). The perimeter of the entire crystalliser has been rebuilt (detail of the wall, below right). ©ANSE

- During the works, the population of an endemic fish present has been monitored to avoid impacts, sometimes requiring the transfer of fish present in the salt ponds.
- Informative signs have been put in place to avoid people (who are sometimes accompanied by dogs) disturbing the local birdlife.

Challenges and lessons learnt

The salina faced major administrative difficulties in obtaining the necessary permits to carry out the work, which has led to long delays in the implementation of the project. As a result, the team involved has gained valuable experience in the associated administrative process for obtaining the relevant paperwork, permits, and concessions. In terms of time, money and human resources it is a great effort and the entire procedure can take years. The process involved preparing documents, meetings with administrations and conducting reports. Weak coordination between administrations does not make this work easier.

Flexibility has been essential to carrying out this work. During the development of the project, unforeseen activities and general delays have meant that some of the planned activities have not been carried out in full or have had to be replaced by other, more pressing, activities.

The economic cost of a project of this kind, to restore and bring an abandoned salina back into operation, is high, and it is advisable to seek various sources of funding for this purpose. Having a dedicated team to carry out the work is also necessary as it requires a great deal of patience and perseverance to get the job done.

Further information and contact
ANSE's website:https://www.asociacionanse.org/medartsal/
Interview with the manager of the salina: https://www.youtube.com/watch?v=AJNrOviE1Ic

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Factsheet 30C: Sustainable cultivation of microalgae through raceways for diversification in the salina Preciosa and Roqueta, Cádiz, Spain

Author(s): Helena Clavero-Sousa[1]
[1]IUCN Centre for Mediterranean Cooperation

Model Component: Socio-economic
Strategy: Product diversification (goods and services)
Sustainability Components: Reaching innovation

Description of the action

The action has enabled the acquisition and installation of *raceway* reactors for the production of microalgae in the Preciosa and Roqueta salina. The use of this pioneering technology will support the diversification of activities in the salina and improve its economic sustainability.

After the acquisition, assembly and commissioning of the raceway reactors, and a few months of testing and optimisation of the cultivation conditions, the production of the microalgae has begun and will be initially used for gastronomy in the salina's on-site restaurant. So far, the raceways have led to the sustainable cultivation of one species of microalgae (*Spirulina*), with more to be cultivated in the future. This project is a direct result of the research carried out by the University of Cadiz and an example of how this research is supporting the private sector.

Results

In the first months of the project, the equipment was purchased, including the raceway reactors and the workshed, and the greenhouse where the reactors were later installed was set up. This equipment is where most of the subgrant budget was spent.

- Two custom-made raceway reactors for the cultivation and production of microalgae have been purchased and installed (one 6 metres long and another scaled, 1.5 metres long).

Figure 148. Microalgae cultivation plant during installation (left) and after operation (the reactor with the microalgae; right) in the salina Preciosa and Roqueta, Cádiz, Spain. ©H.Clavero (left) and Marambay (right)

- A water pump kit and a 1000L water collection tank to support the cultivation of microalgae have also been purchased.
- A work shed (detachable) has been installed in the microalgae plant, next to the raceways, for storage of the materials and reagents used in the cultivation of the microalgae and for processing the resulting cultivated product.

Figure 149. The work shed installed next to the reactor "raceway". ©H.Clavero

- The installation and start-up of the cultivation plant was followed by trials in the final months of the project to test and optimise cultivation conditions. The first Spirulina productions have been already obtained, approximately 40-60 g/day, a success in terms of productivity. The harvested microalgae obtained have been used in recipe testing for future dishes at the salina restaurant.

- Thanks to this data, it has been possible to start a second cultivation phase. This phase seeks to produce "salty" Spirulina, using seawater obtained directly from the salina for its growth. Achieving the growth of this species using seawater will reduce the water footprint, improve the environmental sustainability of production, and will open up an emerging and potential market. On the other hand, once the production of Spirulina has been completed and stabilised, the production of another species, *Dunaliella salina,* will begin.

- In terms of tourism results, to date there have been three visits to the salina linked to the microalgae plant. This visit will be offered as another activity within the company's tourist packages planned for the summer season.

Challenges and lessons learnt

On the one hand, difficulties have been encountered in finding qualified technical personnel for the monitoring and control of production, as a very specific profile is required. In this case, it has been decided to hire and train a person with a research profile, specifically for this purpose. There have also been problems in meeting the delivery deadlines of certain purchased equipment, due to the context of crisis and strikes, which has delayed the entire project.

On the other hand, it has been learned that the microalgae plant is an easy resource to extrapolate to other salinas and that the location of the plant in the salt pan itself allows species of marine

microalgae to be cultivated directly with water obtained from the salina structures, which improves sustainability. The plant also has tourism potential, thanks to the installation of innovative and unique equipment. Finally, the innovative aspect provides access to European and National funding calls to continue improving the line of research and development in the future.

Further information and contact

Salina Preciosa and Roqueta - Marambay's website: https://www.marambay.com
Interview with the manager of the salina:
https://www.youtube.com/watch?v=A_Nxw834Vy8&pp=ygUJbWVkYXJ0c2Fs
MedArtSal video: How to grow a microalgae plant in Salinas

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Factsheet 30D: Use of the natural resources of Salinas de Chiclana for health and leisure, Chiclana de la Frontera, Spain

Author(s): Helena Clavero-Sousa[1]
[1]IUCN Centre for Mediterranean Cooperation

Model Component: Socio-economic
Strategy: Product diversification (goods), marketing
Sustainability Components: Reaching innovation, optimising sales strategies

Description of the action

The subgrant has enabled the development of a new cosmetic product line using the resources of the salina. Subsequently, the salina has diversified its product offering, while also optimising the use of its own resources. This new cosmetics line will also support the economic sustainability of the salina.

Thanks to the acquisition of a vacuum machine, a type of macroalgae that grows in salt ponds can now be extracted and preserved for use in cosmetics. This result is directly linked to the research carried out by the University of Cadiz and is an example of how their research has been applied in the private sector.

Results:

- Packaging of macroalgae: thanks to the subgrant, a packaging machine has been acquired to be able to vacuum pack the algae collected in the salt ponds for later use as an ingredient in the new cosmetic product(s).


Figure 150. Vacuum packaging machine purchased thanks to the MedArtSal grant and detail of macroalgae from the salina packaged for later use, Salinas de Chiclana, Chiclana de la Frontera, Spain. ©Salinas de Chiclana

- Creation of a cosmetic product taking advantage of the resources of the salina: algae, mud, salt, and saltwater. Several cosmetic companies have been contacted and the potential of producing the desired product using ingredients from the salina has been studied. A local company has been chosen and has developed the formula and carried out the clinical trials to finally develop the product. It is now on sale at the salina facilities and online. Due to the high cost of launching a new product on the market, only one product has been selected to start with, a Face Scrub Gel. This

cosmetic line will complement the treatments offered on-site at the salina's spa. The design of the labelling and packaging has been carried out with a specialised external company.

- Online marketing: a cosmetics line section has been prepared on the salina's website in order to promote and sell the product online and increase sales.

Figure 151. Cosmetic product (facial scrub) developed during the project (top left). Detail of the packaging designed for the cosmetic (top right). Specific section created on the salina website for the sale of the new cosmetic line (bottom left). Testing the scrub gel at the MedArtSal Fair in Lebanon (bottom right). ©Salinas de Chiclana and H.Clavero (bottom right)

Challenges and lessons learnt:

The project has made it possible to optimise the collection and packaging of macroalgae, which will be used for cosmetics, among others. It has become apparent that choosing the right cosmetic company is an important and complex process which takes several months and requires visits and negotiations to reach an agreement since companies do not usually work with this type of raw material.

Finding a company that wants to work with a product that is not available in their own laboratory, can be complicated and requires a significant amount of time as the company has to assess and study the properties of the ingredients from scratch.

It should also be noted that bringing a new product to market requires a lot of testing and the procedures can be bureaucratic.

Thanks to the subgrant, the salina has been able to carry out innovative activities and take risks in the business, which is much more difficult to achieve without financial support, due to the high cost and complexity involved.

Further information and contact
Salinas de Chiclana website: https://salinasdechiclana.es/
Online shop: http://tienda.salinasdechiclana.es/
Interview with the manager of the salina:
https://www.youtube.com/watch?v=zhxdqYb7Rk0&pp=ygUJbWVkYXJ0c2Fs

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Practical examples of the MedArtSal Model in Italy

Grants process managed by:

MedSea Foundation

http://www.medseafoundation.org/index.php/it/medartsal-sub-grants

Factsheet 31A: Salt from Cervia: Sweet by Nature, Parco della Salina di Cervia, Italy

Author(s): Elisa Ulazzi[1], Manuela Puddu[1] and Francesca Etzi[1]
[1]MEDSEA Foundation

Model component: Socio-Economic / Environmental
Strategy: Product diversification (goods) / Biodiversity and ecosystem conservation
Sustainability Components: Reaching innovation, optimising sales strategies, improving productivity / Biodiversity maintenance/improvement

Description of the action
The project consisted of two main parts:

Work has been carried out to restore favourable nesting areas for protected bird species. Restoring nest areas in the salina will enhance the environmental value and promote the nesting of protected birds, contributing to the preservation of the area's unique birdlife. This targeted conservation effort aims to maintain and potentially increase the salina's biodiversity. It must be highlighted that this activity has been done under the supervision of ISPRA (competent national authority).

The introduction and testing of a new product, specifically an artisanal smoked salt infused with locally sourced flavours, presents a lucrative business opportunity for the salina. This innovative product not only boosts the salina's economic sustainability but also expands the gastronomic offerings at the salina restaurant, providing a fresh culinary experience for visitors.

Results

- Restoration of eight nest areas and the construction of three new areas to promote nesting of protected birdlife. These nesting areas, in the form of mounds of salt pan soil and stones, have been constructed inside the salt ponds to prevent predation (once they are flooded with water again).

Figure 152. Favourable nesting areas after the intervention sub-granted by MedArtSal. ©Salina di Cervia

- A new smoked salt product flavoured with local essences has been developed, along with the design of the labelling. This new smoked salt can be produced in the salina thanks to the purchase of a special oven, also bought in the framework of the project.

Figure 153. Final product realised and related labelling. ©MEDSEA (left) and Salina di Cervia

Challenges and lessons learnt

Collaboration with public and competent authorities is fundamental in order to define an agreed strategy for a sound improvement of environmental conditions and biodiversity enhancement. The increased number of species shall be monitored and collected data shall be made available for official inventories.

In relation to the production of the new salt, different tests of smoked salt have been done, and it has been found that not all the essences are suitable for the creation of a smoked salt; for example, the local pine originally foreseen, didn't give the expected results, resulting not appreciated in the creation of gastronomic proposals. The grading tests executed in different restaurants allowed the salina to define the best essence for the creation of the new products.

Collaboration with the local school has been a successful experience in terms of testing new recipes and studying adjustments in the smoked salt.

Further information and contact
Cervia salina website: https://www.salinadicervia.it/
Online shop: https://www.salinadicervia.it/catalogo-articoli
https://www.facebook.com/parcodellasalinadicervia
https://www.instagram.com/parcodellasalinadicervia/channel/
https://www.youtube.com/user/salinadicervia
Video of the salina: https://drive.google.com/file/d/1iaL8LEH5FWVaJpdKLmu3Uh3wUXd-tKOA/view?usp=drive_link

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Factsheet 31B: Recovery of Tanks and Canals of the Salina Infersa, Saline Ettore e Infersa, Sicily, Italy

Authors: Elisa Ulazzi[1], Manuela Puddu[1] and Francesca Etzi[1]
[1]MEDSEA Foundation

Model Component: Socio-economic / Environmental
Strategy: Product diversification (services) / Biodiversity and ecosystem conservation
Sustainability Components: Improving productivity, supporting social equity / Ecosystem services maintenance

Description of the action

The MedArtSal funded project has consisted of the reconstruction and reinforcement of the outer embankment that separates the Ettore e Infersa saltpans from the sea. This will improve water circulation and increase productivity, as well as keep the salt pan ecosystem in better condition. The embankment recovery project has involved using local traditional materials and techniques, such as dry-stacking stone blocks without concrete. This approach promotes environmental sustainability in the coastal area and showcases the cultural heritage of local traditional production.

In addition, the reconstruction of the embankment and its use as a new pathway enhances the environmental and experiential tourism offer known as "*saliturismo*" and improves the tourist attractiveness of the site.

Results

- The restoration and consolidation of the salt pan's external wall (around 500 metres) will prevent seawater infiltration from the "Stagnone di Marsala Lagoon," enhancing salt production by an estimated 10-15%. The engineering techniques were based on a circular economy approach and ancient building traditions, in particular the use of local tuff blocks. It has been possible to recover the existing blocks and complete the works with around 10,000 new ones.
- The embankment section has been widened with material recovered from the cleaning of the tank, making it more easily passable for walkers and suitable for (electric) vehicles.
- The project's anticipated outcomes have significant benefits for productivity, the environment, and tourism. By expanding the "saliturismo" activities to areas away from the visitor centre, the production district of "Saline Ettore e Infersa" will attract over 40,000 annual visitors. This site offers experiential tourism and serves as a production site for the premium-quality "IGP-Sale Marino di Trapani," (*Indicazione Geografica Protetta*) the only Italian salt with European-recognised Protected Geographical Indication certification. The walkaway will also be promoted by local tourist agencies.

Figure 154. The salt pan's external wall before the intervention (top left); workers at work during the embankment renovation (top right); the embankment after the recovery (middle); details of the embankment (bottom). ©Salina Ettore e Infersa

Challenges and lessons learnt

By implementing sustainable solutions rooted in ancient salt-making traditions and utilising locally sourced stones, productivity can be significantly enhanced. Additionally, diversification efforts, particularly in tourism, can transform the seasonal activity of salt production into a year-round environmental and sensory experience.

Further information and contact

Salina's website: https://www.seisaline.it/

Articles: https://www.medseafoundation.org/index.php/en/news-eng/664-sicily-salt-pans-medartsal
https://www.medseafoundation.org/index.php/en/news-eng/591-medart-sal-projects-in-cervia-and-marsala

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Practical examples of the MedArtSal Model in Tunisia

Grants process managed by:

Tuniso-Italian Chamber of Commerce and Industry (Chambre Tuniso-Italienne de Commerce -CTICI-)

http://ctici.org.tn/medartsal.html

Factsheet 32A: Ecological development of the Kerkennah saltworks, Kerkennah Islands, Tunisia

Author: Fares Hached[1]
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Model Component: Socio-economic / Environmental / Governance
Strategy: Product diversification (goods and services) / Biodiversity and ecosystem conservation, Environmental quality / Adequate governance framework
Sustainability Components: Improving productivity, reaching innovation, supporting social equity / Biodiversity maintenance/improvement, waste and pollution management / Cultural aspects

Description of the action

The aim of the DESK project (*Développement écologique de salines de Kerkennah*, Ecological development of the Kerkennah saltworks) was to use the saltworks' natural resources to cultivate new business opportunities, products and services, while also preserving local environmental and cultural values so that any profits are generated in an environmentally and socially conscious manner. The initiative involved piloting an integrated multi-trophic aquaculture experiment to produce fish in a sustainable manner, as well as to exchange experiences and techniques with similar facilities in the region through networking. In addition, an ecotourism circuit has been created, highlighting the biodiversity of the fauna, flora, and birds, and reinforcing the social responsibility of the company.

The sustainability components of this initiative included: establishing a new economic activity by harnessing aspects of the natural environment; the creation of a best practice manual for salt marsh aquaculture; the cultivation of fish and clams; comprehensive mapping of basin flora and fauna; the development of ecotourism activities and infrastructure to develop tourism offerings; and a contribution to local employment opportunities. The activities are contributing to the promotion of the environmental and cultural heritage of Kerkennah Islands.

The project has been developed in partnership with the Association of Generation Continuity (ACG) and the Association for the Conservation of Biodiversity in the Gulf of Gabes - ASCOB Syrtis, with the support of local authorities. This is a good example of successful collaboration between civil society and a salt company to propose new and innovative ideas and revitalise activities at the saltworks.

Results

- Beautification works around the saltworks.
- Eco-tourist offers developed. Two circuits have been set-up and opened: one circuit has been prepared to explore the saltworks and ponds, and observe salt production; and another more specific circuit for bird watching. Boundaries of the tourist circuit have been established, and

signposts have been installed all along the circuits. It has generated a space for exchange and sharing about salt and the richness of biodiversity and will provide the community with an opportunity to showcase local products.

- Creation of a salt museum in a natural salt and wood structure. Construction of a wooden hut in which the products of the saltworks are displayed (which will be on sale to visitors soon), as well as an exhibition of photos and panels with information on the wildlife species present in the salina.
- Organisation of educational walks and environmental education events and activities. The activities have especially involved the youth of the Sfax region.
- Several awareness-raising workshops on Corporate social responsibility (CSR) held.
- Launch of CRS certification process.
- Manufacture of new salt-generating products.
- The visibility of the products of the salina has been improved, with the organisation of visits to the saltworks and participation in fairs.
- Mapping of the saltworks' biodiversity.
- Feasibility study and implementation of a pilot experiment of integrated multi-trophic aquaculture for fish farming.

Figure 155. Informative sign about the project (top left), group taking part in an activity day (top right), students at a youth clean-up and awareness raising event organised in the salina (bottom left), and Kerkennah salinas food market during a MedArtSal workshop (bottom right). ©SODIMER

Figure 156. Wooden hut with salina products and photos on wildlife species. ©SODIMER

Figure 157. Users of the tourist circuit, on foot and by bicycle (above) and map of the circuit (below) around the salina. ©SODIMER

Figure 158. Exhibition of salina products at the MedArtSal Fair in Lebanon, 2023. ©H.Clavero

Further information and contact

https://www.kerkenniens.com/les-diamants-de-la-mer-saline-kerkennah/
MedArtSal articles: https://www.enicbcmed.eu/sodimer-experience-medartsal-huge-contribution-promotion-environmental-and-cultural-heritage
https://www.enicbcmed.eu/tunisia-medartsal-supports-local-alliances-civil-society-sustainibility-kerkennah-salinas
Interview with the managers of the salina and partners:
https://www.youtube.com/watch?v=NlTJiax3KV4
https://drive.google.com/file/d/1IZueDMmzYrNZ8o4jxgvbFgiM6Cg2g8w9/view (in French)
https://drive.google.com/file/d/1KP3NahGF6YvbnLbZjrVOTUirDNQlhnRO/view (in French)
https://drive.google.com/file/d/1lXwUW-J7iqVBrjp1P9EQ1UzaCJHJt8SE/view?usp=sharing (in French)

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Factsheet 32B: Saline Jebel Hadifa, governorate of Gabès, Tunisia

Author(s): Amous Chedli[1]
[1] SAFIR immobilière

Model Component: Socio-economic / Environmental
Strategy: Product diversification (goods and services) / Environmental quality
Sustainability Components: Improving productivity, supporting social equity / Waste and pollution management

Description of the action
The main components of the "Saline Jebel Hadifa" initiative were: the resumption of salt production at the saltworks, increased employment opportunities and the construction of access trails to the saltworks. The main objective has been to ensure that the site remains productive and that employment opportunities from the saltworks continue in the region by improving access to the saltworks. The restoration of the saltworks will bring significant benefits to the local population.

The action has included the construction and improvement of the access roads, which not only serves the needs of the saltworks but also facilitates the movement of the population living in the vicinity. Also, by building and improving roads, the project aims to prevent salty rainwater run-off (when it comes into contact with the salty soil) from flowing into and contaminating the surrounding agricultural fields managed by local farmers.

Results
- Improving access to the saltworks: access roads to the salt pans have been built and improved, prior to the completion of the feasibility study and obtaining the necessary permits.

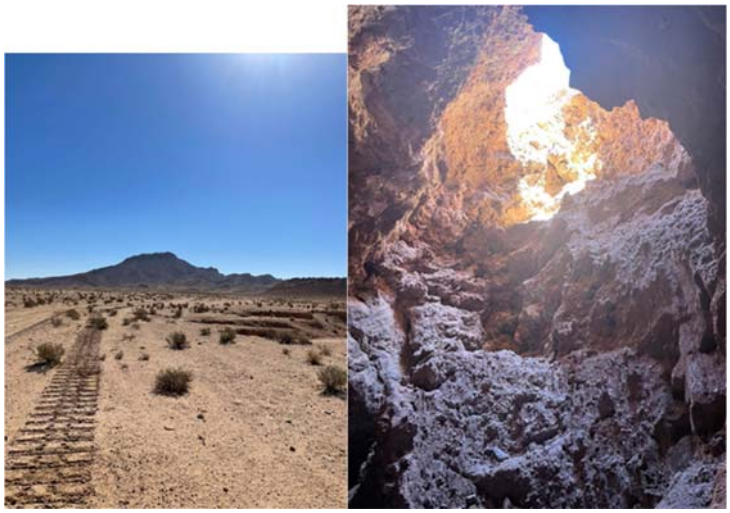

Figure 159. Improvement works at the Jebel Hadifa salina, Tunisia. ©SAFIR

Further information and contact
Jebel Hadifa salina project site
Menzel Habib, Gabès governorate, Tunisia

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Practical examples of the MedArtSal Model in Lebanon

Grants process managed by:

Association for the Development of Rural Capacities

www.adr.org.lb/callforproposalsubgrant.htm

Factsheet 33A: White Salt, Blanc Sel - Al Najjar Artisanal Salinas, Anfeh, Lebanon

Author(s): Hiba Fawaz[1]
[1]Association for the Development of Rural Capacities

Model Component: Socio-economic
Strategy: Product diversification (goods and services), marketing
Sustainability Components: Improving productivity, optimising sales strategies

Description of the action

This MedArtSal-funded action aimed to rehabilitate the damaged and unexploited parts of this artisanal salina located on the coast of Anfeh, and develop marketing skills. This is expected to increase salt production and improve the sale of the product by the owner, by creating networks and seeking the best prices. In addition, the visual identity and branding of the salina has been improved. All this is expected to improve revenue, profitability and thus the sustainability of the salt works.

Results

- 1600 square metres of salt ponds have been rehabilitated and are now productive, with the repair of cracks in the pond floor and walls.
- Production has increased by 20% compared to production before the rehabilitation.
- The corporate image of the salina has been redesigned as part of marketing and sales improvement efforts.
- The visibility of the products and of the salina itself has improved significantly, thanks to the organisation of visits to the saltworks, participation in local markets and fairs, and greater visibility in the media and on social networks.

Figure 160. Salt ponds rehabilitation (left). Salt production in rehabilitated salt ponds (right), Blanc Sel Salinas, Anfeh, Lebanon. ©Jessica Najjar/Blanc Sel Salinas

Figure 161. Promoting the products of the salina in a local market and at the MedArtSal Fair in Lebanon (above). New logo design (below). ©Jessica Najjar/Blanc Sel Salinas (top left), H.Clavero (top right) and Blanc Sel Salinas (below)

Figure 162. School visit to the saltworks. ©Blanc Sel Salinas

Challenges and lessons learnt

Increasing productivity of the salina through activation of abandoned salt ponds and improving marketing efforts by establishing a brand identity for the salina are successful strategies worth investing in to improve sustainability.

Further information and contact

https://www.instagram.com/blancsel.lb/
MedArtSal video (Arabic with English subtitles): Interviews with Anfeh salt producers
Local media interview (Arabic):
https://www.facebook.com/MorningTalkLBCI/videos/1970615203295702/
MedArtSal article: https://www.enicbcmed.eu/lebanon-medartsal-boosts-artisanal-salinas-reviving-abandoned-saltpans-and-diversifying-activities

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Factsheet 33B: Improvement of Georges Sleiman Salinas-Evaura, Anfeh, Lebanon

Author(s): Hiba Fawaz[1]
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Model Component: Socio-economic / Environmental / Governance
Strategy: Product diversification (goods and services), marketing / Environmental quality / Adequate governance framework
Sustainability Components: Improving productivity, optimising sales strategies / Waste and pollution management, energy saving processes / Cultural aspects

Description of the action

The MedArtSal sub-grant at the George Sleiman Salinas has enabled the repair of existing water tanks (damaged by storms) and the creation of new ones, which has prevented water shortages at the saltworks. Moreover, fixing the traditional windmill, pumps and implementing a new solar energy system has reduced the cost of production and the salina has significantly reduced carbon emissions.

To increase sustainability, a tourism approach has also been taken at the salt pans, which has led to a better understanding of the traditional historical process of salt production in the region and among the local population, which has been involved and engaged in the activities.

Thanks to marketing and branding efforts and product differentiation, access to new markets has been opened up, increasing profitability.

Results

- The repair and rehabilitation of old and damaged structures has made it possible to bring abandoned ponds back into operation and increase productivity.
- The capacity of the water tank increased from 320 m^3 to 2000 m^3.
- Solar panels have been installed to supply renewable energy. Fuel levels used to pump water into the salina were reduced by 100%.
- New brand image design (Evaura), and new products developed: various cooking salts, mixed with local spices or herbs, and salts for wellness and cosmetics. Product packaging improved.
- Development of an ecotourism approach in the salina. The number of visitors increased from 150 per year, before the project, to 2000 in 2022.
- The visibility of the salina and its salt has improved thanks to the organisation of visits to the saltworks, and participation in fairs.
- A spa pool has been set up to allow visitors to benefit from the cosmetic and medicinal benefits of the saline water.

- Environmental measures have been carried out such as protecting the clutches of fish that enter the facilities from the great tides, keeping the juveniles safe in the ponds until the end of the season, which also help in filtering the water.

Figure 163. Salina pond rehabilitation (top, and bottom left). After work (bottom right). ©Georges Sleiman/Evaura

Figure 164. Installation of solar panels on the roof of the hut in the salina. ©Georges Sleiman/Evaura

Figure 165. The windmill, a characteristic feature of these saltworks and a tourist attraction, before its restoration (left) and once restored for water pumping, next to the spa pool (right). ©Georges Sleiman/Evaura

Figure 166. New brand and products developed, exhibited at the MedArtSal Fair in Lebanon. ©H.Clavero

Challenges and lessons learnt

The rehabilitation and commissioning of abandoned salt ponds and the increase in the capacity of the water tanks have led to an increase in the productivity of the saltworks. At the same time, the use of green

energy (solar and wind) has reduced pollution levels in the saltworks itself (elimination of fuel oil use) and the emission of polluting gases, as well as the cost of salt production.

Further information and contact
https://www.instagram.com/sleiman_salinas
https://www.facebook.com/sleiman.salinas
MedArtSal article: https://www.enicbcmed.eu/medartsal-project-supports-white-gold-producers-four-salinas-anfeh-win-lebanese-call-proposals
MedArtSal video (Arabic with English subtitles): Interviews with Anfeh salt producers

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Factsheet 33C: Development of Malek Salinas, Anfeh, Lebanon

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Model Component: Socio-economic / Environmental / Governance
Strategy: Product diversification (goods and services), marketing / Environmental quality / Adequate governance framework
Sustainability Components: Improving productivity, optimising sales strategies / Energy saving processes / Cultural aspects

Description of the action

The MedArtSal project has enabled the implementation of a solar energy system and fixing the windmill, which has reduced the cost of salt production and the salina now has zero carbon emissions. Moreover, the salina is now more sustainable on a financial level thanks to the diversification of services, such as the introduction of a visitor path, to facilitate and promote the visits of local and foreign tourists, and the offering of new activities like snorkelling and diving.

Results

- Solar panels have been installed to power the pumps in the salt ponds, cutting energy costs and helping to reduce pollution. Fuel levels have been reduced by 100%.
- Productivity has been increased through the rehabilitation of abandoned areas of the saltworks that were no longer in operation.
- An ecotourism approach has been developed, with part of the salt pan being used for tourist purposes, and the opening of an itinerary that allows visitors to access the different parts of the salina. Several guided tours have already been organised, where visitors can enjoy the salt harvesting process.
- The number of visitors increased.
- Acquisition of diving and snorkelling equipment, which is offered as a complementary activity to visitors.
- The visibility and image of the salina and its salt has improved thanks to the organisation of visits to the saltworks, and participation in fairs. Participation in the MedArtSal fairs has allowed networking and exchange of experiences with other Mediterranean salinas, opening up the possibilities and showing the benefits of diversification of products and services.
- Improved brand image and marketing, as well as product packaging.

Figure 167. Path prepared for visitors, and guided tour at Malek Salinas, Lebanon. ©Imad Malek/Malek Salinas

Figure 168. Solar energy production system implemented at the saltworks. ©Imad Malek/Malek Salinas

Figure 169. Rehabilitated salt ponds (left) and diving equipment purchased, for diversification of activities (right). ©Imad Malek/Malek Salinas

Figure 170. Product exhibition at the MedArtSal Fair in Lebanon. ©H.Clavero

Challenges and lessons learnt

The income of the salina has increased because using renewable energy (solar and wind) reduces the cost of salt production, as well as pollution levels. The diversification of salina activities has also led to the salina becoming more financially sustainable. On the other hand, the meeting and exchange experiences with other Mediterranean salt producers, promoted and organised by MedArtSal, have been really gratifying and useful to learn and open up business possibilities in salinas.

Further information and contact

https://www.instagram.com/malek.salinas

MedArtSal article: https://www.enicbcmed.eu/medartsal-project-supports-white-gold-producers-four-salinas-anfeh-win-lebanese-call-proposals
MedArtSal video (Arabic with English subtitles): Interviews with Anfeh salt producers

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https://www.enicbcmed.eu/projects/medartsal

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