

GIAHS Proposal

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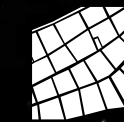
THE AGRICULTURAL SYSTEM OF VALLE SALADO DE AÑANA



AÑANAKO GATZ HARANA FUNDAZIOA
FUNDACIÓN VALLE SALADO DE AÑANA

Plaza Miguel Díaz de Tuesta 1
01426 Salinas de Añana - Gesaltza Añana
Alava - Basque Country - Spain

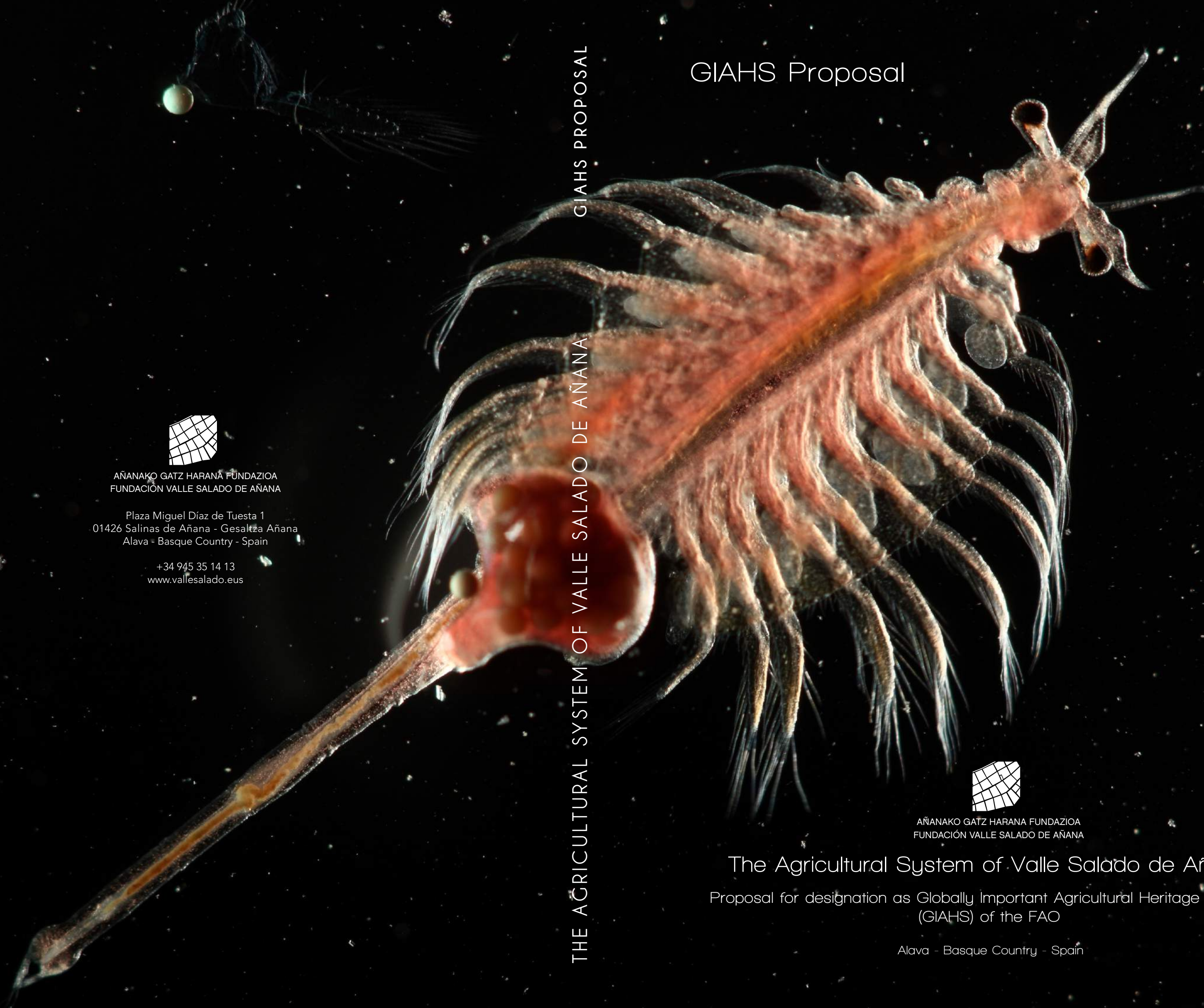
+34 945 35 14 13
www.vallesalado.eus



AÑANAKO GATZ HARANA FUNDAZIOA
FUNDACIÓN VALLE SALADO DE AÑANA

The Agricultural System of Valle Salado de Añana
Proposal for designation as Globally Important Agricultural Heritage Systems
(GIAHS) of the FAO

Alava - Basque Country - Spain



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I.1. Name/Title of the Agricultural Heritage System

Valle Salado de Añana

I.2. Requesting Agency/Organisation

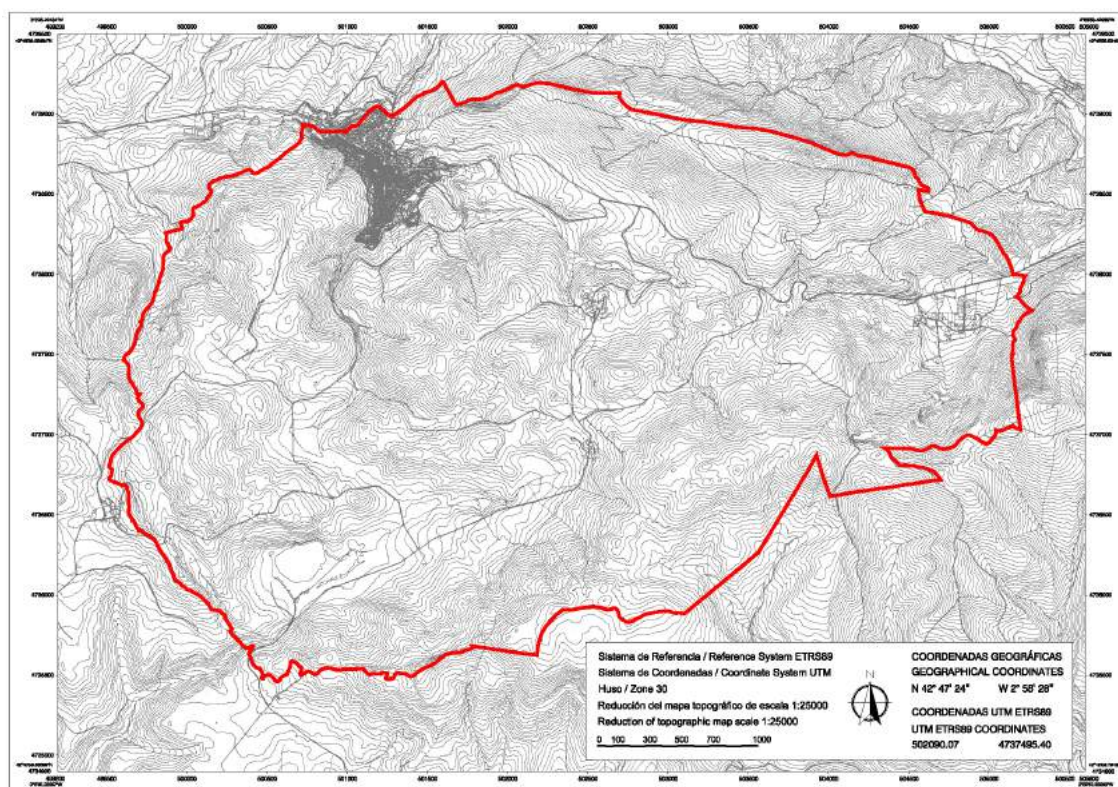
Fundación Valle Salado de Añana. Consisting of the local community, integrated by the owners of the salt works and the inhabitants of the town, and the main public regional institutions: Basque Government and the Provincial Council of Álava.

I.3. Responsible ministry (for the Government)

Ministry of Agriculture, Fisheries, Food, and the Environment. The government of Spain.

1.4. Location of the site

N 42° 47' 24'', W 2° 58' 28''



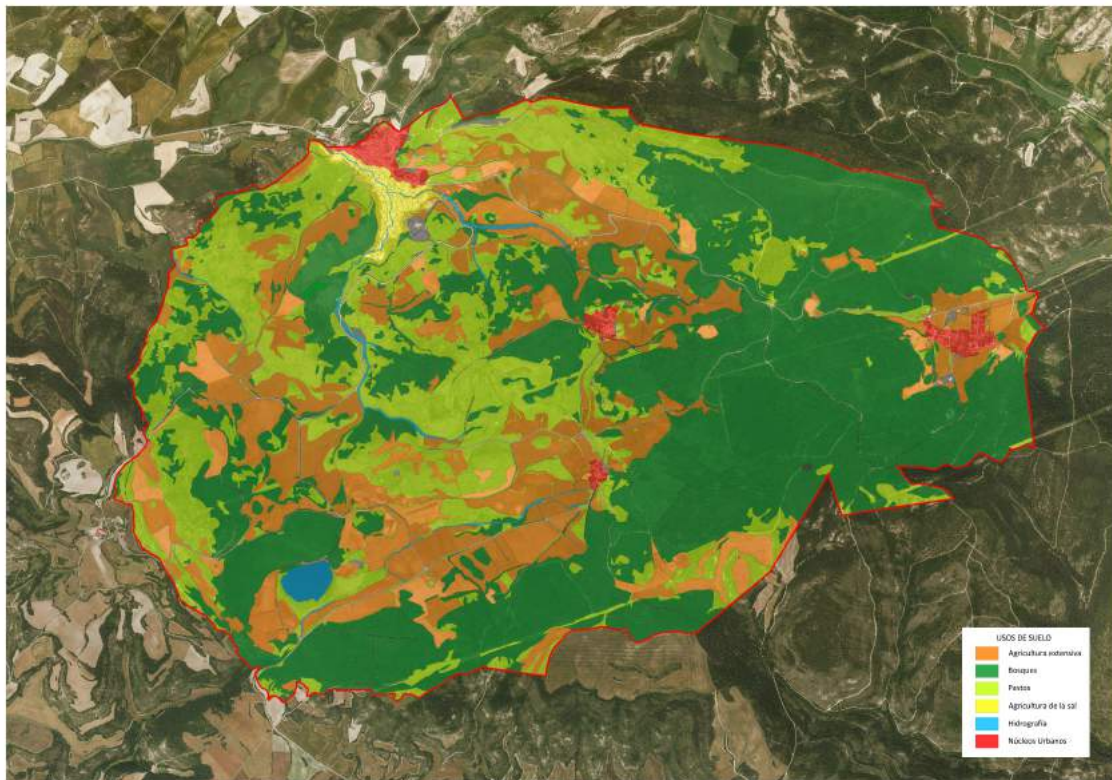
I.5. Accessibility of the site from the Capital City or Major Cities

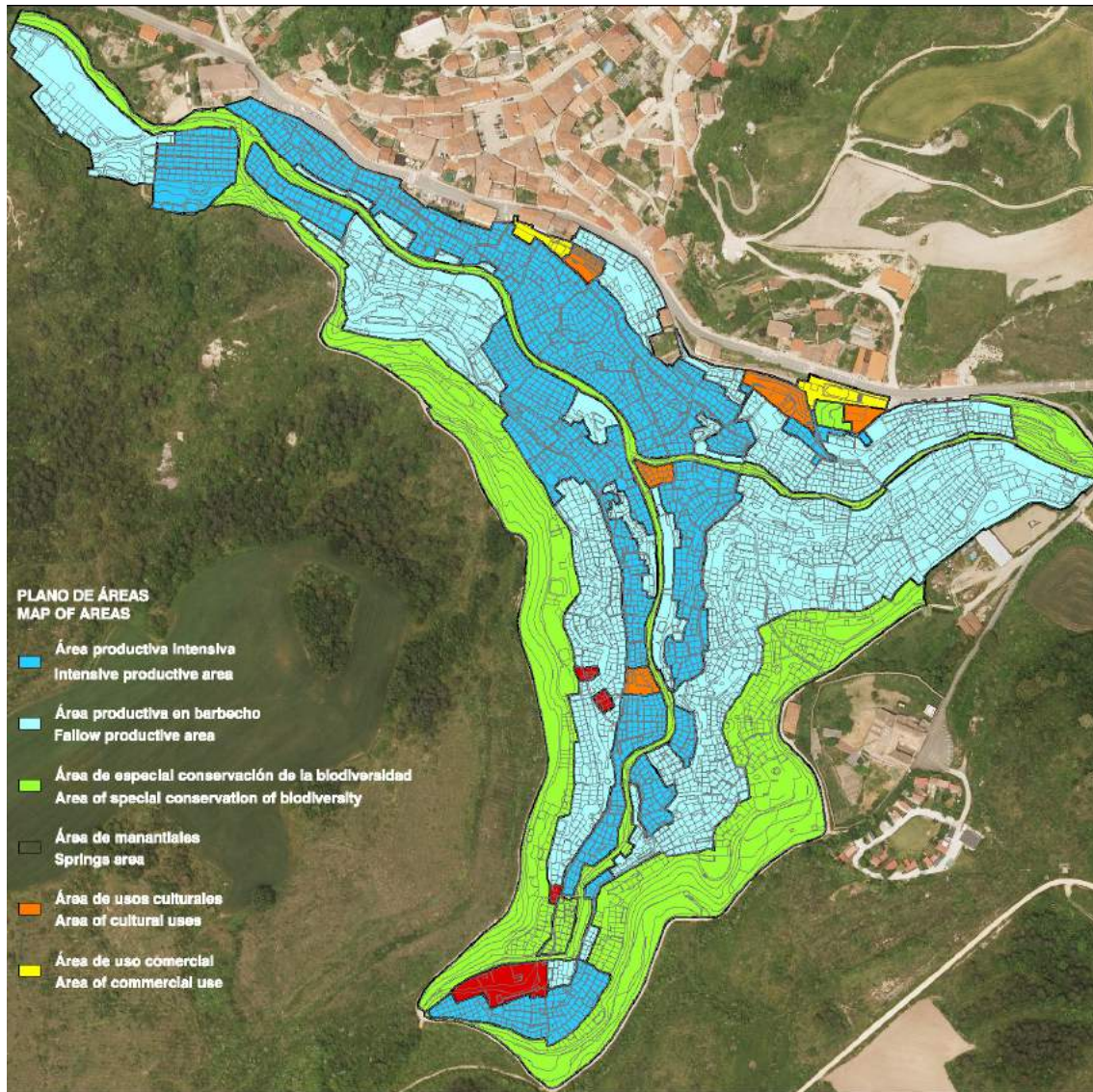
The Valle Salado de Añana is located in a abrupt area nestled among mountains, more than 30 kilometers from the capital of the Basque Country (Vitoria-Gasteiz) and seventy kilometers from Bilbao. The site can be reached by road, taking exit 340 on the “San Sebastián - Madrid: A1” road or exit 6: Pobes / Nanclares on the Bilbao / Burgos motorway: A-68. Once near the area, and after crossing one of the last level-crossings that still exist in the province, the last ten kilometers are on a local road that is both very beautiful and difficult, given that it is narrow, and it can be dangerous when meeting on-coming traffic. Most of it consists of tight bends on the so-called Tejera Mountain Pass, which reaches an altitude of 700 meters and features steep slopes that exceed a gradient of 11%. Consequently, this section of the road is often closed in winter or requires the use of snow chains, given the high rate of accidents.

I.6. Area of coverage

1.500 hectares

I.7. Agro-ecological zone (for agriculture, forestry and fishing):





The agro-ecological zone of the Añana salt valley (henceforth Valle Salado) is made up of a mixture of extensive agricultural and cattle raising areas and areas dedicated to the protection of biodiversity. All those included within the maximum degree of protection area of the Natura 2000 Network, known as the Diapiro de Añana Protected Biotope, which includes the Special Conservation Area of Lake Arreo - Caicedo de Yuso.

Within the agro-ecological zone, two areas declared as Ramsar wetlands of international importance are found: Lago de Caicedo Yuso and Salinas de Añana, which exclusively refer to the salt production system.

The former productive site could be defined as a salt agriculture zone by irrigation. Due to the multifunctionality and complexity of its system, we have defined areas based on various natural and human factors. The main factors would be:

- The altitude of the points where the springs emerge. The ingenious water system works by gravity; therefore, any areas that are above this level are considered unsustainable.
- The production of salt requires sun and wind in the summer. Consequently, the ancient know-how of the salt workers tells us which areas have been more productive historically.

- The production of salt by evaporation requires terraced, level surfaces. The valley where the salinas are located is characterized by its steep slopes; therefore, the areas that require less maintenance work on the structures are chosen for the production of salt.
- The rationalization of the production, packaging and marketing of Añana Salt. This implied that the productive areas should be as close as possible to the storage and packaging modules, and to the subsequent shipping of the salt by road.
- The last factor that affects the allocation of the areas is the compatibility of salt production with other cultural uses, to achieve the already mentioned multifunctional nature of the agricultural system.

The result is the establishment of six areas that can be seen on the attached map: intensive production area, productive area left fallow, cultural uses, area of special conservation of biodiversity, commercial area, springs.

I.8. Topographic features

The Agricultural System of Valle Salado lies within the municipality of Añana, at an altitude of 580 meters, and is located in the district known as the “Valles Alaveses” (Alava Valleys) in the west Basque Autonomous Community. “Valle Salado” the name that refers to the area occupied by the salinas, occupies the center of the small and beautiful Valley of Añana. Covering an area of 21.79 km², it includes two settlements; the town of Salinas de Añana, the capital of the municipality, and Atiega, to the north-west.

The Alava Valleys district is located in the Eastern reaches of the Mediterranean side of the Basque-Cantabrian Mountain Range. One of its major landscape features is that the geological structure of these mountains is visually accessible.

The Badaia (highest peak Oteros at 1,031 m a.s.l.) and Arkamo (Repico, at 1,184 m a.s.l.) mountain ranges are to the north. These are carved by the Bayas river as it flows towards the Ebro river and by a valley that runs from east to west uncovering the limestone ridges of both ranges. To the west, and as a scenic backdrop to Valle Salado, rises the massive limestone anticline of the Arcena mountains (Bachicabo, at 1,713 m a.s.l.) which leads north to the slopes of the Valdegovía mountains, separating the Omecilla and Losa valleys.

The eastern section and the place where Valle Salado is located corresponds to a large synclinal structure that, from Navarre in the Andia mountains (Berriain 1,495 m a.s.l.), runs along the Urbasa, Entzia (Baio, 1193 m a.s.l.) and Iturrieta mountains, the Vitoria mountains (Kapildui, 1,180 m a.s.l.), Tuyo Mountain Range, Basquiñuelas mountains (Alto de la Hayas) and the Cantoblanco (1,009 m a.s.l.) and Olvedo (941 m a.s.l.) peaks. This great concave fold, which is known as the Miranda-Treviño fold at its western end, has a gently sloping north flank cut by sharp cliffs and a southern flank that presents a soberer relief as it extends towards the Ebro in the Ribera Alta mountains, with the Turiso mountain range to the south, where the peaks of Soto (903 m a.s.l.) and Peña (840 m a.s.l.) stand out.

Bordered by those mountain ridges, the valley of Salinas de Añana, drained by the river Terrazos or Muera, presents, at its head, the diapir that provides the salt to the springs. From the town, the valley opens to the west until it joins the basin area of the Omecillo river in the Espejo district.

I.9. Climate type

The location of Valle Salado System at the western end of Álava and in the lee of the orographic barrier that divides the Bay of Biscay and Mediterranean slopes of the mountains, means that the climate in this area presents many continental features and, therefore, is classified as a transitional climate between the oceanic and the Mediterranean climate types, with a predominance of Atlantic features, as there is no actual dry summer, therefore defined as Sub-Atlantic.

Annual rainfall ranges from 400 mm in the driest years to 900 mm in the wettest. Regarding the monthly distribution of the rainfall, there is a clear decrease during the summer months, which may be classified as minor summer drought period from July to September. But, despite the fact that rain falls on fewer days and the overall amount is smaller, there are occasional, very intense summer storms that may exceed 15 mm of rainfall. The presence and development of these storms, disturbances from the Bay of Biscay (although to a lesser extent), or the cloudy weather and cool temperatures associated with these situations are key factors in the activity of the salinas, as they have a negative effect on production in the summers in which they take place.

The greater continental features of this area can also be seen in the thermal range. While the average annual temperature ranges between 11oC and 13oC, the range of absolute annual extremes exceeds 40oC, as 35oC can be exceeded in summer while temperatures below -10oC are regularly recorded in winter, with over 40 days of frost.

I.10. Approximate population (beneficiary)

The population that would benefit from recognition transcends the limits of the local community. The salt production and commercial activities and the way the project has been opened to tourism have transformed the Valley into a powerful economic engine nestled in the heart of one of the most rural and depressed areas in the Basque Country, which attracts workers from nearby villages, many of them the sons and daughters of the salt-working community. Today, 159 inhabitants are registered in the municipality of Añana, and 8,851 in the "Cuadrilla de Añana", which is the administrative entity to which the town belongs.

I.11. Ethnicity/Indigenous population

Not applicable.

I.12. Main source of livelihoods

Salt production and agriculture 85%, services 15%.

I.13. Executive summary:

In the north of Spain, 30 km from the capital of the Basque Country, lies the Añana Salt Valley (henceforth called Valle Salado). In this small valley, salt is cultivated following millennial practices, thanks to the existence of saltwater springs whose origin is a geological phenomenon called diapir, a gigantic bubble of salt from a sea that disappeared millions of years ago. The Valle Salado is an element of an intricate hydrogeological complex, the basis of a multifunctional system in which agroforestry and stockbreeding and farming are intimately linked to saline environments and salt production, occupying an area of 1,628 hectares. From this territorial base, the salinas of Añana proper occupy 13 hectares and host a large halophilic agro-biodiversity, adapted to salinity, which has led to its inclusion, together with Lake Caicedo, in the Ramsar Convention's list of wetlands of international importance. This area is an essential part of the salt production process, thanks to the empirical knowledge that the community of salt workers has transmitted from generation to generation.

The nearby Caicedo Yuso Lake is another essential element of the system, in which the production of salt and an environment rich in halophilic biodiversity coexist in perfect balance with traditional agricultural activities and the water quality of the rivers. The native forests were depleted to use timber as a building material, thus taking advantage of the free land for cattle, which in turn helps to regulate vegetation growth. Other building materials used, such as clay and stones, are extracted from the environment, while the salt activity contributes to control water quality, avoiding damage to the ecosystem by increasing salinity downriver of the valley. Everything works in a perfect cycle, with strong interrelationships, extremely important in terms of biodiversity with rare endemic species.

The landscape of the Valle Salado is based on a complex hydraulic system of distribution and storage of brine, composed of hundreds of channels of pinewood that distribute it in all corners by gravity, complemented by millenary salt cultivation techniques that are carefully preserved. In its wise adaptation to the physical environment, which is reflected in the succession of terraces built by humans with dry stone, wood and clay and in the salt crystallization basins, small but necessary changes have been gradually introduced to continue to be today the means of subsistence of the local community, respectfully preserving the basic conditions that experience shows are the key to their exploitation, which justify its *raison d' être*. Aspects such as agro-biodiversity, local and traditional knowledge systems, culture, value systems and social organizations, the environment and physical framework, the hydraulic system, the tools, the language - the traditional vehicle of know-how and traditions - are maintained.

The Valle Salado of Añana has provided food and a secure livelihood for more than 7,000 years, starting in the Ancient Neolithic, when humans evolved from being hunters to producers and began to need salt. During the Roman period, an important change took place when fire was no longer used as a method of evaporation and the sun began to be used in a way that was practically identical to the one used today, and towards the 8th century, the ingenious system of distribution and storage of salt water was created. A few centuries later, a community-led organization of salt workers was created and still is part of the valley's management. Despite that the changes in transportation and the production of industrial salt from the nineteenth century onwards produced a strong impact, the salinas managed to recover. Thanks to their tremendous resilience, they adapted to the new situation, always relying on knowledge, traditions and ecological respect. The Fundación Valle Salado emerged shortly after, applying criteria of quality and multifunctionality, with a regard to history, completely recovering the basic principles that have governed its history throughout millennia. Today, there is still work to be done, but the Valle Salado, once again, can look towards the future.

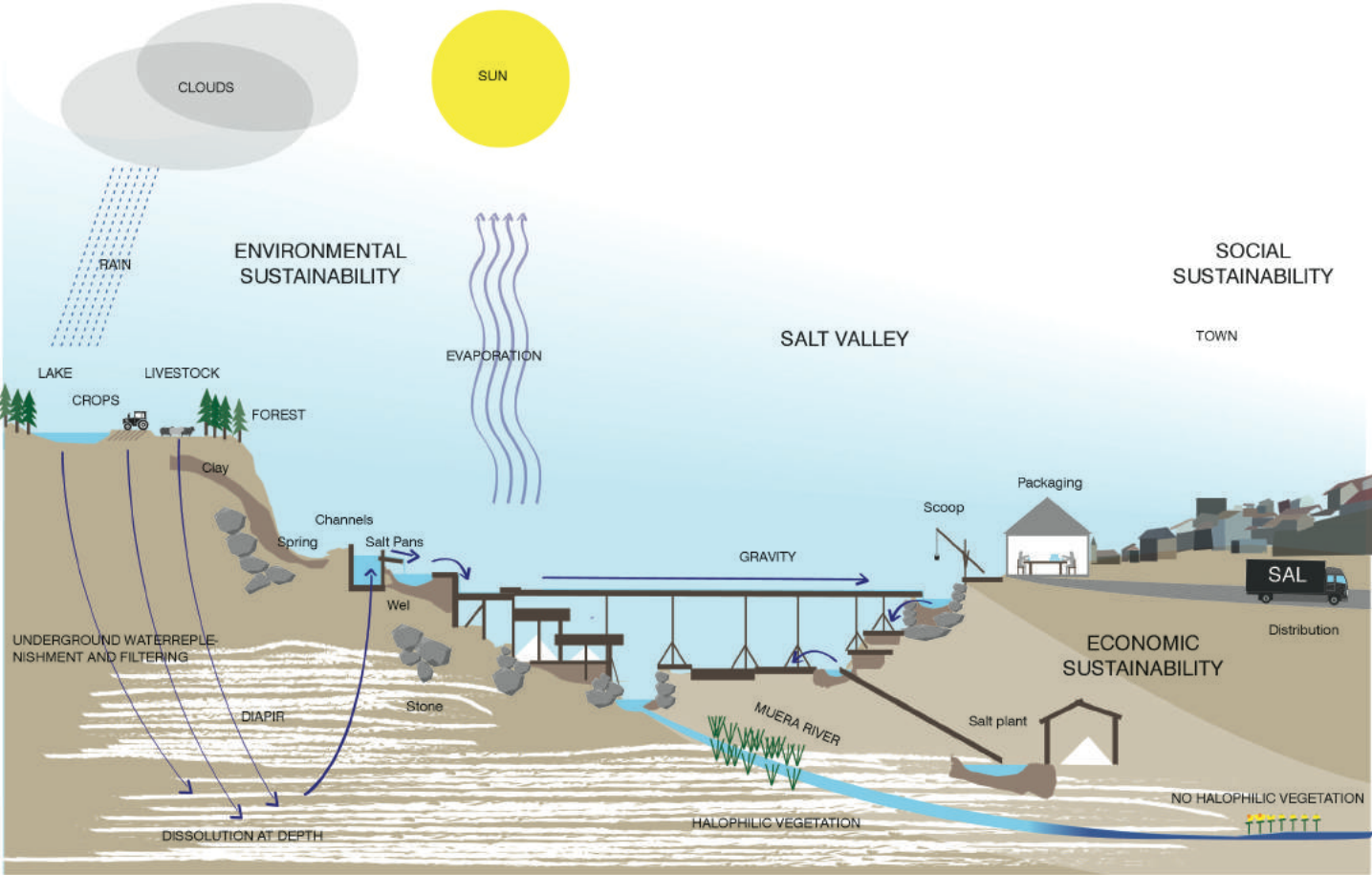
The Valle Salado is therefore a remarkable example of the interaction of human beings with the natural environment in the creation of a unique system whose origin dates to Prehistory, being preserved and kept alive, in a dynamic evolution that has allowed it to adapt to production rhythms that ensure its sustainability. The site is a paradigm of wise and discreet human intervention on the environment, taking advantage of it to the limit of sustainability, a wonderful example of popular wisdom that is reflected in an Agricultural System of incredible but simple beauty, an example of sustainable use, which has also known to incorporate the new quality requirements,

uses and management of contemporary society; a society that lives, exploits, maintains and enjoys it, becoming strongly involved in its management, and is a part of it.

In short, the Valle Salado system is an outstanding answer to a fundamental need for all humanity: the cultivation of salt, an indispensable element for its subsistence. Throughout history, humans have invented and setup different types of exploitation to obtain the so called "white gold" worldwide, but Salinas de Añana stands out among them for many reasons: its local community has managed to make a living from salt for more than seven millennia; its agrobiodiversity; its ingenious hydraulic system; its complex system of terraces built with stone, wood and clay; the process of obtaining salt, taking advantage of the sun and the wind. All in all, for the uninterrupted evolution and adaptation to the environment, derived from the traditional knowledge of the saline community transmitted from parents to children.

II. DESCRIPTION OF THE AGRICULTURAL HERITAGE SYSTEM

II. 1 Significance of the proposed GIAHS site



The Valle Salado agricultural system has an oval shape with a total extension of 1,500 hectares and can be considered a paradigmatic example of the theory of the properties of the landscapes of Professor Gonzalez Bernáldez (1981). According to this theory, there is a part of the system that is not visible to the naked eye (cryptosystem) and that is formed in our case by the diapir hidden in the subsoil, but that explains what can be seen (phenosystem), made up of surface elements with such extraordinary values as the Valle Salado de Añana, with an area of 12 hectares and the lake of Caicedo Yuso, with 13.5 hectares.

Thus, what at first sight has no relation whatsoever with each other - the agroforestry and livestock activities on the one hand, and saline environments and salt production on the other - are intimately linked by the diapir and the complex flows of water within it.

The diapir is a typical geological structure of halite or rock salt (NaCl) that tends to rise below the surface due to the lightness and plasticity of the salt it holds. This salt was accumulated by evaporation from the Tethys Sea during the Triassic period 200 million years ago. Typically, the diapiric systems, due first to extrusion and then to erosion processes, have semi-circular flat-bottomed valleys bordered by more recent rock escarpments. But in the case of Salinas de Añana, the greater and interspersed presence of ophiitic intrusions and Jurassic limestones determine that the system is formed by an endless number of gently sloping valleys and hills, drawing a mosaic of reliefs. This character of the system is reinforced by the land uses, occupying the valleys with cereal and gall, holm and Pyrenean oaks forests as well as meadows in the hills.

Below the surface we find an intricate hydrogeological system. The unique structure of the diapir that emerges in this area is a complex aquifer that presents a mixture of interrelated materials of different behavior, where hypersaline flows coexist with others less salty, of greater or lesser speed, depth and transit time. As will be seen later, this medium is very sensitive and any alteration - even on the surface - would cause irreversible an impact in the flow pattern that governs the springs of the salinas and Lake Caicedo Yuso.

The most important elements of this complex landscape are those to which nature has provided high levels of salinity: the Valle Salado and Lake Caicedo Yuso.

The Valle Salado is located at an altitude of 580 meters above sea level in a markedly uneven valley with a characteristic Y-shaped shape crossed by the rivers Muera and Vitoria. Its location at leeward of the orographic barrier of the Cantabrian-Mediterranean hydrological divide determines that the climate of the area is transitional between oceanic and Mediterranean. The precipitation regime (from 400 to 900 mm per year) is characterized by a period of summer drought from July to September, although very intense summer storms are present that can exceed 15 mm. Also important is the orientation of the valley, which acts as a funnel for the prevailing winds. This is a determining factor when it comes to evacuating the small masses of humid air resulting from the brine evaporation process, which facilitates and accelerates the crystallization of the salt.

On the other hand, the small watershed of Lake Caicedo Yuso presents an interesting agroforestry mosaic of extensive herbaceous crops (cereals, rape, potatoes, beet...) and oak forests (holm, gall, Pyrenean), which are not affected by soil salinity, as it is confined in deeper layers. From an ecological point of view, the agricultural system of the diapir is a habitat connecting element in the great mountain corridor that extends from the Cantabrian Sea to the Western Alps. It can also be considered as a great ecotone formed by the three natural regions present in Álava: the Atlantic, the Mediterranean and the transition between these.

In both sites, sources of hypersaline waters spring up, close to the 240 gr/l that are needed to precipitate the salt. Of these, only four are used for salt production: Santa Engracia, el Pico, la Hontana and Fuenterriba, which arise naturally, without the need to build wells or pump the brine from the subsoil as needs to be done elsewhere. Also, three kilometers south of the salinas is Lake Caicedo Yuso, which in part also feeds on a strong hypersaline spring. Thus, the system described here encompasses the outcrop of the diapir and its agro-ecological values, both of which are strongly conditioned by the presence of this geological structure. Partly thanks to it, it

hosts landscapes, ecosystems, areas of geological interest, geomorphological formations, and elements of biological interest of notorious uniqueness, rarity, beauty and scientific interest. In addition, the presence of salt water leads to the appearance of halophile vegetation, which is another unique scenic feature of the Valle Salado Agricultural System.

Local and international system protections

The Valle Salado of Añana is an outstanding example of the interaction between humans and the natural environment in the creation of a salt producing agricultural system whose origin dates to Prehistory, more than 7,000 years ago, and which in the 21st century continues to enjoy great vitality. This productive system is a unique testimony to a traditional agricultural way of life that lasts to this day, having enjoyed a dynamic and resilient evolution that has allowed it to adapt its production method to the specific features of each era to ensure its sustainability.

The survival of the traditional agricultural system of the salinas of Añana in the face of global challenges that threaten sustainable development is due to two essential factors. On the one hand, an activity management strategy that combines, on the one hand, the active and equitable participation of all parties involved. On the other hand, the diversification of activities and uses given to the products and services obtained and derived from the main activity: the artisanal production of salt. In recent years, the new quality and sustainability requirements of contemporary society have been incorporated into all of this, with a salt making community that is perfectly intertwined with the Valley, which lives, exploits, maintains and enjoys it, becoming strongly involved in its management and involving all citizens in this unique agricultural heritage.

Thanks to all this, the Valle Salado and the Añana diapir have been protected with many different conservation figures, both locally and internationally. The protected biotope Diapiro de Añana, which covers the area underneath which the diapir feeds the salinas is found (Decree 85/2016, of 31 May, in BOPV 159 of 23 August 2016), is worthy of special mention. The biotope includes the Special Conservation Area (SAC) of the Lake Caicedo, Yuso and Arreo (Natura 2000 Network) as well as the two Ramsar wetlands of international importance (Resolution of 17 October 2002, in BOE nr 278 of 20 November 2002), the Valle Salado de Añana and the lake itself. The Salinas de Añana, on the other hand, was declared a National Historical Monument in 1984, a figure that changed into Bien de Interés Cultural (Good of Cultural Interest) in 1990, the first of its kind to receive this distinction in Spain. Finally, on March 26, 2013 the Cultural Landscape of the Valle Salado de Añana was declared Monumental Site.

Elements of the system and relationships

The diapir

The Añana diapir is located in the Basque-Cantabrian Basin, to the west of the Pyrenees and has an oval shape. According to some models, it reaches a depth of 3.5 km (Pinto et al. 1998). The origin of the diapir dates to the Triassic period (200 million years ago), a geological period in which the sea of Tethys and the salty lakes that existed in the interior of the continents were evaporating, as a consequence of the warm climate that prevailed then. This water was saturated with salts and when evaporated, the salts were then deposited in the soil, in a process of epicontinental sedimentation. Over time, these layers of salts were covered with more recent materials. The repeated phenomena of sinking, re-flooding and subsequent dehydration of marshy environments suffered by this marine basin occurred in subsequent periods, creating saline deposits of great depth and extension. Another consequence of these processes is the presence of fossil footprints; by species that have inhabited these marshy environments, although from much more recent times, in the Miocene (5-25 million years). The abundance and quality of these remains allows us to affirm with objectivity that the Salinas de Añana deposit harbors the best collection of fossil footprints of the Miocene known in the world (Valverde 2007, Alonso 2010, Frankovic et al. 2016).

The diapir of Salinas de Añana is formed by materials of very low permeability (clays and gypsum) that include masses and fragments of rocks of varied permeability, mainly ophites (dolerites) on one side and on the other, carniolos, limestones and dolomites. This second group of rocks is considered to have a high permeability, especially because of the important meteorization they can present (Telur 2015). Jurassic carbonate and/or dolomitic materials, together with ophites and breccias and emerging carniolos, are the most interesting from a hydrogeological point of view. The fact that they appear within a diapir considerably increases the permeability of these formations due to fractures, as the contact surfaces are frequently mechanized. The carbonate and/or ophytic masses are thus "floating" within the Keuper clayey masses.

The impermeable materials contained in the diapir, such as clay, loams and gypsum, in addition to salt, have lower density and greater plasticity than those of more recent geological origin - limestones and loams from the Jurassic and Cretaceous periods - which cover it. The salt and other materials found inside the diapir, favored by tectonic movements or by the differences in pressure of the covering package, were migrating towards the surface by halokinesis. In their ascent, the caprock that covers it is broken, just as a mushroom would make its way through the forest floor to the surface. This is how the so-called chimneys are formed, which can be located above all on the perimeter of the diapir. As a result of this process, the carniolos or ophites emerge. Both rocks are very characteristic of the area and have been used traditionally in the construction of houses and salt infrastructures. The ophites are distinguished by their dark color - black or greenish - and their compact appearance, while the carniolos, which are light in color, have a rotten appearance. Likewise, as a consequence of the ascending movement of the diapir materials, gullies have formed which leave the versicolor clays visible, with violet, pinkish, green tones, etc. These are sites of great aesthetic beauty, but also vulnerable to erosion (Valverde 2007).

Diapir hydrogeology

The water recharge in the diapir ensured by runoff and direct leaching of precipitation falling on the surface. In those sectors with carbonate or ophytic masses nearby, a possible indirect infiltration from the stream bed should not be ruled out. It is estimated that 80% of the water resources of the diapir are converted into underground runoff, most of which ends up being retained in aquifers. These are characterized by being captive or confined, that is, separated from the atmosphere by an impermeable soil layer and saturated with water, so this water is found at a pressure higher than the atmosphere and has a high dissolution capacity. These aquifers emerge occasionally, taking advantage of a tectonic weakness, as artesian wells through which a continuous flow of salt water flows and where the decompression can be appreciated in the bubbles that are formed on the surface. Some of these aquifers, which are relevant on a regional scale, are therefore included among the materials that the diapir passes through in its ascending movement. Although the impermeability of evaporitic materials makes it difficult to pass through water, the structure behaves in fact like a major surge.

The high level of compartmentalization or isolation, at least superficially, of permeable materials conditions the existence of a large number of small bodies of water drained by small springs. Where these masses acquire greater importance, the most important channels and springs appear: those of Vitoria, which crosses the eastern part of the salinas; the Añana river, which rises in the springs of Paul; the Arroyo del Lago, which rises in Caicedo Yuso; and the Amarguillo or Muera river, which rises in the Manantial de la Muera and drains the Valle Salado. The river Muera is sweet at its source, but acquires a saline character from the recharge of the Santa Engracia spring. The waters of the Muera make their way westwards to the Omecillo in Espejo, a river that in turn joins the Ebro beyond the town of Bergüenda. (Valverde 2007, Eguluz et al. 2011, Telur 2015).

As already mentioned, hypersaline flows coexist inside the diapir with other brackish and even freshwater flows, of greater or lesser velocity, depth and transit time. The flow of the saline springs is different from that of the less mineralized waters, but in no case independent; it is different

because the tremendous heterogeneity inside the diapiric unit allows the coexistence of different networks, even though they may share the same recharge and/or discharge areas. The difference is that in some cases it is possible to reach greater depths than in others, to cross saline masses or not, or to travel at faster or slower speeds... Although the hydrogeological system of the diapir would require more detailed studies, it is known that the flow of the springs -especially Santa Engracia- is stable in terms of flow and composition over time (Rojo et al. 2004). From this -and from the high conductivity- it is deduced that the water flows inside the diapir that feed the springs are slow and deep. Decades can pass since the rain hits the surface and this water reaches the springs (Iribar & Ábalos 2009) (there are no traces of Tritium, a constituent element of atomic bombs in 1945 and used as an indicator to determine if a given mass of water is older or not than that time).

For this reason, it is especially important to understand the system as a whole, in which the Valle Salado and the rest of the system act synergistically. The diapir is the element that guarantees the flows of water -both in and out of the system- and allows, despite its high salinity, that salt production and the creation of environments with high halophilic biodiversity are compatible with traditional agricultural activity and the quality of rivers. The joint protection of this saline and agricultural system allows the different activities that take place in it to be kept in balance as it is today.

Lake Caicedo Yuso and the rest of the biotope

Lake Caicedo Yuso, another essential element of the system, is located on the southwest edge of the diapir of Salinas de Añana, in the northwestern basin of the river Ebro. It has an ellipsoidal shape and a surface area of 13.5 ha. It is a halokinetic structure resting on evaporative formations of the Triassic, since it geologically originates from the same diapir. Lake Caicedo Yuso is the best example in Spain of a karstic lake formed on evaporites and constitutes the deepest water body (ca. 25 m) with gypsum substrate in the Iberian Peninsula. The lake is hydrologically open, with a small stream that enters the lake from the east and a small ephemeral outlet, a tributary of the river Ebro, which flows southward (Rico et al. 1995). The lake was formed when the gypsum substrate that covered a captive or confined aquifer near the surface collapsed. The continuous contact of the water that remained under some soluble rocks such as gypsum, initiated a slow solution process. Gradually, the solution of these materials continued and, together with the erosion that was also acting on them on the surface, the materials finally subsided and the lake basin was left as a result (Valverde 2007). It is worth noting that the water balance within the basin of Lake Caicedo Yuso is balanced, without gain or loss processes within the lake itself, nor does it depend on Añana's salt springs, although it is obviously part of the same great hydraulic system: the diapir (Telur 2015).

The biotope

The covering layer of the diapir - that is, the surface of what is protected as a biotope - has allowed the use of the soil for agricultural, livestock and forestry purposes, which have undergone slight variations in recent decades, but which, in essence, have been carried out extensively and in medium-sized plots. The extensive nature of the activity has meant that the use of natural resources, especially water from the diapir aquifers, does not pose a threat to the recharge of salt springs, although this is an aspect that needs to be monitored. On the other hand, there is no evidence of any leaching processes of fertilizers, pesticides, etc. that have come to percolate into the salt water springs.

From an aesthetic point of view, the agricultural and forestry activity has maintained the landscape with an aspect consistent with what is seen in its surroundings, beyond the limits of the system. This offers an aesthetic continuity that gives serenity and harmony to the whole. The fact that the

plots are small and the topography is undulating, makes us obtain an agroforestry mosaic of great plastic and chromatic richness, which in a way imitates in its structure the mosaic of the salinas.

The salt

The beginning of the salt production works in the Valle Salado of Añana is linked to the human need to obtain the only edible stone of nature, salt. A common mistake today is to consider this product as a simple, cheap condiment with bad press. However, this product is essential for several reasons:

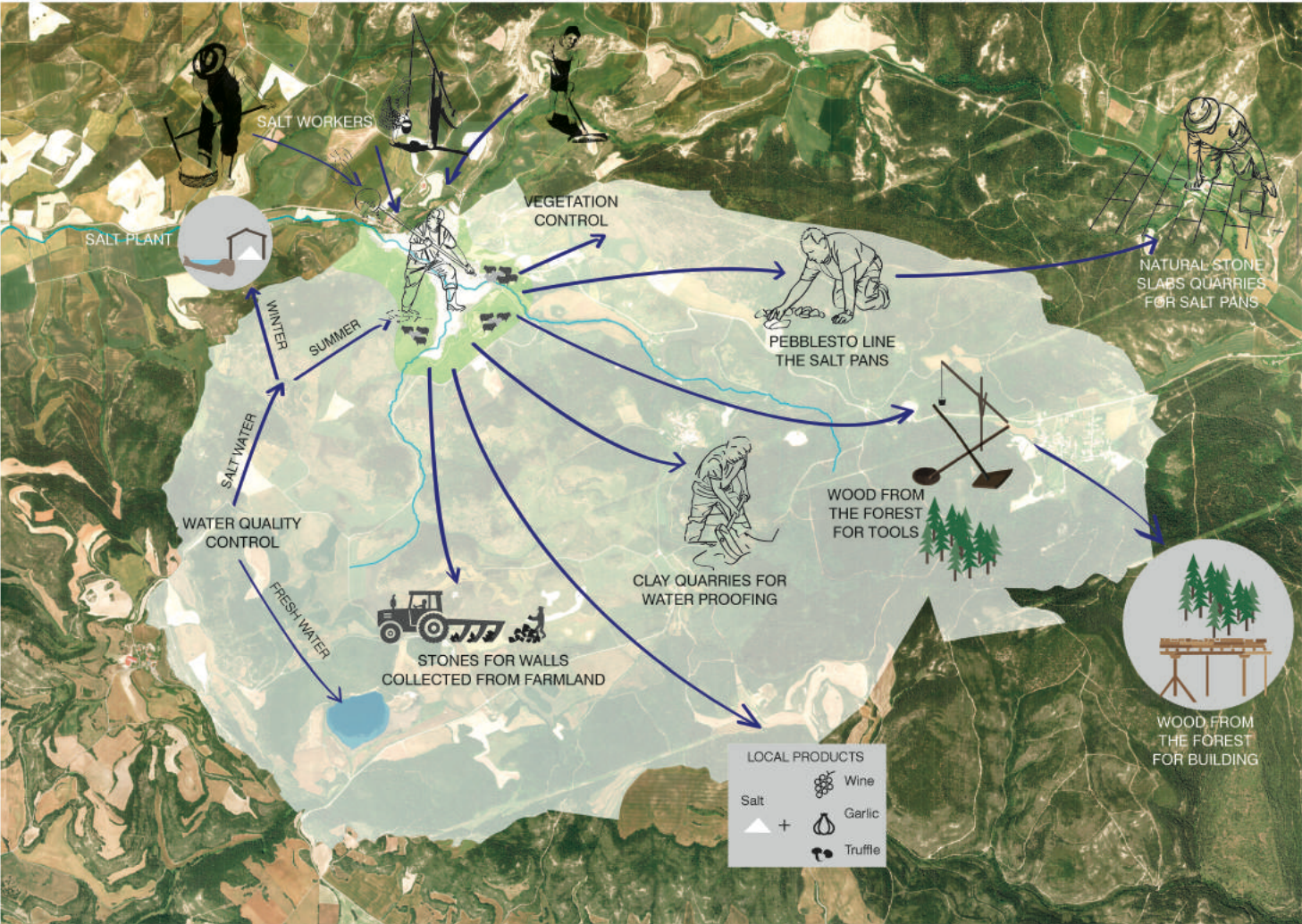
- Firstly, one of the most important uses linked to the origins of its exploitation is that salt is a chemical compound (NaCl) vital to the physiological functioning of living beings, both humans and animals. It is essential for growth, good bone structure formation, development of the hormonal system, locomotion, reproduction and longevity. The human body of an adult person stores a quantity of salt equivalent to 1.5 grams per kilogram of weight. This quantity must be maintained to avoid physiological disorders, so that it is necessary to ingest between twelve and fifteen daily grams of salt.

- Second, because of its antiseptic properties, it has been essential for the preservation of foodstuffs, mainly meat and fish, especially before the appearance and widespread use of refrigerators.

- Thirdly, it has been and is an indispensable product in a multitude of activities, both in traditional - tanning leather, dyeing, pottery and soap making, among others - but also in new activities such as modern chemical industry. It is known that both salt and its separate components - sodium and chlorine -, which cannot be obtained separately in nature, can have up to 14,000 different uses.

- Fourthly, salt is a seasoning. The high price of this product until the 20th century meant that its use was restricted to the wealthy classes. Today, however, it is a staple commodity in the kitchen, anywhere in the world, thanks to its ability to enhance the taste of food. A part of society - especially in the haute cuisine sector - is increasingly concerned about quality, the origin of products and nuances such as texture or taste. These features of salt become the distinguishing elements of a product made with care and zeal that can only be provided by seven millennia of experience and adaptation to change.

Landscape and human activity



The value of the Valle Salado, an agricultural salt production system, resides in the complex hydraulic system of distribution and storage of brine composed of hundreds of channels of pinewood that bring the brine to all corners of the site, by gravity. Essential to the valley's functioning is the old communal distribution system, as well as its unusual adaptation to the physical environment, which translates into the succession of stepped terraces built by humans with dry stone, wood and clay and in the salt crystallization ponds.

But, in addition, the intervention carried out by the salt community to obtain salt is unique, not only because of its construction techniques and the impressive system that is created with the symbiosis of all of them, but also because the more than 7,000 years of uninterrupted evolution of the Valle Salado are perfectly preserved, having adapted to the environment and to historical events, as explained later in this document.

This evolution brings together in the same site centuries old production structures, which were developed for production systems already in disuse, with others that were built throughout the twentieth century. The salinas are not a frozen system in time, but are the result of a complex evolution developed by the saline community for thousands of years, through a long trial-and-error process based on its empirical know-how, to obtain the most efficient way to obtain the greatest amount of salt. It thus corresponds to the perfect definition of the system as a "combined work of humans and nature".

Thus, in order to understand the Valle Salado, we need to comprehend the importance of salt throughout history in the survival and food security of human beings in the world, being a key product in food preservation and transportation in times of war, for example. On the other hand, artisanal production so clearly reflected in the Valle Salado has only been possible thanks to the wisdom of the local community and its determined effort to keep alive a tradition adapted to the environment and totally sustainable. This applied sustainability, demonstrated in the Valley, has ensured its adaptation to the different challenges it has faced and has shown itself to be the key to a resilient local community thanks to its artisanal salt production. This in turn has prevented the rural exodus, so characteristic of other salinas in the world, with the consequent socio-demographic deterioration that it entails.

The activity of artisanal salt production is not only limited to obtaining brine and its evaporation, but to survive it needs to relate to the surrounding environment to obtain the necessary resources to develop its activity.

The production of salt has required the execution of various activities that have left their mark on the surrounding landscape. Firstly, deforestation of indigenous forests has historically taken place. From 7000 to 2000 years before present, timber was used as a fuel for seething salt. From the year zero of our era until present, this timber has been used for the construction of the platforms on which the evaporation ponds are located. It should be borne in mind that, due to salinity, metals cannot be used inside the salinas because of their rapid corrosion. This fact, which may appear to be negative, however, has a very positive side to it. The deforestation near the salinas namely avoids the pollution of salt with pollen and leaves that may fall on it. In addition, deforested areas have traditionally been used as pasture for cattle, which was an essential ally for the transportation of salt to the markets. At present, small livestock, mainly sheep, help regulate the vegetation of the area and forest resources are only used for the construction of the salt making tools as well as special pieces such as the end of the cans of the crankshafts. There is evidence of the need to resort to external forestry resources to build the rest of the pieces since 1801, when three linear kilometers of pinewood were purchased to reform the salinas.

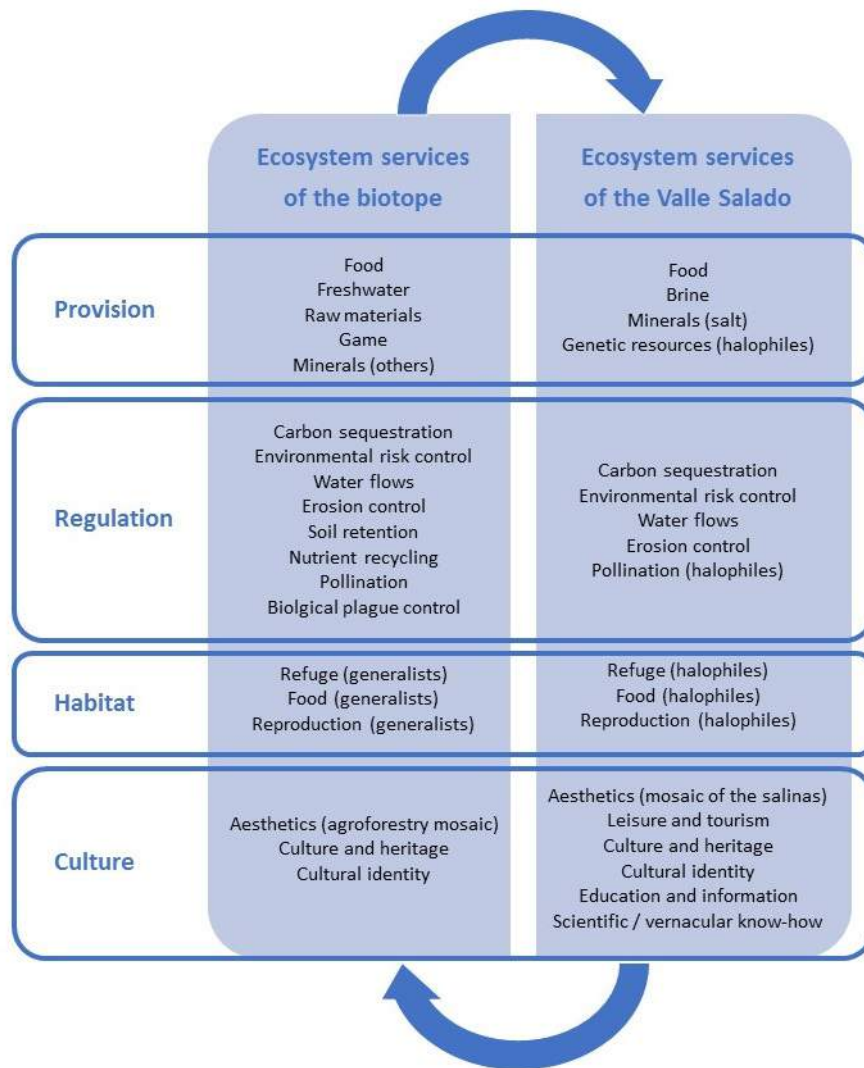
On the other hand, the continuous activity of salt production requires the replacement of materials for the recovery and maintenance of walls, wells and crystallization ponds. Fortunately for the salinas, the diapir provides the most suitable materials for this purpose. The waterproofing of wells and basins is carried out with a clay that is extracted from quarries in area and which, by blending it with the brine, acquires a great plasticity. For the masonry work of the walls, the stones that farmers remove from their plots during ploughing are used. On the other hand, the stone needed to make a surface for the evaporation floors that allows us to obtain a white salt that does not stain with clay was, until the twentieth century, made of pebbles from the mountain that protects the salinas in the north. Today, we bring limestone slabs from Navarre.

One of the most prominent features of the relationship between the salinas and its surroundings is that the salt making activity in the Valle Salado helps to control water quality. The freshwater system that nourishes the diapir's hydrogeological system is protected by law, as it is forbidden to use pesticides and other agrochemical products. On the other hand, salt making prevents the massive dumping of brine from springs to rivers, which would damage the ecosystem. During the summer months, the brine flow is automatically controlled with the production of salt and in winter, most of the brine is conducted to the company Salinera de Añana S. L., located downstream of the Valle Salado.

Benefits of human activity and consequences of cessation of activity

The relationship between the diapir - occupied on the surface by what is now protected as the biotope - and the Valle Salado can also be understood from the point of view of the ecosystem services that both environments provide and in which they mutually support each other: on the one hand, the extensive agroforestry mosaic services in the biotope and; on the other, the two wetlands, especially the Valle Salado.

Ecosystem services can be classified by the functions they perform, as shown in the figure. Provisions refer to those that provide us with useful materials for the human being. Regulatory processes should be understood as those that control the ecological processes that take place on site, and that can give direct or indirect benefit to people. Habitat functions are those that provide a viable and livable space to the flora and fauna that occupy it and contribute to conserve the diversity of species and genetics that they host. Cultural functions, on the other hand, contribute to human health and well-being through local experiences and development that we can enjoy on site (de Groot et al. 2002):



Based on: de Groot et al. 2002, Hueso 2017

In view of this scheme, the Valle Salado and its surroundings can be seen as a multifunctional landscape, in which multiple ecosystem services overlap in both the agroforestry mosaic and the saline mosaic. The services of one area depend on the adequate provision of these services in the other, in such a way that a strong mutual interrelationship is evident. For this reason, it is very important to maintain not only the salt making activity, but also extensive agriculture and livestock farming in a similar way to what is currently practiced.

Salt production in the Valle Salado has been carried out continuously for 7,000 years, so it is difficult to get an idea of what would happen if the activity were to stop. Even more so given the complexity of the hydrogeological system that brings brine to the valley. Due to the experience of the nineties, with a significant decline in production in the valley, as well as the abandonment of the salt making activity elsewhere, it is known that there is a banalization of saline environments, which allows their colonization by ruderal and opportunistic species. There is a loss of halophilic biodiversity at the scale of both communities and species, and even that of the genetic variability that occurs in them. When the activity ceases, not only do ponds with different concentrations of salt - and, therefore, with specific trophic networks for each range of salinity - cease to exist, but many are emptied and retain only rainwater. This means a significant loss of habitat for lenitic

halophyte species (i. e. ponds and wells) and those occupying the spaces between these structures. The lack of maintenance of slopes and infrastructures causes watercourses to fill up, with a particularly serious impact on halophyte species of lotic environments, such as streams (Sánchez-Fernández et al. 2007). More specifically, the cessation of salt making activity may lead to the disappearance of halophilic macroinvertebrates, specifically *Ochthebius glaber*, as well as of *Artemia parthenogenetica*, both of which are dependent on hypersaline habitats. Vegetation, on the other hand, initially halophile, invades the areas dedicated to salt production, but is soon displaced by generalist, at most halotolerant species. Negative impacts, similar to these, have been observed in other abandoned solar evaporation salinas (Paracuellos et al. 2002, Morgado et al. 2009, Tavares et al. 2009).

Given the experience in places with similar geo-environmental conditions, it can be deduced that a lack of use would result in soil and hydrographic salinization on the banks of the river Muera, given that the natural flow of the springs it collects would not be retained. The hypersaline waters of the springs and the river Muera as it passes through the salinas, would follow their natural course without diminishing their flow, which could affect the quality of the water in the receiving river basin, as well as on the aquatic flora and fauna that this hosts. Besides the loss of salt production activity, agricultural activity downstream of the valley would then be affected, and it would be difficult to achieve current agricultural yields with salinized soil and water. It would also impact the aquatic and terrestrial biodiversity that can be found in the lower reaches of the river Muera, as well as water quality in general, as is the case in other sites where hypersaline water is discharged into natural freshwater courses (Hart et al. 1991, Lucha et al. 2008, Braukmann & Böhme 2011, Cañedo-Argüelles et al. 2012). Thus, the lack of salt making activity and salt water use in the Valle Salado would result in the loss of halophilic biodiversity in the valley and detriment to the quality of water in the river Muera.

From a socio-cultural point of view, the abandonment of salt making activity would also have important consequences. The population of Salinas de Añana is highly dependent on the production of salt. Not only of the activity itself (maintenance, production, packaging, administration) but also of the associated products and services (tourism, hotel and catering, trade, transport, etc.). Although this situation has not occurred in Salinas de Añana, there is abundant evidence of what happened in other salt making sites after the abandonment of the activity, both in Spain and in the rest of the world (Carrasco & Hueso 2006, Carrasco & Hueso 2008, Hueso 2017). Given the scarce population living in Salinas de Añana, the exodus of people directly or indirectly related to salt making activity would have a very significant impact on the population and, therefore, on the level of local socio-economic development. The cessation of the activity would also result in the loss of the intangible heritage associated with know-how, the brine distribution system, traditions, legends, festivities, etc. which would ultimately result in a loss of identity in the local community. Inactivity would have, in the medium term, a significant impact on salt making infrastructures. These are fragile constructions, with materials from the surrounding area, which would suffer badly over time without adequate maintenance. In this regard, suffice to see images of the Valle Salado in the early 2000s, at the beginning of the recovery process. The cessation of salt production activity would therefore result in the loss of natural, tangible and intangible heritage; in a process that could be irreversible in a relatively short period of time, as has been shown in other locations (Hueso 2017).

However, to this day, this situation does not exist in the Valle Salado. Efforts to protect and disseminate their natural and cultural values are bearing fruit and institutional support is a key aspect in this regard. According to scholars, the management of the Fundación Valle Salado de Añana is an example to follow, from many points of view. Everything that has happened so far there is observed with a magnifying glass and aspired to by any manager or owner of other traditional salinas that wish to enhance their activity. Perhaps the key to success lies in the fact that the institutions involved in their management have shown an unusual degree of maturity and vision. The consolidation of sound and lasting agreements has been essential to ensure the continuity of the project. But what can perhaps be considered the greatest achievement is to have created a culture of artisanal salt making, to have fostered a sense of pride and belonging to that culture among the inhabitants of Salinas de Añana - and many people from Alava, by extension - and to have put artisanal salt on the international culinary and cultural map (Hueso 2015).

The Fundación Valle Salado de Añana is, therefore, the non-profit organisation charged by the local community with recovering and preserving the biocultural diversity, including the agrobiodiversity, and the management of the salt producing ecosystem to ensure its sustainability; produce high-quality salt using traditional techniques, in a sustainable manner, and respecting the ancient “know how” of the community of salt workers; and develop, under a recovery plan that is open to the public, cultural initiatives that will become a driving force for the social, economic and tourist development of the district.

The recovery project that the local community and the trust have carried out is an exemplary intervention on this Agricultural System, and is proving that, in addition to its recovery and preservation, it is possible to transform this traditional system and its associated heritage into an economic, social, cultural and tourist development resource. This fulfils the principles of the European System Convention (Council of Europe, 2000): based on the following reasons:

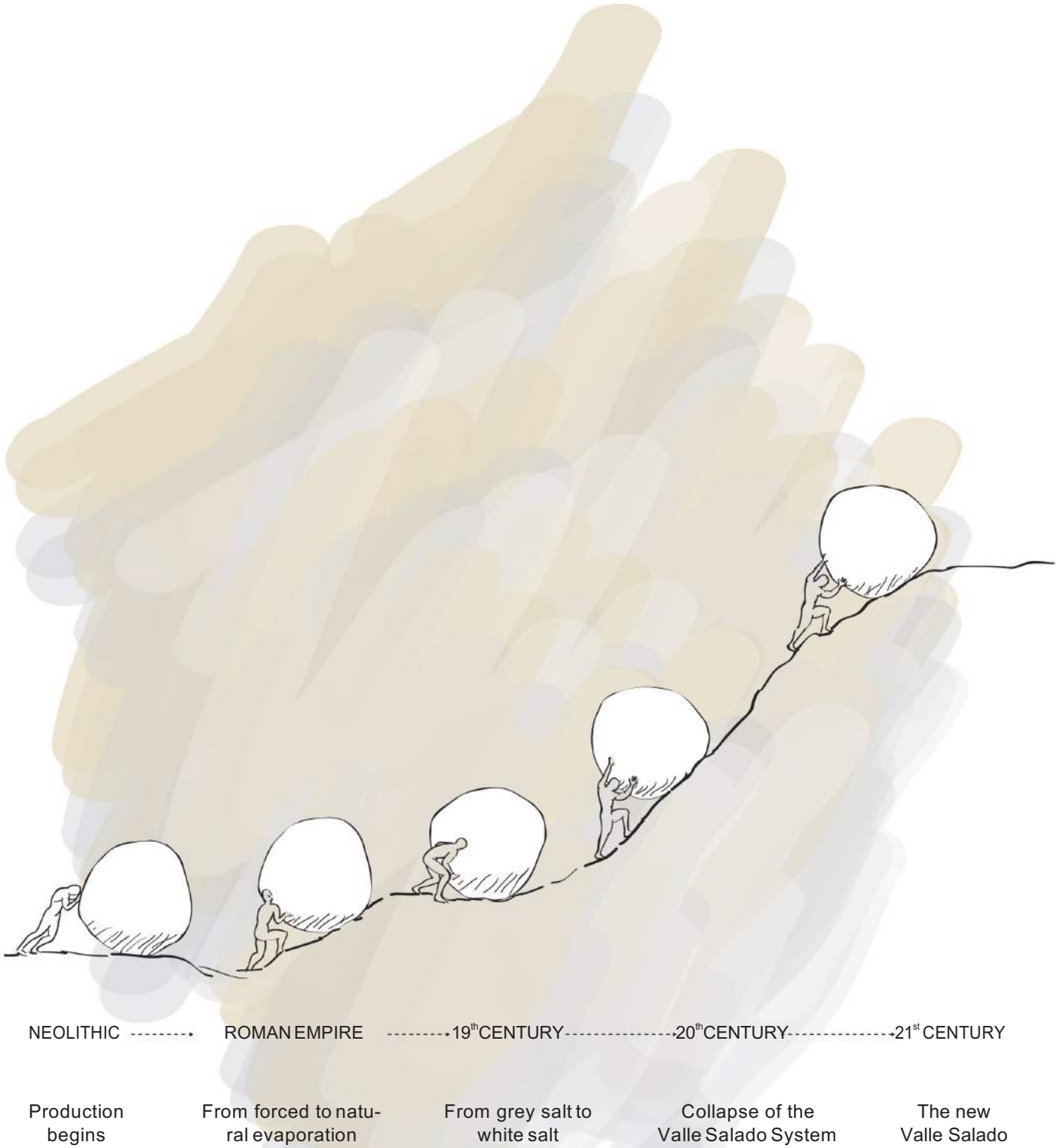
- It integrates the valley in the environmental management and protection policies regarding all aspects: declaration as a Site of Cultural Interest and as a Ramsar Wetland, within the Protected Biotope of the Añana diapir and the European Natura 2000 Network.
- It promotes the multiple values of the cultural system at an international level by trying to promote awareness of the importance of traditional crafts in the recovery and maintenance of the fragile ecological balance of these ecosystems.
- It enhances the social and economic recovery of Valle Salado and its surroundings by developing employment and training policies that affect local citizens, especially young people, and by fostering a sense of pride, belonging and identity among the people who live here and enjoy the property.
- It is an example of the active participation of the local community in the use and management of the property. Proof of this is the salt workers’ association, Gatzagak, the original owner of Valle Salado, which brings together the community of salt workers, the repository of the traditional know-how or the intangible heritage associated with salt production, and the City Council of Añana. Together, they represent the local community and belong to the trust. Thus, another of the basic principles of the European System Convention is fulfilled: that the population of Añana must become an active part of the management of the property. Their rights and responsibilities are acknowledged in the knowledge acquisition and decision-making processes.
- For contributing and being a global recovery model of a living cultural and agricultural system, which perfectly balances tradition and modernity. Recognised with the Grand Jury prize at the European Union Prize for Cultural Heritage /Europa Nostra Awards 2015. This award acknowledges the exemplary work in the recovery of the constructive and productive techniques, of the “know-how” developed by the community of salt workers over seven millennia. Thus, making Valle Salado and its Añana Salt international agri-food benchmarks.
- It promotes research and applied knowledge through a Management Plan prepared by a multidisciplinary and interdisciplinary team of agronomists, architects, archaeologists, environmentalists, geologists, economists, landscape experts, anthropologists... Its guidelines provide present and future opportunities to Valle Salado and to the surrounding areas.
- It is an example of institutional and civic collaboration. This project brings together all the relevant public authorities with responsibilities regarding agricultural development and the local community living near Valle Salado. They have all become part of the Foundation that manages the property.
- It is a member of the World Rural Forum, a network that works in favor of family agriculture and sustainable rural development. The WRF is an organization made up of Family Agriculture federations and organizations, such as COPROFAM, PIFON, PDRR and AFA, Rural Development organizations, such as INADES, cooperatives, and agricultural research centers, such as CIRAD. Its contribution to the fight against hunger and poverty has been fully recognized

by various international organizations such as FAO, which, in 2015, awarded it the Jacques Diouf Award.

- It is an outstanding example of the importance that farming culture has in the Basque Country, where for decades there has been a commitment to promoting high-quality agriculture, which can be seen in the seals and denominations of origin granted to the region, which become certification systems that guarantee the quality of the products and their production systems. In addition, the Valle Salado promotes cooperative arrangements, a widespread form of social organization in the Basque Country in the field of agriculture, and that ensures greater social equity and the intense participation of the local community in its own development.

II.2 Characteristics of the proposed GIASH site

i. Food and livelihood security



Valle Salado de Añana is an abrupt system, with steep slopes that do not provide large areas for growing crops. Its typical geological features are those of a salt diapir, making it an arid and unsuitable habitat. However, a number of springs spontaneously emerge in the upper part of the valley carrying water mixed with salt (brine) which, by means of a simple agricultural process, is transformed into salt by exposure to the summer sun and breeze.

The presence of a product considered “white gold” because of its vital importance throughout history in preserving and flavouring food and as a food supplement for livestock, etc., was sufficient reason for the uninterrupted development, over thousands of years, of an important settlement in the area that, basing its economy on the production of salt, learned to adapt, until today, to the conditions and requirements of each historical period.

The livelihood of the District of Añana cannot be understood without the production of salt. Salt has contributed and still contributes to securing the livelihood of the population and provides the community of salt workers with the agricultural products and services that they would otherwise have been unable to develop in such an abrupt and salty environment.

A document dated in 1575 and written by those responsible for running the salt works clearly confirms this point: Salinas de Añana... is located in very rough mountains and nowhere in the surrounding area is there a piece of flat land measuring the equivalent of a musket shot, there is no wine, very little bread, no livestock and so, all year round, they live thanks to the bread and wine sold here by those who come to these salt flats for salt and if the salt trade were to fail, the land would suffer and the town would be destroyed as they have no other farming activity or solution than the said salt and if the sale of it were interrupted, the trade would cease and they would not have anything to eat in the said village or in the entire land (Porres, 200: 151-156).

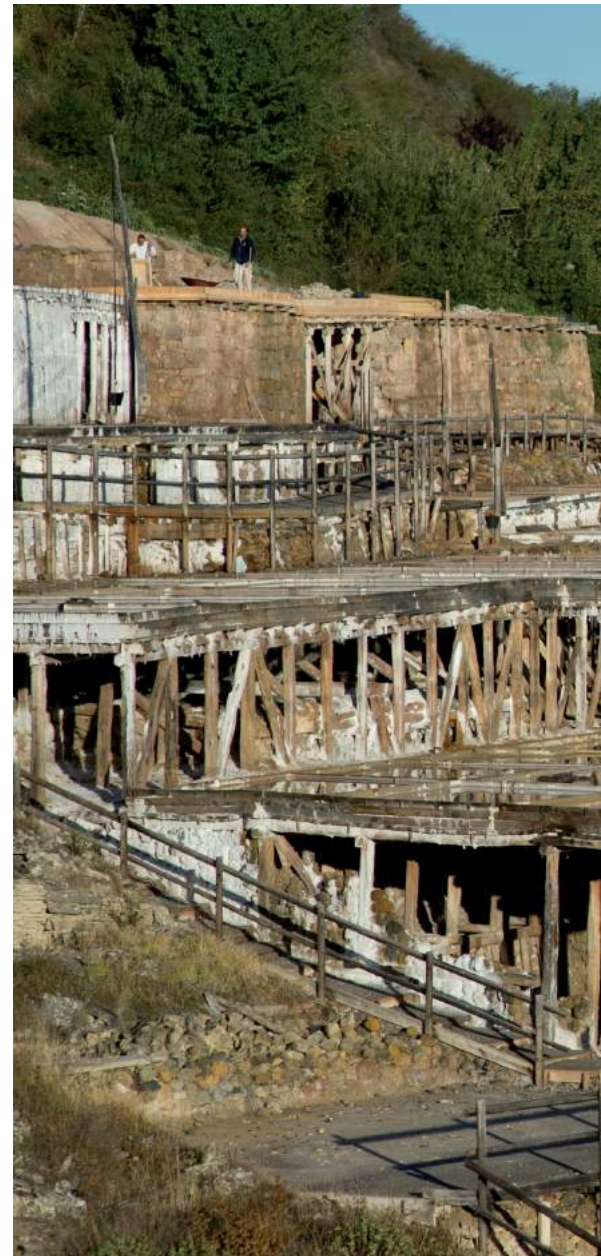
The fact that the local community has been able to survive and ensure their livelihoods for more than seven millennia is mainly due to two factors that are key to their identity: applied sustainability and resilience.

Food security and applied sustainability

The extraordinary applied sustainability of the community of salt workers, i.e. their ability to achieve a fully sustainable operation, that has remained diverse and productive over time; or, referring to its operation, the ability to exploit its resources below their renewal threshold. If considered from the perspective of local development (Brundtland Report, 1987), this quality should be considered as the ability to meet the needs of the successive generations that have inhabited and exploited the site without sacrificing the ability of future generations to meet their own needs.

Thanks to this wisdom and to these techniques developed by the community of salt workers, taking advantage of the natural elements, a sustainable agricultural operation has been achieved. The water flowing from the springs, the steep slopes, the sun and the wind, and the use of some traditional techniques have created a distinctive system, free from waste materials for centuries, that exploited all the natural resources to incredible extents.

Thus, one of the factors that ensures the livelihood security of the community of salt workers is that it preserves the idea of re-using the materials provided by nature in the area around the site, i.e. stone and clay; although, over time, the community of salt workers has had to turn to more distant forestry resources to cover their needs.



Stone was used to build the walls as a base for the wooden structures, which became very complicated. Of these, Valle Salado preserves outstanding examples; from the simplest to the most sophisticated. Wood was used for the water system (hollow logs) and the structures that supported the salt-pans. But this material is used for all kinds of items, such as warehouses, scoops (to extract water from the wells) and even for the locks on the doors.

All the joints are also made of wood; no metal nails are used as they would rust, especially in a saline environment. Wood, however, is made resistant thanks to the salt water that preserves it. All that is required is permanent maintenance. Of course, the wooden structures have to be replaced or repaired periodically, but this has been done over the centuries and is still done by the community of salt workers who not only control the salt production process but also build all the wooden or stone structures themselves. The highest wooden structures result in the existence of spaces under the salt-pans that are used as storage areas, where the salt was stored in piles. This type of salt storage facility only exists in Valle Salado.



The entire system is proof and a vestige of an example that has remained alive throughout history and that exceptionally illustrates the passage from an artisanal and subsistence production system based on producing the greatest amount of salt possible, to new methods adapted to the 21st century markets, with higher yields based on the extraordinary quality of the product. It represents, therefore, an extraordinary example of the evolution of productive systems used by society, maintaining a harmonious and sustainable balance with the physical framework on which it sits.

Following the methods based on experience and tradition, the community of salt workers transformed the environment around them, taking advantage of and promoting the agrobiodiversity and, without meaning to, generated an unusual, anonymous, popular, sophisticated, but simple type of agriculture, unique in the world, that allows the continuity of the system and ensures their subsistence.



Livelihoods and resilience

The second factor that has contributed to the Valle Salado Agricultural System contributing to the livelihoods of the local community of salt workers is its resilience. This quality refers to the ability of this Agricultural-social-economic-cultural System to overcome the impacts, absorb the pressures, withstand the shocks and, subsequently, transform and even strengthen itself.

A resilient Agricultural System, such as Valle Salado is capable of preserving its values derived from natural, semi-natural and artificial ecosystems without compromising its future. This attribute contains a number of points relating to intangible values, such as the transformation, adaptation and survival of the valley as a whole, despite being subjected not only to natural or environmental conditions, but also to changes in its political, social and economic context.

The Agricultural System of Valle Salado de Añana is the result of the evolution of a workplace that has adapted to the needs of its owners and workers over generations, developing a unique culture based on the “expertise” of the salt workers that have preserved its identity characteristics unchanged.

The Añana salt works are still in operation and are therefore a historical record of a process of constant adaptation and transformation, where different solutions have been incorporated into the historical and cultural heritage of the Valley. The system chosen for the production of the “cleanest” salt in the Valley and its viability justified the constant changes, and continues to justify the current “struggle-research” regarding the consistent sustainability of the Valley.

Some highlights of this adaptation and survival are:

a) The change of the site of their habitat used in prehistoric times or during the Roman Empire, to be able to produce and sell salt in the best conditions.

b) The scattered settlements around the salt farms from the 5th century resulted in the founding of 7 completely independent villages between the 8th and 10th centuries to defend themselves against external attacks



from the Moors and feudal lords. Villages that they were quite prepared to abandon to benefit from the economic advantages offered by King Alfonso I of Aragon when he built a royal town near the salt works.

c) The privileges granted by King Alfonso VIII of Castile, who guaranteed that the ownership of the salt farms would never be alienated from their rightful owners, which implied that more ambitious future monarchs, such as Philip II, who expropriated all the salt works in the Peninsula, could not take the property away from the salt workers of Añana.

d) The adaptation of the agricultural system to minimise environmental risks, such as the floods that occurred in 1789 and avoid other disturbances by learning to overcome and survive catastrophic situations.

e) The changes that the community of salt workers made to the production system; reforming and extending the valley in the early 19th century to obtain high-quality white salt that would make them more competitive in the market.

f) The crisis of the 20th century due to improvements in transport and technological developments in coastal saltworks meant that salt production at in-land sites was no longer profitable. The vast majority of

Artist's impression of the Valle Salado System about 7,000 years ago.



them, in other parts of the peninsula and of the world, were abandoned. Valle Salado logically suffered from the impact but managed to overcome what could have caused its disappearance.

g) Finally, the lack of profitability of the traditional salt works led the community of owners to adapt between the late 20th century and the early 21st century and to establish a Corporation of salt workers called Gatzagak, which is now supporting the preservation of Valle Salado, and that transferred ownership of the salt works to the Valle Salado Foundation, of which it is a trustee.

Future survival: the Valle Salado de Añana Foundation

The birth of the Foundation was a real turning point for Valle Salado, as it has continued to perform maintenance work in the salt works and to produce salt based on the ancient criteria of sustainability and adaptation, i.e. using the wisdom passed on by the local community over centuries.

The purpose of this new stage is not to produce salt in bulk as before, but to reach the secular balance that has made the survival of the valley possible. With this in mind, new targets have been set, including the social and economic recovery of one of the most depressed rural areas of the Basque Autonomous Community. In this sense, Valle Salado and its activities have already become a significant driving force in the

Adapting the agricultural salt making area
to the current production system



economy of the surrounding area, providing new hope for the future of the community of salt workers and their descendants who had, in many cases, begun to abandon their ancestral home in search of new jobs in industrial cities.

This capability to become a driving force for the revitalisation of the local community and its environment is helping, in collaboration with the Public Administrations and public and private agencies, to introduce a wide range of activities and services that will help position the District of Añana and Álava as an attractive destination to live.

New innovative projects like the production of gourmet salt, cooperation with great chefs, the generation of cultural, leisure and health activities... that have already produced important results, generating economic resources that contribute to the gradual self-funding and consolidation of the survival of Valle Salado.

Overall, the sustainable economic recovery of Valle Salado is contributing to a feeling of identity, cohesion and ownership by all the institutions, agents and citizens involved. This will strengthen the social capital that is essential to any sustained local development process.

It has been noted that the actions developed by the Valle Salado Foundation under the 2000 - 2017 Action Plan, evaluated in the report issued by the Faculty of Economic and Business Sciences of the University of the Basque Country titled "Economic Impact Study of the Valle Salado de Añana Foundation on the Province of Álava", referring to the year 2014, and using a methodology based on Input-Output tables, confirms the multiplying effect of spending, in particular on the following items:

- 1) Impact on production: With an annual expenditure by the Valle Salado Foundation in Álava in 2014 of €1,386,600, the total impact that on the economy totals €6,772,573. This means that for every €1 spent by the Foundation, the impact on the regional economy totals €1.48.
- 2) Household income, from a direct expenditure of €861,914, the total impact amounts to €3,374,530.
- 3) Revenue for the Public Finances (Tax Return): of the €550,000 subsidy the Valle Salado Foundation receives each year from the Álava Provincial Council, 87% (€480,103.21) reverts to the Treasury in the shape of VAT, Income Tax, and Corporate Tax.
- 4) Generation of revenue from the sale of Añana Salt and from the guided tours of the project (Self-financing): The Valle Salado de Añana Foundation is able to fund more than 40% of its budget, thanks to the growing number of visitors (more than 70,000 people) and its total annual income (€710,000, exceeding, in 2015, the previous year's figures by €120,000).

In the end, without the empirical know-how of the community of salt workers, which has ensured its survival through highly efficient and ingenious systems, it would have been impossible to preserve this incredible Agricultural-Cultural System. The knowledge of the salt workers was transmitted orally for generations until the sixteenth century, when it was compiled in detail in the "Master Book", which is still used today. This know-how, this intangible asset, has ensured the survival, throughout history, of an operation that should, in all logic, have disappeared under pressure from natural changes (climate change, floods, etc.) and from economic and social changes.

The use of sustainable salt production techniques makes it an ancient agricultural and productive system; the livelihood of a group of people who have been able to maintain their traditional techniques while





incorporating new technologies. The topography, geology and morphology, and other peculiar features of this system, especially the existence of the diapir and the resulting brine springs, along with the expertise of the community of salt workers, have created a cultural identity, one that has managed to cope with changes introduced by new manufacturing techniques, economic conditions and market demands.

The Agricultural System of Valle Salado has managed to preserve its sustainability based on a very difficult balance between nature conservation and respect for the environment and the exploitation of the resources found in the said natural environment.

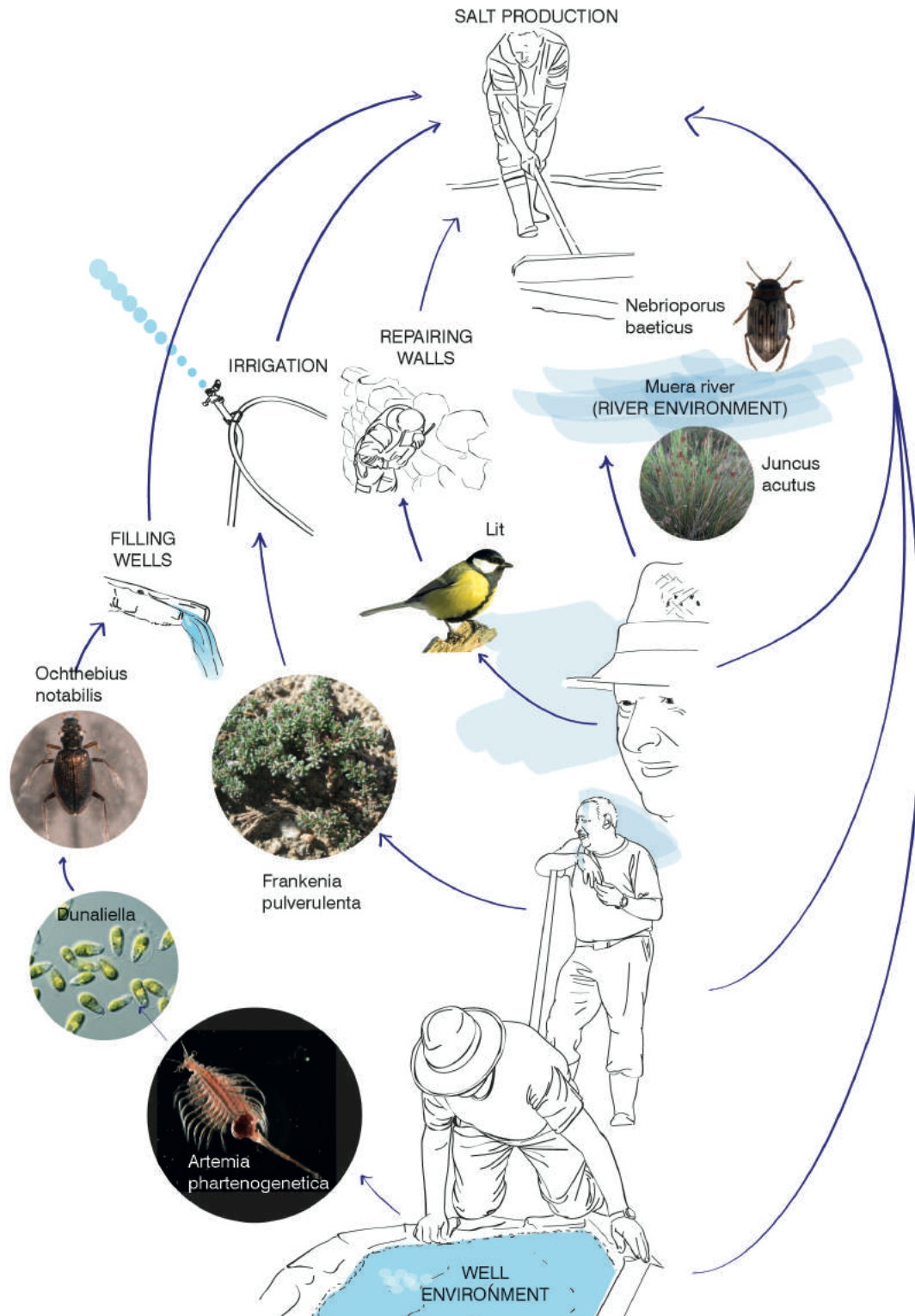
This sustainability, which has made its survival possible, preserving the record of the successive historical stages of its operation, is proof of the uniqueness of the system and its adaptive capacity and resilience to events, which, in the case of other operations would have led to their disappearance or total transformation, especially during the twentieth century, while seeking quick and easy profit.

This search for profit, which, for a time was almost realised with the introduction of new materials and the construction of new salt-pans above the level of the channels and occupying the course of the river, would of course have resulted in the transformation of the process and the total deterioration of the system. However, the local community was able to take these impacts, suffer them and, through a unique adaptive capacity, create a new management body to seek new products and uses. In short, to innovate as had been done for millennia, while retaining the traces and evidence of all the previous stages.



II. 2. Characteristics of the proposed GIAHS site.

ii. Agro-biodiversity



ii. Agro-biodiversity

The Valle Salado of Añana is located on the diapir, on which diverse land types are settled, resulting in a great wealth and variety of fauna and flora. Thanks to this geological structure, and one of its key features, the halite or rock salt (NaCl) -which is dissolved by the freshwater inside the diapir and emerges as brine-, a characteristic landscape has been generated. The soils host deposits with important paleoenvironmental and paleoclimatic information. As a whole, it is a saline habitat with an extraordinary biodiversity typical of wetlands associated with salty environments, which has led to its inclusion in the Ramsar list of international importance.

Habitats and vegetation

From the point of view of the agrobiodiversity of the Valle Salado system, it is worth highlighting the natural values of the different protected areas included in it. At least 10 types of habitats of community interest are present in the area of the SAC Lake Caicedo Yuso and Arreo, which are included in Annex I of the Habitats Directive, of which 4 are priority habitats. In the Valle Salado as such, two habitats of community interest have been found (with an asterisk, priority habitats), which are described below:

1510* Mediterranean salt steppes (Limonietalia)

Annual halophilic communities adapted to live on brackish muds that flood from autumn to spring, but remain dry during the driest part of summer. Among the most significant species we can mention: *Frankenia pulverulenta*, *Hordeum marinum*, *Hymenolobus procumbens* subsp. *procumbens*, *Parapholis incurva*, *Spergularia diandra*, *Spergularia salina*. What allows the development of these annual communities of halophilous and subnitrophilous character is the superficial desiccation, which favors the ascent of salts by capillarity and subsequent deposit on the surface, where they form very striking white crusts in the middle of summer. Within this habitat, *Frankenia pulverulenta* has been observed, classified as vulnerable in the Autonomous Community of the Basque Country.

1410 Mediterranean saline meadows (Juncetalia maritimii)

In both the Valle Salado and Lake Caicedo Yuso, there are brackish meadows of *Puccinellia fasciculata* and halophile rushes of *Juncus acutus*, occupying very small or narrow areas, near saline springs and salt crystallization ponds. The brackish grasslands of *Puccinellia fasciculata* can be recognized by the appearance of the dominant gramineae, which form medium-sized, glauco-green root balls, contrasting with the sturdy, very dark greenish clusters of the *Juncus acutus* halophile rushes. Among the most significant species we can point out: *Atriplex prostrata*, *Hordeum marinum*, *Juncus acutus*, *J. gerardi*, *Plantago coronopus*, *Puccinellia fasciculata*, *Schoenus nigricans*, *Scirpus holoschoenus*, *Spergularia salina*.

The ecological limiting factor is the very humid saline soils with different degrees of salinity, which only dry in the middle of summer, both in endorheic basins and inland saline springs. The presence of this habitat in the Autonomous Community of the Basque Country can be considered permanent because they are communities linked to salt levels in the soil and the level of flooding, both in intensity and duration (Uribe-Echebarría 2007, Prieto 2011).

On the other hand, there are at least three endangered flora species in the salinas, two vulnerable and three rare species in the Basque Catalogue of Threatened Species. Three are endangered and two are vulnerable, according to the Basque Red List of vascular flora. The most remarkable halophile flora species that can be found in the salinas of the Valle Salado are summarized in the following table, along with their conservation status:

TAXON	CATALOGUE	RED LIST
<i>Frankenia pulverulenta</i>	Vulnerable	Vulnerable
<i>Juncus acutus</i>	Rare	Almost endangered
<i>Puccinellia fasciculata</i>	Vulnerable	Vulnerable
<i>Puccinellia festuciformis</i>	-	Insufficient data
<i>Puccinellia hispanica</i>	Endangered	Endangered
<i>Cistus crispus</i>	Rare	Almost endangered
<i>Berula erecta</i>	Endangered	Endangered
<i>Utricularia australis</i>	Endangered	Endangered
<i>Ophioglossum vulgatum</i>	Rare	Almost endangered

Most of this halophile flora in the Valle Salado is composed of annual ephemeral plants whose growth peak occurs in the spring. Among them are the abundant colonies of *Hymelonobus procumbens* and *Frankenia pulverulenta*. Small esplanades are formed around the springs, with moist soil until the arrival of summer, when it becomes a hard, dry and whitish crust where plants such as *Parapholis incurva*, *Plantago coronopus*, *Hordeum marinum* and *Puccinellia fasciculata* grow in large quantities, some of which are protected and included in the list of endemic and threatened species of the region. Other species of singular halophilous flora that can be found in the ponds are: *Atriplex prostrata*, *Spergularia salina*, *S. maritima*, *Sagina maritima*, *Polypogon monspeliensis*, *Parapholis incurva*, *Lotus maritimus* and *Cladium mariscus* (Uribe-Echebarría 2007, Prieto 2011).

Another organism of great importance is the green algae or Chlorophyceae *Dunaliella salina*, whose presence can be observed by the pink or orange-red shade of the waters of some brine wells, or in salt itself when it is still wet. Its color is due to the large amount of beta-carotene, which makes it a species of great commercial interest (cosmetic products and nutritional supplements). From an ecological point of view, it plays a basic role in the feeding of artemia, which is consumed by filtration (Rico & Medina 2013).

Other habitats of community interest that can be found in the area of the biotope are (with asterisks, priority habitats):

3190* Lakes of gypsum karst

6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)

6210* Previous habitat with important orchid sites

7210* Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*

7230 Alkaline fens

9230 Galicio-Portuguese oak woods with *Quercus robur* and *Q. pyrenaica*

9240 *Quercus faginea* and *Q. canariensis* Iberian woods

9340 Quercus ilex and Q. rotundifolia forests

In Lake Caicedo Yuso, different vegetation belts are arranged around the sheet of water, according to the depth gradient of the lake, from its banks to the free water, giving rise to a series of concentric rings formed by different permaseseries, namely: aquatic flora proper (in the free water live aquatic communities formed by hydrophytes, some of them totally submerged, as well as carophytes of the genus *Chara*; belt of large helophytes (high-sized herbaceous plants, rhizomatous, adapted to live in permanently waterlogged soils); reed beds (in shallow areas, but in contact with the sheet of water); reeds (the outermost marshland area, influenced by permanent soil moisture, but without reaching the waterlogged soils) and halophile reed beds (which have remarkable plant communities of remarkable singularity, such as *Juncus acutus*, *J. gerardi*, *Spergularia salina*, *Parapholis incurva* and *Plantago coronopus*).

Fauna

In the Valle Salado, invertebrates are undoubtedly the fauna group of greatest interest. Among them, the most notable is *Artemia parthenogenetica* (Amat et al. 1994, Trantaphyllidis et al. 1998), which constitutes the northernmost population of this species in the Iberian Peninsula. In Añana, this crustacean is found in the wells and ponds of brine. In spring the development of cysts resumes, and artemia populations develop during spring-summer. It can survive in the extreme salinity wells used by the community of salt makers to produce, which can reach 220 grams of salt per liter, but it adapts and grows better and in greater numbers in those ponds that are mixed with rainwater and have a lower salinity, from 150 or 170 grams of salt per liter.

Many indigenous populations of artemia in the world are seriously endangered by the disappearance or destruction of salinas or salt lakes. Another danger to native species is the use of this crustacean as a fish feed for aquaculture. Cysts of exotic species (such as *Artemia franciscana*) are sold in specialized retailers, and often unconsciously dumped into streams, lagoons and salinas, displacing and eliminating native species (Amat et al. 2007).

Other macroinvertebrates have an important added value as indicator species for ecosystem health. Its presence is dominant, both in biomass and in diversity, being able to find millions of individuals of a species in those environments that are favorable to them. Classic examples are the Coleoptera of the genera *Nebrioporus* and *Ochthebius*, very abundant in salt pans and hypersaline streams. The saltwater aquatic community of the stream in Añana consists of a total of 84 macroinvertebrate taxa, 61 of which are identified up to the species level, comprising all Coleoptera (49), except Scirtidae, and aquatic Hemiptera (12). Five endemisms have been found, two of which are associated with mineralized waters: *Nebrioporus baeticus* and *Ochthebius delgadoi*. On the other hand, there are two species with a medium degree of vulnerability: *Ochthebius notabilis* and *Sigara selecta*. Of all the macroinvertebrate species inventoried in the salinas, only eight can be considered halophilic, and probably only *O. notabilis* is a halobiont species (i.e. exclusive to hypersaline environments). The cessation of salt activity may mean the disappearance of this species -as well as of *A. parthenogenetica*- because they are found in wells with a salinity higher than 100 grams per liter (Sánchez-Fernández et al. 2009, Rico 2010).

In Lake Caicedo Yuso, 27 families of macroinvertebrates have been identified; among them, the dominant group has been Diptera, with 6 families, followed by Mollusca, with 5 families, by Heteroptera, Coleoptera and Odonata, with 3 families, and Trichoptera and Ephemeroptera, with 2 families. There are also vertebrates such as the fish species that were historically known: tench (*Tinca tinca*), Graells' barbel (*Barbus graellsii*), common carp (*Cyprinus carpio*) and the largemouth bass (*Micropterus salmoides*); the latter two species being allochthonous, while the eel (*Anguilla anguilla*) was considered extinct. There is not a notable diversity of mammals in the area, although it is worth mentioning a certain variety of Chiroptera, with six different bat species. Eight species of amphibians and six reptiles have also been found. But it is undoubtedly the group of birds that contributes the most to the fauna diversity of the lake, having registered 29 species

in what is strictly the wetland, of which at least 12 are included in Annex I to the Birds Directive, among which eight pairs of marsh harrier (*Circus aeruginosus*) stand out.

Microbial diversity

Determining which microorganisms are present in saline environments is not an easy task. At present, it is estimated that only between 1 and 10% of organisms present in natural environments can be isolated in the laboratory. Recent studies in collaboration with the University of the Basque Country (UPV/EHU) have detected more than 18 bacterial genera in the different sampling points along the salinas. However, the use of new metagenomics techniques will allow us to know many other microorganisms that are not capable of growing in a culture medium (Leon et al. 2014).

For this reason, it is also worth highlighting the presence of a type of communities that are still little known, and which presents a great development in extreme environments such as salinas: the so-called microbial mats. These are functional communities of stratified organisms integrated in an organic matrix that may contain a large quantity of minerals such as carbonates or silicate (Bolhuis et al 2014). They are structures in which cyanobacteria (also known as cyanophytes or blue-green algae) are intertwined with green algae (*Chlorophyceae*), diatoms, etc., forming sheets in different layers. This type of mats can be found in the beds and banks of the Muera stream, as well as in some wells that present a substrate with clayey sediment, but the most important microbial mat in the Valle Salado is undoubtedly the Pico spring waterfall. The importance of this type of community lies in the fact that these living structures are very similar to those that constituted the primeval life forms of our planet (Rico & Medina 2013). They therefore have great scientific and possibly applied value, as has been shown in places with similar characteristics (Guerrero & de Wit 1992, Bender & Philips 2004, Stal & Caumette 2013).

About the biological system of salinas

Solar evaporative salinas are biological systems consisting of a succession of semi-enclosed and stable ecosystems, in which ponds or wells are in equilibrium and the organisms that inhabit them form a well-adapted and established community (Pedrós-Alió et al. 2000, Dyall-Smith et al. 2003). Each pond or well presents different conditions of depth, insolation, salinity, dissolved oxygen, etc., so they are different habitats, each with its own biological community and trophic network. However, they are not watertight ecosystems, because the springs, wells and ponds are sequentially linked, so their trophic networks are interrelated. Each living organism present in the salinas proliferates best where conditions are optimal for it, but it can also appear in other habitats, under sub-optimal conditions, contributing to the trophic network present there.

Añana has a greater diversity of saline aquatic habitats than other similar sites, since both currents or lotic waters (Muera stream) and stagnant or lenitic waters (brine wells or basins, evaporation ponds...) converge in the saline aquatic habitats. The concurrence of both types of habitats means that the salinas of Añana can host a greater number of halophilic or halobiont species. Another factor that increases the biodiversity of the aquatic ecosystems in Añana is the salinity gradient that can be found in the different habitats; thus, in lentic environments we find from extreme saline media, which correspond to wells and active ponds that are filled with brine, to others with moderate salinity, which generally correspond to dormant wells in which the brine or salts deposited in its tanks are mixed with rainwater and/or freshwater surface or sub-surface flows (Rico & Medina 2013).

The living organisms of salinas are essential for the production of salt, which is in turn closely linked to the physical-chemical characteristics of the system (Davis 1980, 2006). The community of a salina is composed of those microscopic organisms that float in the water (the plankton) and

those that inhabit the bottom of the wells and basins (the benthos, which form microbial mats), in addition to the invertebrates and vertebrates that contribute to the trophic network of the system as a whole. Salinas can aid or harm the production of salt (Davis 2006), so knowledge of their ecology is extremely important for salt farmers. A "balanced" biological system will allow the production of a quality salt with a high yield, while an "unbalanced" system will make it difficult to precipitate salt and its crystals will be of low quality (Davis 1980, Sundaresan et al. 2006). Plankton thus contributes to the production of salt by coloring the brine in the wells with a dark shade that reduces albedo and increases the absorption of solar energy, accelerating the evaporation of water and thus increasing the productivity of the salinas (Oren & Dubinsky 1994). Meanwhile, microbial mats retain nutrients in the water and seal the bottom of wells, basins and streams, preventing brine leakage and fresh water infiltration and preventing mucilage formation. All this contributes to the formation of clean, large and high-quality crystals (Davis 2000). The invertebrates in turn contribute to nutrient cleansing and the control of the proliferation of microorganisms, clarifying the brine and cleaning it of suspended matter.

An "unbalanced" system can be manifested by insufficient biological development and poor nutrient availability. Another typical problem, the excess of nutrients, generates an excess of organic matter, which in turn causes viscosity in the brine and translates into small or hollow crystals that could retain particles. Management practices should focus on maintaining stable physical-chemical conditions in the ponds and the ecosystem as a whole in balance and pollution-free.

In addition to the above, if salt production were to be abandoned, the flow of brine would stop, the balance between wells and ponds would disappear, conditions would be standardized in the salinas as a whole and the rare and fragile halophyte species would be replaced by other generalists and even opportunists. As a result, the network of sequential trophic networks would become banalized and their biodiversity would be reduced. This imbalance, if not adequately remedied, can result in a very serious deterioration of the natural values of the site.

Thus, it can be concluded that the habitats of the Valle Salado are extremely important in terms of biodiversity, not because of the number of species that they host, which, as corresponds to extreme environments, is generally lower than other types of ecosystems, but because they are in many cases endemic species and, in general, quite rare and/or of very restricted distribution. Salt production in an inland salina thus contributes to maintain a reservoir of halophilic biodiversity, a biogeographical island, but also to increase biodiversity at local and regional level. It is important to understand biodiversity not only as the variety of species, but also of the genetic variability within them; which improves as the abundance of each species increases. An example of this is the action planned in the Viloría stream. This is fed by one of the brine distribution channels, thereby allowing increasing the salt concentration of the stream, and floods an area of disused salt pans. This in turn will allow the colonization of these pans by halophile species, thus increasing biodiversity in this area.

From this it can be inferred that salt production is an essential element in the ecosystem of a salina, which is also its *raison d'être*. Salinas can be considered a special type of ecosystem in which the human influence must not only be tolerated, but it is necessary to contribute to the dispersion, conservation and improvement of biodiversity while maintaining an economic activity (Korovessis and Lekkas 1999, Hueso & Carrasco 2012, Petanidou & Dalaka 2009). The natural values of the salinas are not only a fundamental pillar for their functioning as productive facilities, but they are preserved and improved by the salt making activity itself.

Vernacular knowledge and use of agrobiodiversity in the Valley

The maintenance of the same activity (salt production) in a specific location (the Valle Salado), whose first archaeological data was confirmed some 7,000 years ago, has led to this unusual place to collect the wisdom and empirical knowledge that human beings have been developing to make sustainable use of the resources provided by nature.

In addition to what has already been mentioned about the trophic networks in salinas and their role in the production of salt, the community of salt makers has developed systems of management and control of biodiversity throughout history, both in its surroundings and inside the productive zone, to favor this production. The border between these two areas can be clearly seen by the difference between the snow-white color of the valley and the greenery surrounding it. The green color is caused by the non-halophile vegetation, which advances downhill to reoccupy the space that was theirs more than seven millennia ago. The salt makers prevent this simply by producing salt or by irrigating the inactive production areas with brine.

The area around the salinas presents a dislocated aspect, with some regrowth of natural vegetation. Although it is common practice to systematically afforest plots without considering the historical evolution of systems, this poses a threat to the traditional way of life in the Valle Salado. Salt production systems in general, and in the Valle Salado specifically, are characterized by the control of forest cover for four essential reasons:

The first is that timber is a basic construction resource for salinas, so the immediate surrounding of the salina is the first to be deforested.

The second is that, traditionally, the community of salt makers needed a very large number of cattle to transport the salt they produced to their markets and therefore, large areas of pasture were needed to feed the cattle.

Thirdly, the forest masses near the production areas prevent the free passage of wind, essential to evacuate the humid air masses resulting from the evaporation process.

Fourthly and finally, the pollen and leaves of the trees stain the salt when they are moved by the wind. The salt making community, which was looking for a white quality product, tried to prevent trees to be planted near the salinas. For all these reasons, the salt making community has always taken care of and controlled the vegetation in the surroundings of the salinas.

However, forest stands on the steeper slopes of the Valle Salado, well above the production area, are used to support slopes and prevent erosion. This stops the clayey soil from being washed away and flood lower elevations at times of heavy rainfall.

Halophile biodiversity is very present within the salinas. but, as in the previous case, the community of salt makers has had to control these habitats because they should not be present in some productive areas such as the ponds where salt crystallizes. For this reason, the saline fauna and flora adapts to other locations in the valley, occupying the interstitial spaces between the infrastructures. In addition, they actually thrive better in medium salinity areas, since most of them cannot survive in hypersaline spaces anyway.

As already mentioned, the species of halophile fauna most directly related to salt making is *Artemia parthenogenetica*. This small crustacean is present in the brine wells of the Valle Salado and its presence in Añana acquires international importance, because it is currently the northernmost population of the Iberian Peninsula and it is threatened by *Artemia franciscana*, an invasive species of American origin.

Artemia can survive in extremely saline wells used by the community of salt makers to produce salt, with a concentration of 220 grams of salt per liter, but it adapts and grows better and in greater numbers in those wells that have a lower reduced salinity, up to 150 or 170 grams of salt

per liter, because they are mixed by rainwater. In this way, artemia has become a key indicator for the salt production process, since the salt making community can quickly assess at a glance when the brine from a well is not suitable for production and must proceed to refill it with new brine from the springs to leave the well at its optimum point, turning this small crustacean into a clear indicator of the salinity index, without needing to use measuring devices or doing it by hand, with the risk of illness or discomfort it bears.

The halophile flora also has shallow roots - since salt rises in the soil by capillarity - and does not damage the structures as the typical vegetation of non-saline soils would do, since their roots seek moisture in deeper layers.

The millennial know-how of the community of salt makers also attributes to Great tit (*Parus major*) several useful properties for salt production. The Great tit is a passerine bird of the Paridae family, very common in Europe and Asia and inhabits the Valle Salado. The community of salt makers observe the place where they nest, since they do so in the sunniest areas, thus indicating the most suitable spaces for salt production. They are also important for detecting damaged structures, such as walls and salt stores. These intelligent birds never set up their nests in structures that threaten to collapse and thus indicate that the structure must be checked because it presents a problem.

The symbiotic relationship that exists between the agrobiodiversity of the Valle Salado, which could never survive without salt production, and the community of salt makers is being promoted by the trust that manages it. In recent years, a series of research projects have been carried out to seek not only the improvement and creation of new products but also to collaborate in mitigating global problems such as climate change.

The trust, together with Neiker, have been researching for two years the possibility of enhancing the growth of *Dunaliella salina*. It is a species of great commercial interest due to its antioxidant properties and its concentration in Beta-carotene, substances of interest for food and cosmetic processing. Cultivation of *Dunaliella* in the Valle Salado would therefore fulfil several objectives that we hope to achieve soon. On the one hand, this alga is the staple food of artemia, so we therefore collaborate in the survival of one of the main indicators of salinity for salt production. On the other hand, its cultivation and harvesting would allow us to obtain a natural antioxidant additive to a new line of Añana Salt products destined to benefit health and well-being.

The Fundación Valle Salado, in collaboration with the Álava Provincial Council's Department of the Environment, soon plans to execute a project for the construction of a "botanical enclave" which would be located next to the main springs, on the terrace of Santa Engracia. In this place, a preserve of halophilic fauna and flora species present in the salinas will be created and an open-air research area will be built to help mitigate the effects of one of the great problems affecting humanity, climate change. Research will focus on the development of the cultivation of edible halophilic plants. Some of them have a high content in nutrients and are present in the Valle Salado, such as sea lettuce (*Ulva intestinalis*). The importance of this type of crop is that, with rising global temperatures, rising sea levels, droughts in some areas and floods in others, the availability of fertile land is being reduced in many parts of the world and agricultural land is being salinized. For this reason, many agricultural projects are being implemented in saline soils, with which we want to collaborate, as we have a privileged site in which you can find the typical characteristics of these salinized environments. The development of this type of agriculture would lead to important advances against climate change for several reasons. Increasing the amount of salt farmland would minimize deforestation, which alone generates 20% of the greenhouse gases, and would preserve more forested areas. The problem of overexploitation of aquifers could also be reduced by releasing almost 70% of the water we use in conventional agriculture when using brackish or saline water (e. g. seawater), a resource available in abundance. Another possible application of halophilic plants is their use as biofuels.

The agrobiodiversity of the agricultural process of salt production in Salinas de Añana is also interpreted in a broader sense. The new opportunities offered by the salt markets in the 21st century, where a growing number of consumers are demanding quality, eco-friendly and

innovative products, has led us to weave networks of collaboration with other agricultural producers to foster mutual development. Thus, we mix Añana Salt with products from our surroundings, for sale in different formats. Examples are the salt with wine and oil from the Arróniz variety from Rioja Alavesa, with tomatoes from the Basque Country, and with black truffle from Valdegovía. But we also offer our salt to be incorporated into other production processes, such as Idiazábal's designation of origin cheese.

The work being carried out by the Fundación Valle Salado de Añana to provide a social and economic future for the local community and its saline environment, while at the same time sustainably protecting its system and the agrobiodiversity it contains, has already been internationally acknowledged. This is demonstrated by the recognition that the Slow Food movement has already made, declaring Añana Salt as a Presidium Product.

II. 2. Characteristics of the proposed GIAHS site.

iii. Local and traditional knowledge systems



The community of salt workers at Valle Salado de Añana forms the basis of this ingenious agricultural system. They embody the knowledge, know-how and wisdom transmitted from generation to generation over more than 7,000 years, which sometimes clashed with the "scientific knowledge" imposed by external agents, and their peculiar social organisation.

However, the valley, which had created its own rules, was able to react through the people who worked and lived here, anonymous people who improved the cultivation and harvesting systems, developing and researching to achieve a perfect ecological balance, while this knowledge and these rights, transmitted orally until the sixteenth century and later collected in the "Master Book", gave rise to a communal exploitation system and to a series of traditions and customs.

These anonymous characters, with their particular immaculate clothing as white as the salt they harvest, have ensured the continuity of the valley and are the option for the future and the bearers of a distinctive culture including place names, legends, language, etc. They have developed the basic salt cultivation systems.



Transfer of and respect for the empirical know-how of the community of salt workers

Salt production requires the constant adjustment of salt producers to the environment that surrounds them. In the beginning, success was based on people's skills and, subsequently, on popular wisdom developed by the salt producers and reflected in guidelines that were handed down through the generations, and that have been preserved thanks to their proven effectiveness and efficiency.

Research conducted at Valle Salado has documented how the knowledge related to salt, whether regarding construction or production issues, was passed down by word of mouth until the sixteenth century, as the economic future of the families depended on that know-how. After that date, certain more conflictive aspects, such as the distribution of the brine, were put into writing. For this purpose, the community of salt workers created the so-called "Master Book", which fully outlines the uses and customs handed down from generation to generation.

A similar situation occurred with the salt-related architecture and system. Its morphology and construction features were the result of a complex evolutionary process, based on empiricism, which had to adapt to a specific environment due to the location of the brine springs and to the type of building materials available in Añana.

The architectural and spatial evolution of the salt works and of the salt production cycle have remained virtually unchanged over generations, leading to the sustainable production of salt in harmony with the natural environment of Valle Salado.

Image from the mid-20th century of a family of salt workers on the salt pans.



Knowledge transfer is interrupted only when a technical innovation is introduced into the cycle - usually by external actors -, as demonstrated in the Añana salt works in Roman times, two thousand years ago, when the forced evaporation system was changed to the natural evaporation system; or with the major reforms introduced to Valle Salado in the early nineteenth century, when the "surface irrigation" evaporation system was changed for the "full immersion evaporation system".

The various constructive solutions adopted in the architectural evolution of the salt farms respond, as in most pre-industrial infrastructure, to a complex popular wisdom developed by the craftsmen themselves, following a number of guidelines inherited over generations due to their proven effectiveness.

The productive system at Salinas de Añana has not only been determined by natural factors, such as local building materials or the climate, but also by human factors, such as ownership, the economy, the search for quality in the production process or even the degree of interventionism by the monarchs, which, in the case of Valle Salado, at times led to clashes between the "conventional wisdom" upheld by the community of salt workers and the "scientific knowledge" supported by the scholars.

The coordination and interaction of all these conditions has been directly responsible for the architectural evolution of the valley and of its time frame, having as their common denominator the slow development of the system based on the empirical knowledge of the craftsmen, while rapid architectural changes promoted by scholarly knowledge have, as we have seen, often been imposed in spite of being empirically incorrect.

Fortunately for Añana, the loss of the salt-making know-how has been interrupted by the ambitious project of providing Valle Salado with the acknowledgement it deserves. With this in mind, on the one hand, extensive studies have been developed to document the history of the site, taking into account the abundant written documentation generated by the salt farms and a number of surveys with which the community of salt-workers have cooperated. And, on the other hand, we have involved salt workers who remained in Valle Salado in the salt production and maintenance activities, thus ensuring the continuity of knowledge that is thousands of years old and a trade which, focussing on the natural environment of Valle Salado, is becoming an option for the future of the people from Salinas and its surrounding districts. Thus, ensuring that past generations of salt workers will be able to transfer their "know how" to future salt workers.

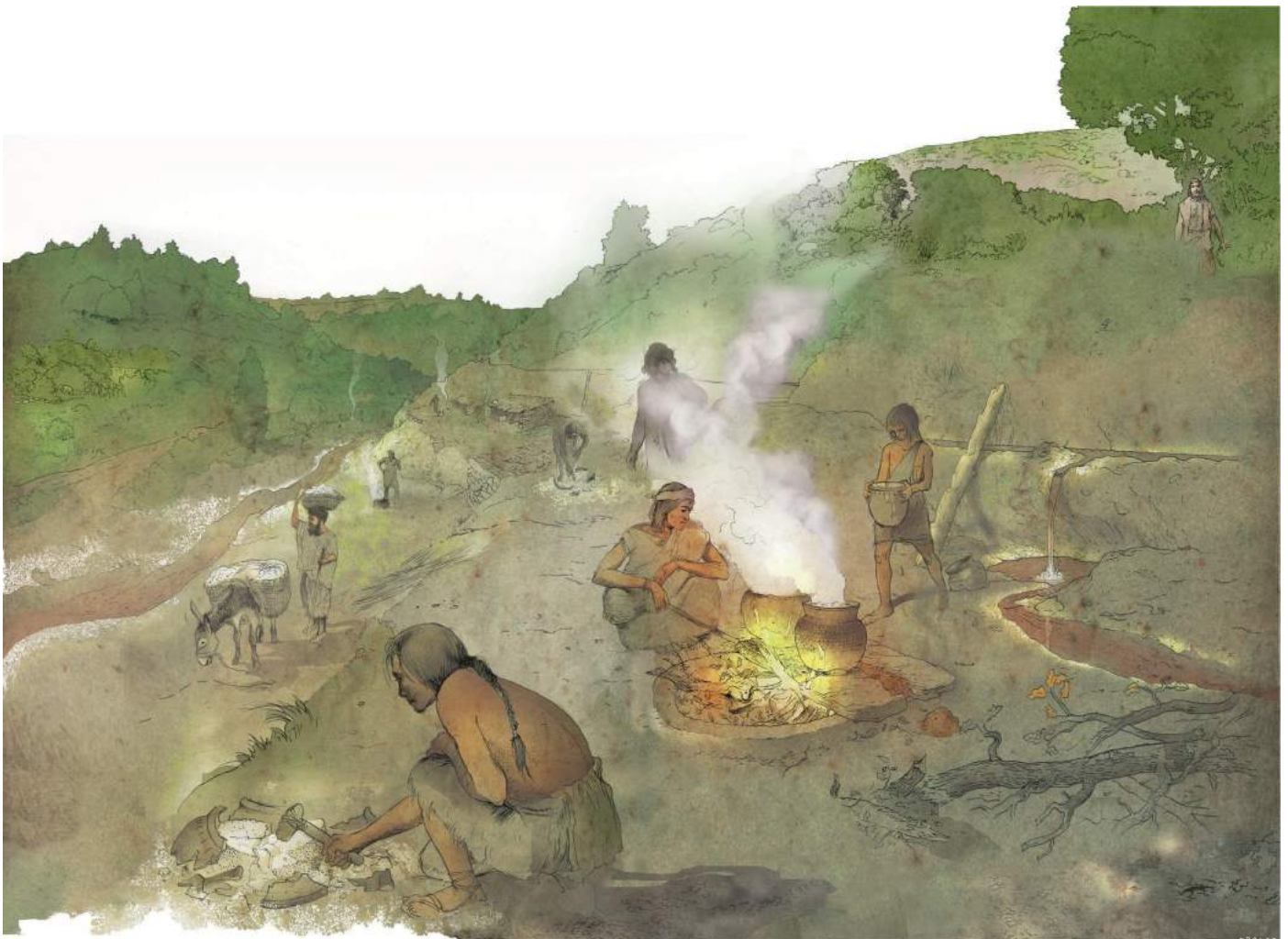
Salt workers being interviewed to recover the historical memory of the site.



Production systems based on local and traditional knowledge

Throughout its history, two production systems aimed at extracting the salt from the brine have been used in Valle Salado. The first was used for about five thousand years and was based on the forced evaporation by burning combustible materials. Around the first century BC, the system was replaced by natural evaporation, and Valle Salado went through a profound transformation, resulting in its current state.

According to studies conducted on salt works in the mid-19th century (Plata, 2006), the so-called "irrigation" system was exclusively used in the Poza de la Sal, Rosio and Herrera salt works in Burgos and in Valle Salado de Añana. Of these, the only one that is still in operation and that maintains its production system, with certain modifications, is Salinas de Añana.



The "filling" system was used in coastal salt mines and in inland works and was the technique that required less effort. It consisted in filling the crystallization pans with a certain amount of brine and then simply wait until the water evaporated, creating a crust of salt that was subsequently broken up and extracted.

These production systems involved differences in the salt collection and storage systems. At salt works that used the "irrigation" method, of which the only surviving example in the peninsula is Valle Salado de Añana, the process of collecting the salt from the crystallisation pans only lasted one or two days. As the product obtained was very damp and as production had to be continuous, the salt obtained was introduced into the storage areas underneath the pans, where it dried until the end of the production season in October. After that date, the salt was transported by hand from the private storage areas in the salt works to the large warehouses located outside the site.

Another notable aspect of the Agricultural System of Valle Salado de Añana is that between the end of the 18th century and the beginning of the 19th century it became an experimental laboratory for the Spanish Royal Household. The general architect, Manuel de la Ballina, wanted to increase the quality of the salt and produce white salt.

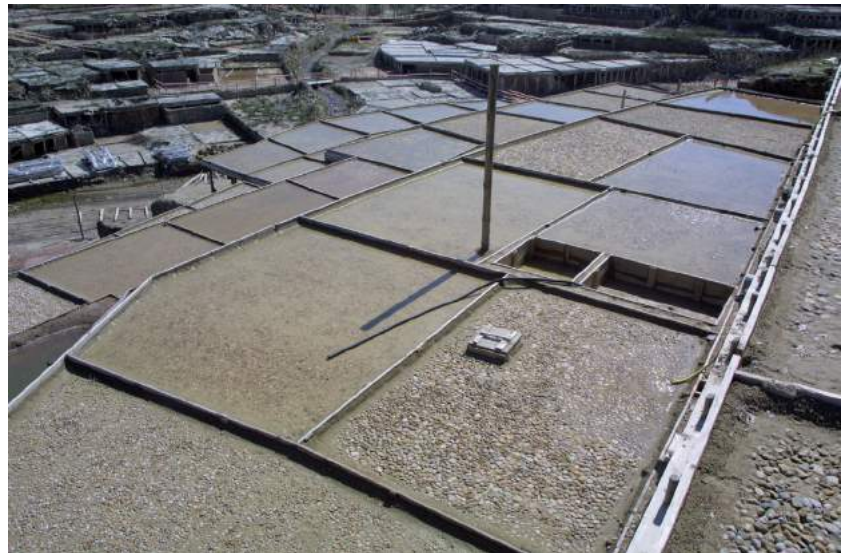
With this in mind, he introduced improvements in both the production system and in the infrastructures, placing stones on the clay surfaces of the salt-pans to prevent the salt being stained and paying attention to other details of the production system, such as the brine channels or salt storage facilities.

Evidence of the success of this experiment led to this new production system being exported to other salt works belonging to the Spanish Crown and would spread throughout countries in Europe and America. In fact, the community of salt workers of Valle Salado de Añana presented their extraordinary salt at the World Fairs of the nineteenth century (London 1851 and 1862, Paris 1855, 1867, 1878 and 1889, Philadelphia 1876).



The new salt became a highly appreciated item for human consumption, to the point that the Spanish salt works that did not adapt to the new production method had to market their salt for industrial and livestock use.

Salt pans with pebbles used to produce white salt.



Therefore, the high quality, white salt philosophy developed and imposed on Valle Salado by the chief royal architect progressively extended to all Crown facilities . The salt produced in Spanish salt works not only served the Peninsular market, but it was also exported to the overseas possessions .

Keep in mind that between the late eighteenth and early nineteenth centuries, the Spanish Empire did not refer only to Spain. At that time, it was one of the largest empires with vast holdings and areas of influence on all continents .

Due to the strong presence of religious institutions, the Community was led by two deputies, one secular and one religious, until the disentailment of Mendizábal in the 19th century. These deputies were elected annually and were responsible for solving conflicts; they had the authority to impose fines and even imprison individuals who dared to steal brine.

The presence of a Community of this type is exceptional, not only for the antiquity of its activities, but because it is an organisation that is still alive today embodied in an association of which all owners are members called Gatzagak. This association is involved in the project to enhance Valle Salado de Añana, as can be seen from the fact that they have donated one hundred percent of the salt farms to the Foundation responsible for revitalising them and that they belong to the decision-making bodies.

The Valley has, therefore, imposed its own rules, institutions and social structures that have ensured its survival over time. It is well documented how the community of salt workers was able to adapt to the constraints of each period without ever forgetting that "know how" their ancestors had put together through a trial and error process that lasted thousands of years.

The salt production cycle in Añana may be classified as technologically simple, since it has not required, throughout its extensive history, complicated tools, or a large number of steps to obtain the final product.

However, the way salt is obtained in Valle Salado is an excellent example of how human beings have had to adapt to a hostile environment to obtain the only edible rock from nature; an essential product for the subsistence and the evolution of humanity.

The production of salt linked to a very specific natural environment that was not chosen by human beings but selected by nature has a direct bearing on all the steps in the cycle, because it determines the production season, the way the raw materials are obtained, the manner in which the final product is obtained and even the construction techniques and materials.

Consequently, the Añana salt cycle is based on the adaptation of human beings to the specific features of Valle Salado. It requires constant adaptations to the environment. The success of the production process was based, at the beginning of the exploitation, on the ability of the salt workers and, subsequently, on the transmission of their know-how over generations. This process was only interrupted when some technical innovation was introduced, usually by external agents, that led to changes in the production cycle.

As salt has been produced at Valle Salado de Añana continuously for at least seven thousand years, it has been possible to document significant changes in the process. The most important of these is the use of different energy sources to facilitate the evaporation of the brine and obtain salt.

Forced evaporation:

During the first phase when the salt springs were exploited, the main method used was the forced evaporation of the brine. The first information we have on the origin of salt production in Valle Salado de Añana goes back 7000 years. In prehistoric times, Añana looked very different from what we can see today. This is because the production system was different. It was not based on the exposing the brine that flowed from the springs to the elements (sun and wind) but on forced evaporation using log fires.

This fact has been proven in Valle Salado thanks to the archaeological investigations that we are conducting, which have uncovered both the presence of carbon layers on compacted gravel surfaces, showing traces of fire and the remains of burned wood, and the appearance of fireplaces lined with stones to place the vessels in which the brine was heated.

Throughout the Bronze and Iron Ages, this procedure to obtain salt has been proven archaeologically in Europe, which means that similar remains to these factories have been documented.

A complete record would consist of: a) large ceramic vats to concentrate the brine, which would not have been necessary for Añana, where the concentration almost reaches saturation levels in a natural manner. b) smaller and finer raw clay containers which served as moulds and c) cylindrical clay supports to place the containers over the fire to crystallize the brine.

Thus, the archaeological studies have confirmed that in the earliest stages of salt-making in Añana, this production system was used. Ceramic pots containing brine were placed over a fire until the liquid saturated and the first crystals appeared at the bottom and on the walls of the containers. At that point, there were two options: salt-makers could leave the liquid in the same container and obtain a solid product or pour the almost solid liquid into other containers that were used as moulds. These would be small clay pots where the salt ingots were produced by placing them on pedestals on the embers of the fire.



Salt production pottery of Añana.



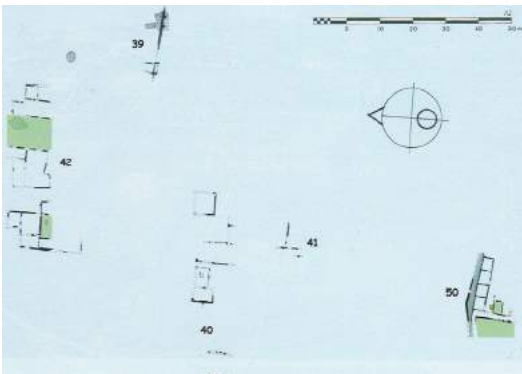
Polished axe from the Prehistoric site of Añana.



Ciempozuelos type bell-beaker pottery of Añana.



Photograph of the archaeological excavations displaying the remains of the Roman city of Salionca



Ground plan of the Salionca archaeological site.



Collection of tools hidden during the destruction of Salionca.

The end result of all this work were compact cores of salt that had to be extracted by breaking the clay pots. The salt-making facility in Añana during this period was located at the beginning of Valle Salado, not far from the salt water springs and near the banks of the river. The community of salt makers who worked in this area did not live there; they lived on higher ground that was easier to defend, as evidenced by the presence of a large site from this period in the district of La Isilla, located to the north of the town.

Natural evaporation:

The change of evaporation system (from forced to natural) in Valle Salado took place two thousand years ago, when this area in the north of the peninsula became part of the Roman Empire. The increasing need for salt by a society that was so advanced compared to the local tribes known as the Autrigones, not only led to significant changes in the habitat, but also in the production and distribution systems.

Consequently, Valle Salado adopted a natural evaporation system that is still in use today, and that, although it implied higher construction costs, multiplied salt production exponentially.

Archaeological investigations being carried out within Valle Salado are certifying the change of the evaporation system. More specifically, the first salt-pans have appeared built over the remains of the old fire-based salt factory. They were built of compacted clay and raised edges to seal the surface. The date of construction has been dated by C14 to around the first century BC.

Salt production based on evaporation in Valle Salado varies each year depending on weather conditions. It usually begins in June and ends in September because the longer nights in subsequent months delay the evaporation process and the continuous rain spoils the little salt that is obtained. This does not imply that the community of salt workers only works in Valle Salado during the summer, since there were other tasks that occupied the rest of the year.

The cultivation of the only edible rock

Valle Salado does not owe its name to the presence of mineral salt on the surface but to the presence of saline water in different springs that emerge from the diapir. Thus, for centuries, humans have had to make an effort to obtain the resource, the salt, by developing an entire water distribution engineering and production system to produce and store the salt, which has resulted in a unique industrial landscape worldwide. A workable system, but also one that is based on custom, on the cultural heritage of the salt workers and of those who directly or indirectly have been and are involved in this activity.

The salt obtained at Salinas de Añana comes from an ancient sea that disappeared millions of years ago. The salt has risen to the surface due to a geological phenomenon known as diapir. This explanation is relatively recent, and those who visit Valle Salado are still amazed to find that there is no sea nearby.

Salt production in Valle Salado requires certain infrastructure, such as channels, wells, salt-pans and storage areas that, distributed throughout the valley, facilitate distribution, storage and production tasks. The

morphology of these elements and their distribution is what gives Valle Salado its distinctive image.

This unusual salt production system that has been developed in Añana is the result of the exchange of cultural and human values that do not display the rigid architectural styles of scholarly learning but, given its practical nature, the valley has witnessed the coexistence of technological innovations and material testimonies from the different periods. Thus, based on the patterns marked by experience and tradition, the salt workers transformed the environment around them, and without meaning to, generated a unique, anonymous, popular, and traditional system that displays a close relationship with nature and culture based on the principles of sustainable and ecological productivity.

These salt production structures have not remained unchanged over time, but have been transformed - in order to increase their productivity - thanks to the empirical knowledge developed over generations by the salt workers. In fact, the valley is a unique and representative example of the evolution, over centuries, of a traditional type of agricultural production, since the system still includes an active production system and the infrastructure that was typical in each period. We shall now explain each one briefly.



The ingenious salt water distribution system

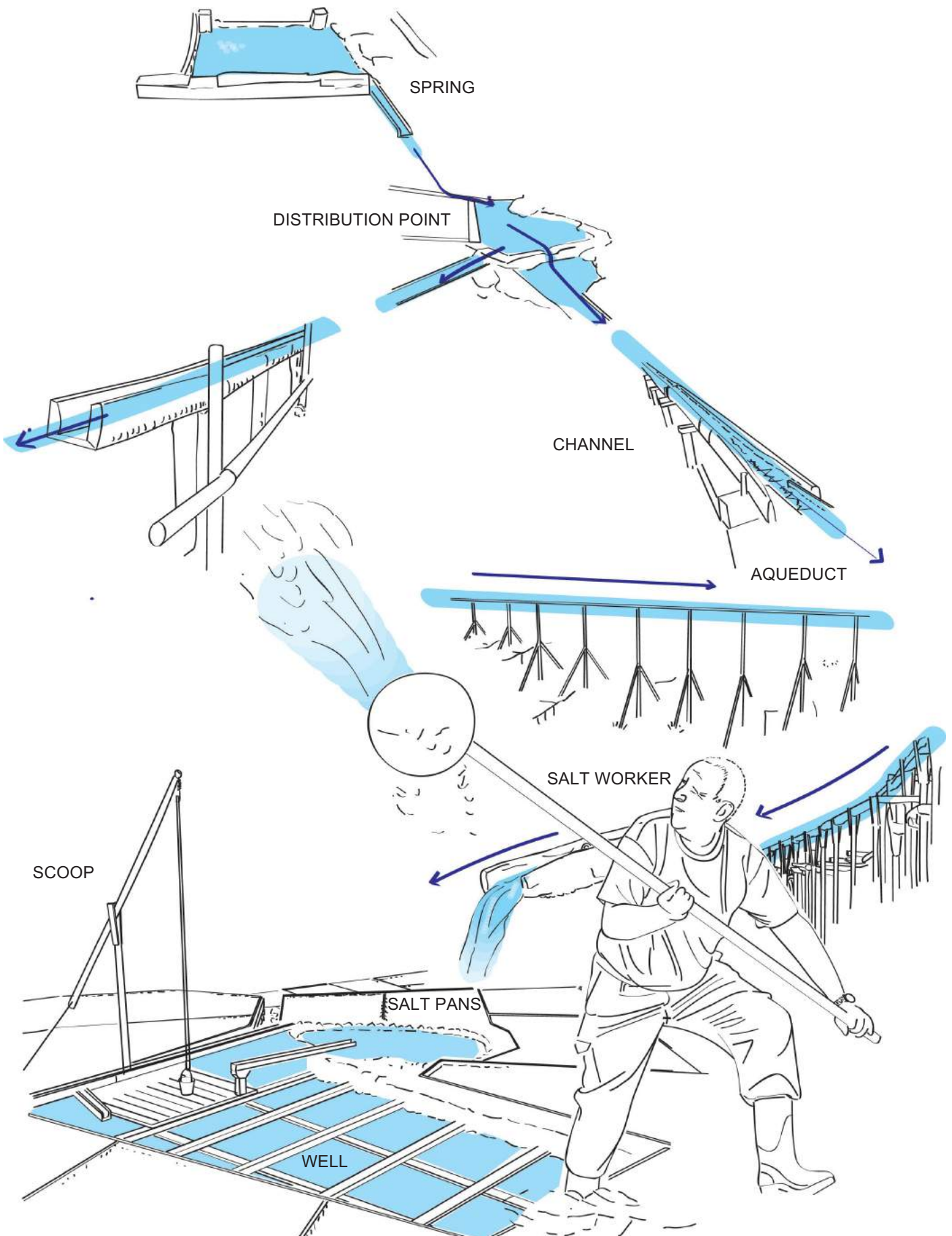
The channelling of brine throughout the salt farm is based on to the fact that the springs are located at the highest point of Valle Salado, together with the location of the storage wells, the extension of the evaporation surfaces and the salt production process.

The brine circulates continuously and by the force of gravity through a network of channels. Although in some areas it runs through trenches in the ground, the bulk of the distribution system comprises wooden channels. They are made of debarked pine logs which have been emptied to permit the flow of the brine. The connection between the different sections is achieved by recesses carved in the wood and sealed with clay to prevent any leakage of the precious liquid.

The main distribution system - over three kilometres long - starts at the spring known as Santa Engracia in a single channel which then separates into two channels at a distribution well called Partidero. The Suso channel extends along the eastern side of the valley while the Quintana channel takes the western side. Twelve parts of the brine that comes from the spring flow through the former while thirteen parts flow through the latter. A short distance from the distribution well, at another well known as

The "Terrazos" and "la Cadena" aqueducts that carry salt water from the Suso channel.





Celemín, it again divides into two channels. The one that supplies the eastern slopes of the valley carries three-fifths of the salt water and is still known as "Quintana" while the one that supplies the central section is known as Medio and carries the remaining two-fifths.

The variety of places through which the channels have to pass means that the brackets supporting them must be different. Some sections lie directly on the salt-pans or on the land. However, most are supported by straight wooden pillars beneath the channels, the height of which is adjusted to control the gradient required to ensure the brine can flow thanks to the force of gravity. In some cases, the solutions adopted are more complicated. For example, in the Terrace area, in order to cross the river and overcome the gradient of the hillside to supply the Santa Ana area, the salt workers built an aqueduct consisting of wooden structures that measures up to eight metres high.

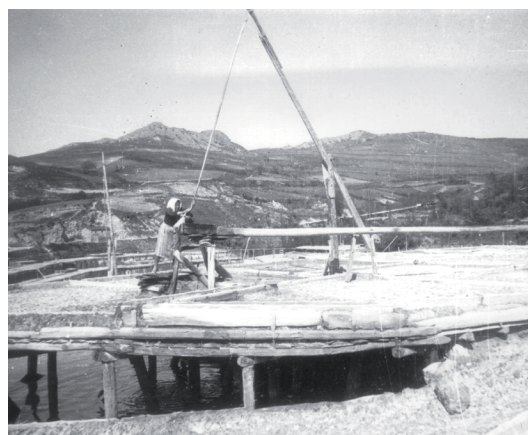




Storing the brine.

Wells

The storage wells are the heart of the salt farms and, when there was a large number of owners among whom the brine had to be divided, filling them was the cause of most of the disputes between the salt workers. This is due to the limited amount of salt water that flows from the springs, the large number of existing salt-pans and the concentration of production work in a few specific months. This explains the large number of existing wells in the salt farm (today 848), and the need for complicated distribution rules for the use of the brine - also called the master book - based on private ownership deeds and traditional allotments acquired by their owners.

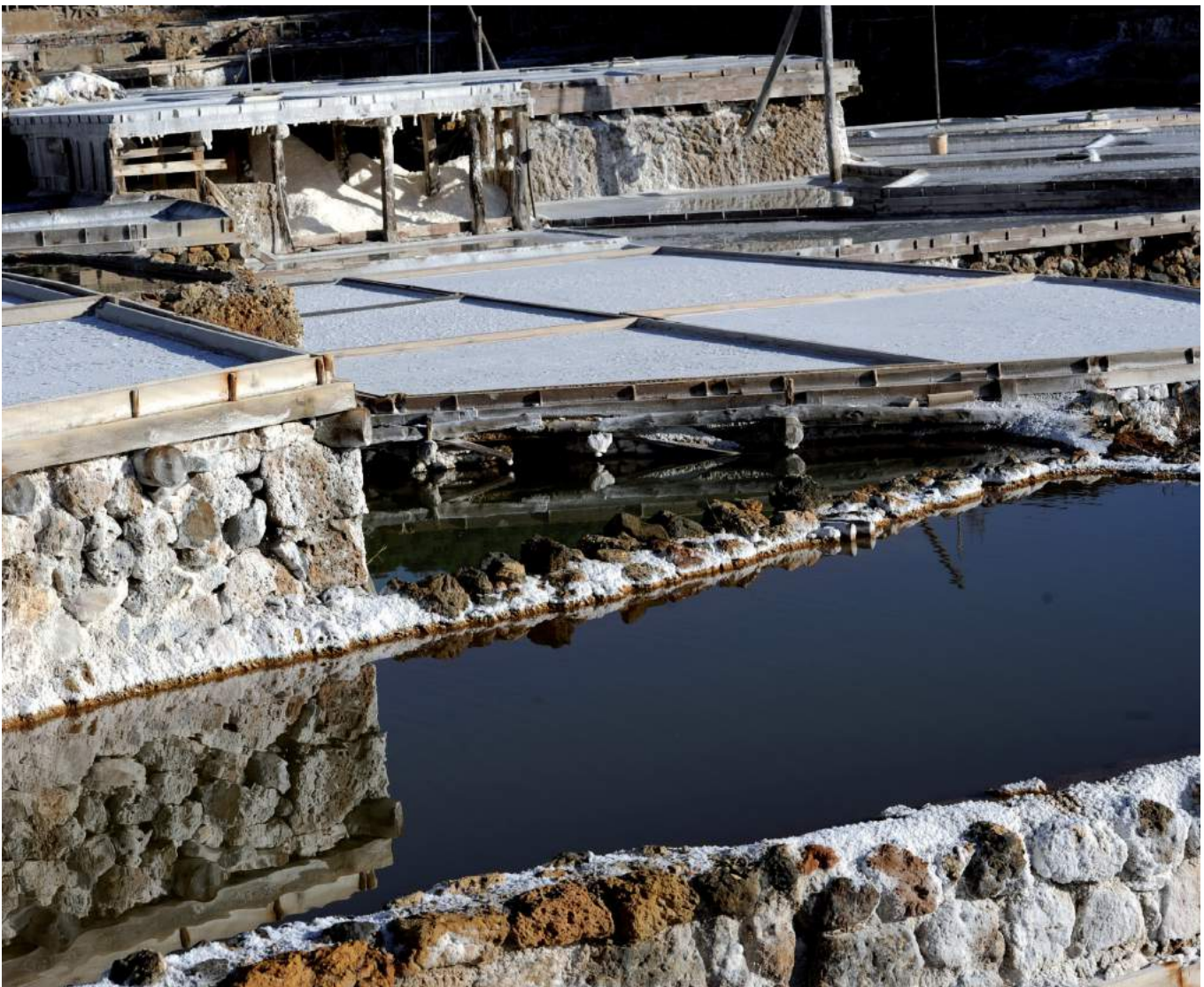


The morphology of the wells is varied, but they can be roughly divided into four types: external, the "boquera" type, heaters and the "hand filled" type. The external wells may be dug into the ground or raised above it. These structures are usually built with masonry and clay or wooden frameworks, in which case they usually have the shape of a prism.

"Boquera" wells are covered by the salt-pans. They are more complicated to build and, in most cases, they are former external wells that have been covered to protect the brine while also taking advantage of the platform created to produce salt.

The heaters are usually small wooden or brick structures. Their role is to preheat the liquid before it is poured in the salt-pans, with a view to accelerating the crystallisation process.

Another typical type of well found on the higher slopes of the valley is the so-called "hand fill" wells (pozos de encube). The characteristic that defines them is that the brine cannot reach them without assistance and they must, therefore, be filled by hand.



Farms and evaporation pans

When Valle Salado extended to its largest area in the mid-1960s, the site consisted of one hundred and eleven farms belonging to fifty-four owners, with a total of 5,648 crystallisation pans.

Salt-pans are traditionally organised into groups called farms, characterised by a set of salt-pans worked by the same farmer and that usually include all the necessary elements to produce the salt, such as: the intake of the brine from the supply network, the salt storage areas, heaters, salt-pans and wells.

The farms adapt, by means of terraces, to the complex topography of the site, resulting in the complicated structures which occupy most of Valle Salado. The shapes and dimensions of the 769 existing terraces are determined by their location. To achieve horizontal surface platforms in a valley like Añana, characterised by steep slopes, the technique usually used has been the creation of terraces supported by stone walls (over 2,000 have been recorded) to support the wooden structures. Generally, the wooden structures consist of a horizontal structure supported on the walls that, in turn, serves to support another vertical structure that



comprises the upright pillars. As regards the level production areas, these are based on another structure formed by straps and planks and waterproofed by means of a thick layer of clay.

Salt production in Añana is based on the evaporation of the water contained in the brine by natural means. The brine is poured onto the horizontal surfaces known as salt-pans. Their shape may vary quite a bit. They are usually quadrangular and measure about twenty square metres. The usual construction method involves building a plank platform on a horizontal wooden structure. The sides are made of solid wooden beams with planks on top. This serves to support a first levelling layer of clay measuring twenty to thirty centimetres deep, on which a layer of finer compacted clay is placed to provide the final waterproofing of the salt-pans.

As observed during the archaeological survey conducted, the finish given to the salt-pans has changed over time. The original system, until the early nineteenth century, was based on clay; after 1801 pebbles were introduced and, then, during the twentieth century, Portland cement.



Salt storage

When the salt is collected from the salt-pans, it is completely damp and, therefore, has to be dried in order to prepare it for the market. Therefore, the salt workers stored the salt in the valley itself until the end of the production season.

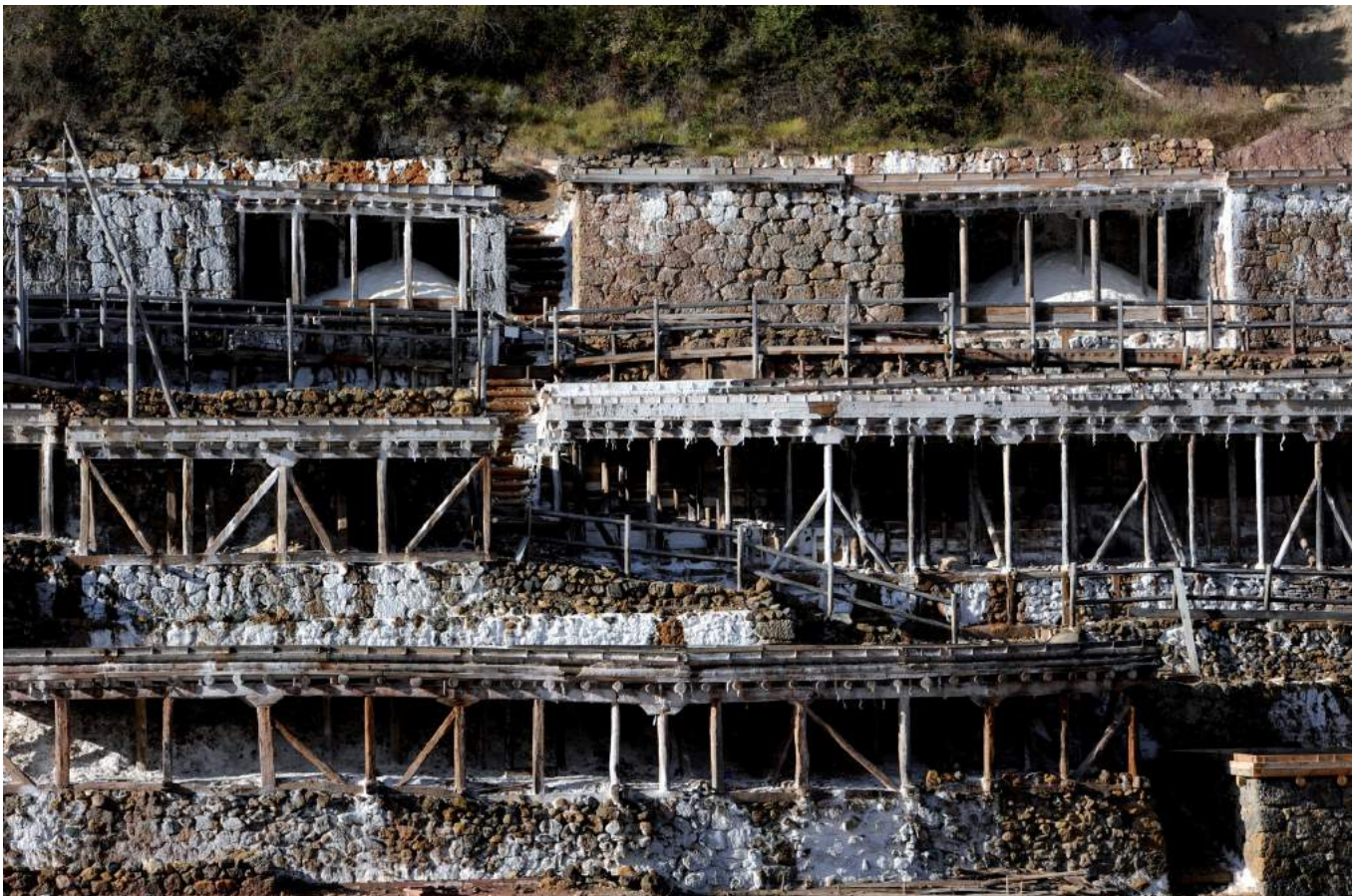
The storage facilities, known as "terrazos" in Añana, were privately owned by the salt farmers, who may have had more than one on their farms. They are mainly located beneath the salt-pans, taking advantage of the gaps between the walls of the terraces and the evaporation pans.

This construction technique greatly facilitates the filling process, as the salt was simply poured through small openings on the surface of the salt-pans, known as "boqueras" (openings). Their main function is to store the product until it is transported in sacks to the warehouses located outside the exploitation.

The "entroje" is one of the last stages of the salt production cycle. It consists of introducing the salt into sacks, which men and women carried on their shoulders to the warehouses, to the main roads or to the banks of the River Muera.

In the latter case, they were loaded onto pack horses or, in the twentieth century, tractors, that then took the salt to its destination. Once there, prior to paying the salt-workers, the salt was measured by three men of prestige within the community: the "Medidor" (Measurer), the "Cuarteador" (Divider) and the Almirante (Admiral), who was in charge of the accounting.

Frontal view of the stepped terraces at the salt works with the salt warehouses at the top.



The Santa Ana and Revilla warehouses, transformed into a salt store, visitor reception centre, and multi-purpose classroom.



The Royal Administration built, during the salt monopoly period (between 1564 and 1869), four public buildings where the salt was stored. They are known as "el Grande del Campo", "el Almacenillo del Campo", "La Revilla" and "Santa Ana". They were used to collect the entire production at the end of each season and also to store any surplus that could not be sold. In total, they could store 110,113 bushels of salt weighing 112 pounds each (approximately 5,681,830 kg).

At present, two of these royal warehouses have been recovered by the Valle Salado de Añana Foundation. La Revilla has become the visitor centre and Santa Ana is a multi-purpose classroom.

Other items

To pump the brine from the "boquera" wells to the surface of the salt-pans, an ingenious system called a "trabuquete" in Añana (basically a scoop) is used³⁰. Images of this device have been found in Mesopotamian reliefs dating from between 3,000 and 2,500 B.C. Its use is so widespread and it has survived so long because it hardly requires any investment or advanced technical knowledge, while it greatly reduces the effort required to perform the task. It is a vertical wooden pole with a cross-bar at the top. On one side, it has a counterweight and on the other, a pole with a container attached to the end. Traditionally a goatskin, locally known as "escuerzo", was used.

Salt production does not require complicated tools:

The roller or rake (rodillo) is one of the tools widely used by salt workers. It consists of a plank with a wooden handle placed almost perpendicularly. The plank may have different dimensions depending on its use. There are three variants.

The stirring rake (rodillo de revolver) is smaller in size and serves to move the brine on the salt-pans. The pushing rake (rodillo de llegar) is a little bigger, and is used during the salt collection process; more specifically to push salt to a certain point of the salt-pan and to make piles. And, finally, the loading rake (rodillo de sacar), which serves to load the salt into the baskets, where it is drained before being placed in storage.

The watering can (regadera) is a wooden bowl fitted with a handle which is used to collect brine from the wells and spread it over the salt-pans.

The strainer (rodillo colador) is a tool designed recently to cater for new salt production requirements in the twenty-first century, the collection of Fleur de Sel (Salt Flower). It is made of stainless steel and has a handle measuring about two metres in length. At one end, it has a flat spatula with holes, which works like a sieve, with two small wheels so that it can roll along the surface of the salt-pans.

Salt is transported from the salt-pans to the private storage areas using baskets made of chestnut wood. The maintenance of the clay surfaces requires the use of rammers (pisón) and the so-called "maceta". The former is a solid wooden block fixed to a handle that is used to compact the clay. The maceta is used to repair cracks that appear in the clay that is used to waterproof the various structures. It consists of a long wooden handle with a wooden piece at the end. One side has a pointed end that is used to close the cracks and the other is flat to smooth over the treated area.

The levelling rod, consisting of a heavy rectangular board with a wooden handle is used to level the clay surfaces. Finally, to lay the pebbles in the salt-pans, in line with nineteenth-century criteria, a gravel rammer was used. It is a circular wooden stump with a handle at one end.

Since the beginning of the salt farm, rain has probably been the salt-workers' main enemy, since a simple summer storm could damage the production of an entire day. If the water drainage systems of the river and the various streams that flowed through the valley were not controlled, flooding could affect the terraces and the storage areas, which could lead to the loss of the entire season's production. Consequently, after the salt farm was taken over by the Crown towards the middle of the sixteenth century, a series of drainage systems and conduits were built to channel the streams that flowed through the valley to the river.



Image 01



Image02



Image 03



Image 04



Image 05



Image06



Image 07



Image 09



Image 10

Image 11

Image 01. Rodillo de llegar

Image 02. Rodillo de sacar

Image 03. Rodillo de revolver

Image 04. Machuqueta y/o maceta

Image 05. Maza de cascajo

Image 06. Heather broom

Image 07. Pisón

Image 08. Maza de nivelar

Image 09. Escudilla

Image 10. Rodillo colador

Image 11. Basket made of chestnut wood

THE AGRICULTURAL CYCLE OF SALT BASED ON SOLAR EVAPORATION

Preparing the salt farm for production.

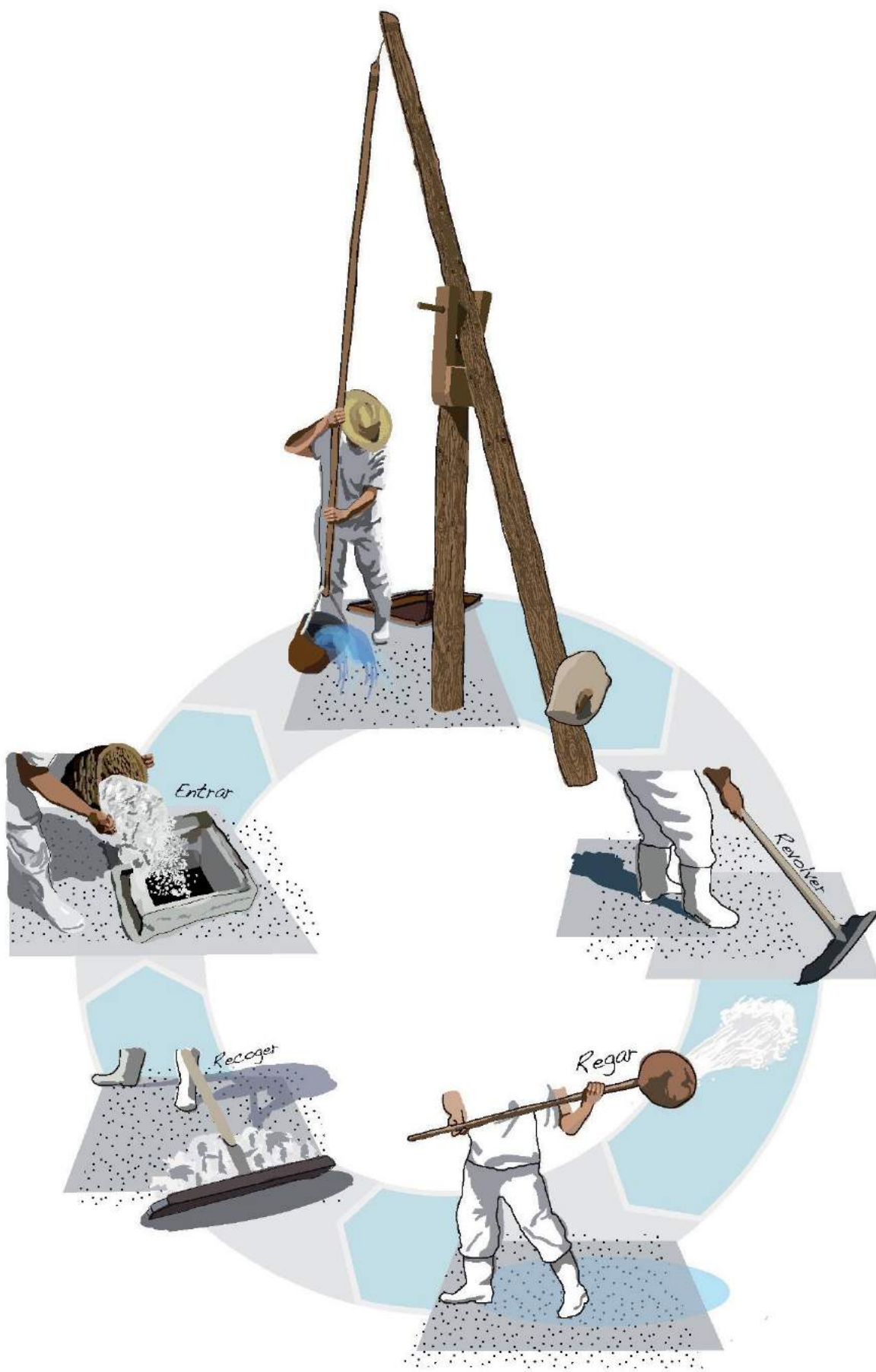
From January to May

Before beginning production work, the following tasks were performed:

a) Since the rain dilutes much of the brine that has been stored during the winter, the community of salt workers had to re-fill the wells before the good weather arrived. When there were hundreds of owners in the valley, this task was performed in strict turns. Today, the salt farm is managed by the Valle Salado de Añana Foundation and there is a smaller number of salt-pans in operation; therefore, such a strict control of the brine is no longer required.

b) The architectural weakness of the salt farm infrastructure and the harsh winter weather meant that the community of salt workers had to rebuild the ruined walls of the terraces and replace damaged timbers.





c) The wells require special care. They must be cleaned and any cracks repaired by ramming the clay used to waterproof them, but sometimes they had to be lined again with clay to prevent the leakage of the brine.



Using a "machuqueta" to waterproof a well with clay.



d) To avoid impurities in the production, the community of salt workers thoroughly clean the brine distribution system from the springs to the wells.



e) One of the most expensive jobs is to repair and prepare the surface preparation of the salt-pans where the salt is made.



Repair work on the edges of the salt-pans.



The surface of the salt-pans is one of the construction features that has changed most over time. The salt farm still has an evolutionary track record of them all; there are salt-pans layered in clay, pebbles, cement and slabs of natural stone. Cracks appear in the clay salt-pans every year due to the sun and permanent moisture; they then have to be compacted again to prevent them from leaking. The salt-pans with pebbles also regularly require repairs and present more serious problems because, in order to solve waterproofing issues, the pebbles have to be removed in order to gain access to the layer of clay.

Cracks appear in the cement salt-pans built in the twentieth almost every year, while those built more recently have been designed to reduce maintenance to a minimum. When the damage is not very severe, the problem is solved by repairing the cracks. When the problem gets worse, a new layer of cement is laid over the previous one. Finally, the stone slab surfaces require virtually no maintenance, except at the edges of the salt-pans to eliminate possible leaks that may have arisen due to winter frosts.

Salt production.
From June to September

The main steps in the salt production process in Valle Salado are:

a) The first step in the process is to fill the salt-pans. This consists in pouring two to four centimetres of brine on the horizontal platforms to expose it to the sun and the wind. This filling process can be performed in several ways, depending on the particular features of the storage wells in each farm.

The simplest system is when the wells are located at above the salt-pans. These were built after 1801, and their design included a drainage system with a wooden plug in order to empty them through the force of gravity. Due to the maintenance problems they caused, the community of salt workers replaced them and introduced wooden channels. When the farms have older wells that were dug in the ground, auxiliary means are used to raise the brine to the evaporation pans. The most common system is a device similar to a crane that is known as a "trabuquete" in Añana (a scoop).

b) The next step is the crystallisation process and this depends on the type of salt to be obtained and on the quality of the final product. In this part of the process, the know-how of the community of salt workers and the weather conditions are vital.

After filling the salt-pans, and after approximately twelve hours, the brine in the salt-pans has to be "stirred" to prevent the salt from sticking to the bottom and to ensure that the evaporation process is uniform throughout the entire surface.



The distribution channel with the opening that allows the brine to fill private wells.



Filling the salt-pans using the trabuquete





Salt workers stirring the brine.

Salt flowers.



Over the next four hours the salt crystallises. This commences when a thin film covers the surface of the brine placed in the salt-pans. Over time, the film breaks up into smaller parts known as Fleur de Sel (Salt Flower). If this Fleur de Sel is not harvested, it will begin to merge and form salt crystals that, as their weight overcomes the surface tension of the liquid, begin to sink to the bottom of the salt-pans.

Traditionally, the objective of the community of salt workers was the mass production of mineral salt. Today, in a market where quality is valued over quantity and where different varieties of salt are also required the process has been slightly altered. More specifically, if the community of salt workers want to obtain fleur de sel, they collect it from the surface of the salt-pans using some specific tools that do not break up the flakes. However, if they want to obtain mineral salt, they stir the fleur de sel to sink it to the bottom of the salt-pan and allow all the brine to crystallise evenly. This process is known in Añana as "hacer escaleras" (making steps) and each salt worker has a different way of making geometric shapes with their rakes.



Stairs.

c) The third step is to accelerate the crystallization process once again by stirring the brine. In those salt-pans where dry areas have appeared due to surface irregularities, preheated brine is added to avoid interrupting the evaporation process. A tool known as a "regadera" (watering can) is used. This is a bowl with a wooden handle. The brine is heated in small wells where the liquid increases its temperature more quickly.



Salt farmer watering the salt-pans.

d) The fourth step is to collect the salt. Contrary to what one might think, the product is not collected when the brine has evaporated completely; it is gathered when there is still some liquid in the salt-pans. This is done to wash the salt one last time. The harvesting process consists in forming one or two piles of salt in the centre of the salt-pans. Then it is placed inside baskets made of chestnut wood, where it is left for a while to drain off any excess liquid.



Salt worker piling salt in the centre of a salt-pan.

Salt inside a storage area.





Mid-twentieth century picture of salt farmers carrying salt.



"Entroje" festival held in October once the production season has come to an end.

e) The final step is to store the salt. The salt is introduced in the storage areas in the farms. These areas are mainly located underneath the salt-pans, on the surface of which there are some small holes called "boqueras" through which the salt is poured.

Transporting the salt.

From October to December

The production season usually ends in October, when daylight hours decrease and cool nights prevent the crystallization of the salt during the day. That is the time when the salt workers (both men and women) organised the removal of the salt from the valley to the external warehouses. This task is known as "Entrojar la sal" and is one of the toughest jobs given that the layout of Valle Salado, which is very compact and difficult to access, means the salt has to be moved by hand.

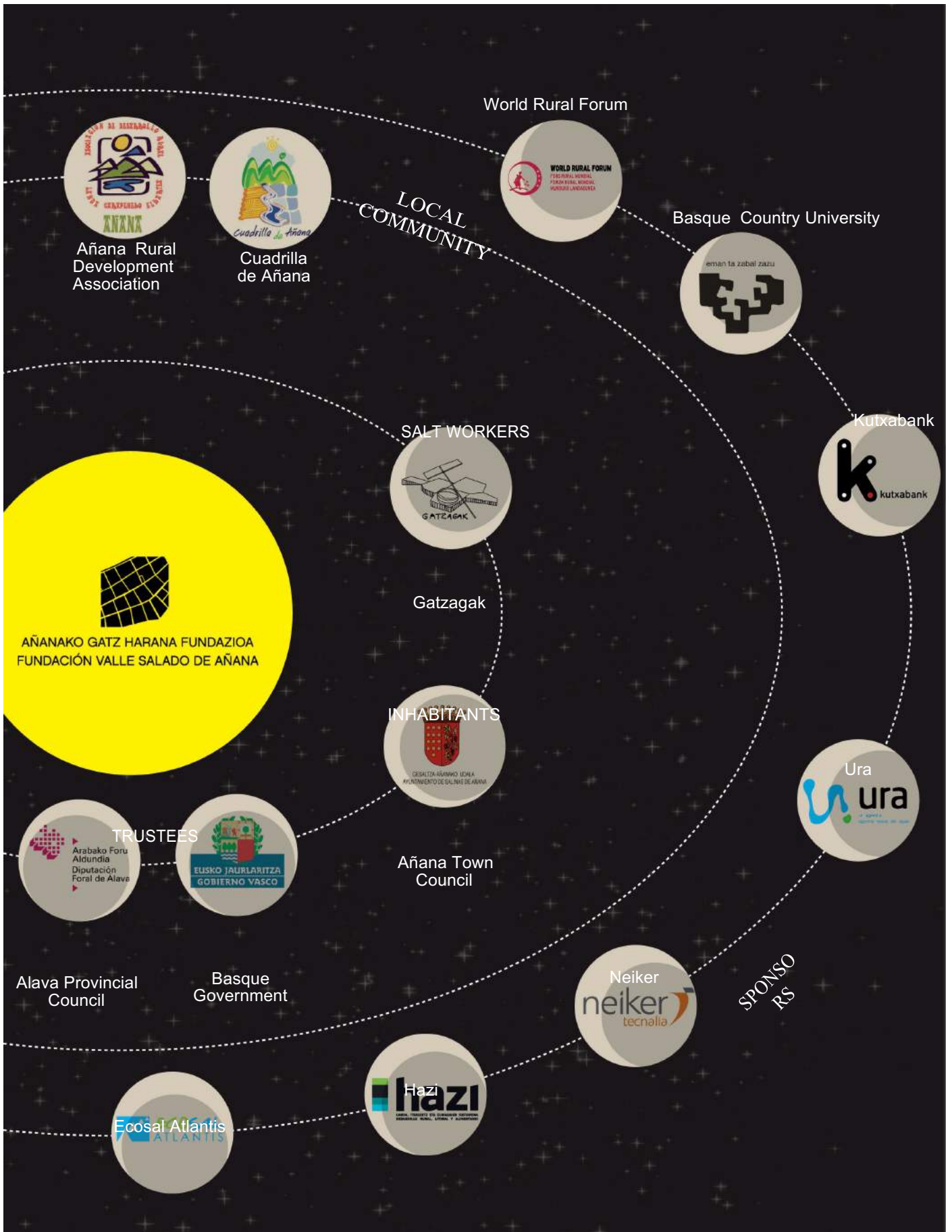
When the salt mines were owned by the Crown (1564-1869), the salt was taken to the four royal warehouses that existed in Añana. There, it was sold directly or handed over to haulage companies hired by the Administration to distribute it to the different markets. In all the other periods, it was usually the salt workers themselves who marketed the product obtained from their farms. Today this process has been altered, as the Foundation that manages the salt works has built, inside Valle Salado, all the infrastructure required to obtain the final product. Thus, the community of salt workers manually takes the mineral salt and fleur de sel to the storage modules, which are adjacent to the packaging module. There, local women package the salt in the various formats available and prepare it for sale at a number of outlets.



Social fabric committed to Valle Salado

Culture and ancient values

iv. Cultures, value systems and organisations



The innate resilience of the Añana salt works can be seen in all its splendour when we analyse the continuous evolution of the social organisation to adapt to each period to ensure that Valle Salado de Añana remains as one of the few agricultural systems in the world that has been operating continuously for more than 7,000 years, producing "white gold", as it was known in antiquity.

The local community

Although we shall explain the local organisations of Salinas de Añana separately, it must be borne in mind that the reduced dimensions of this agricultural system mean that there is virtually no division between them. The local community is very small and the only differentiation lies in the ownership or not of salt pans to make salt. For example, there are salt workers working in Valle Salado who are owners of salt pans and, therefore, members of Gatzagak, councillors in the local town council and who attend the meetings of the Foundation's Board of Trustees. All of them, including the population that had to move to industrial areas in the twentieth century when producing salt became unprofitable, have a strong sense of belonging to and pride for the local community, ensuring the survival of its agricultural values and practices. Without a doubt, the local community plays a key role in the balance between the environmental, cultural and socio-economic aspects of Valle Salado de Añana.

Gatzagak.

Heirs of the ancient Brotherhood of salt workers.

The salt workers' association, now known as Gatzagak, is an entity that groups all the owners of the salt-pans in Valle Salado de Añana. Their present legal description as a Corporation was created in the late twentieth century to adapt to changing times. However, this group of owners is one of the few organisations in the world that, in 2014, celebrated 900 years of history. It was created around the first quarter of the twelfth century and for centuries was known as "Community of Heirs of the Royal Salt Works of Añana" (Comunidad de Caballeros de Herederos de las Reales Salinas de Añana".

Its origins date back to the times of Alfonso I the Battler, King of Aragon, Navarre and Castile, when he founded the town of Salinas de Añana on top of a hill with a view to controlling the production and marketing of the white gold: salt.

The town founded by the king brought together the inhabitants from six small villages that had existed in the Agricultural System of Valle Salado since at least the eighth century. This unification process led to a number of situations that had a major influence on the salt works in the following centuries:

Firstly, as the old communal salt-working spaces included individuals and institutions that were alien to the original community, the salt divisions that governed the first stage eventually became dysfunctional and disappeared, although their names remained.

Secondly, a joint brine distribution network and sharing system was created, although the rights to the liquid and its usage were maintained by the rightful owners.

Third and last; given the new political, social and economic situation that affected the town of Añana, an administrative body, called the Community

of Heirs, was created to bring together all the owners of salt-making infrastructures in order to organise and oversee all the internal operations in Valle Salado and, if necessary, defend their rights against any external aggression.

Although the Community, in its origins, was linked to the town council, it eventually became a fully independent institution. To become a member the only requirement was to be an heir (owner), regardless of whether members were ecclesiastical institutions, local inhabitants or individuals residing elsewhere. It was first mentioned in a document dating from 1198, the year in which Alfonso VIII granted the "Heirs of the Salt" (herederos de las salinas) a series of privileges.

The statues have not been preserved in historical records. However, it has been possible to identify most of its functions by analysing the large number of documents generated by the community over time.

This ancient society of salt workers was governed for centuries by traditions and customs, until, as happened with the distribution of the brine, its statues had to be put into writing. Due to the fact that, during the Middle Ages, over fifty religious institutions held properties in Valle Salado, the Community was headed by two deputies, one secular and one ecclesiastical, who were elected each year from among the heirs.

At the end of their term, if the deputies were not re-elected, two "veedores" (overseers) were appointed to check the accounts before their successors were elected.

The functions of this ancient society have been recorded in their minute books. The main functions included: it was responsible for the care and maintenance of communal areas and facilities (such as the springs, the brine distribution network, the paths and roads, etc.); it ordered any work required to improve the operation of the property, it supervised the distribution of brine and updated the said distribution; it imposed the

Seal of the Community of Heirs.



relevant penalties in the event of any infringement of the rules, it legally defended the rights of the community against external aggression, promoted the marketing of salt, controlled product quality and ultimately oversaw the property of Valle Salado, as it charged a fee for all transactions that took place.

One of the difficulties that public institutions encountered in order to support the Valle Salado project in the late twentieth century was that the Community of Heirs, despite still existing, no longer controlled the ownership of the salt works, which had increased in recent years as many owners had sold out as a result of the lack of profitability. The solution to this problem was reached between 1998 and 1999, when the re-establishment of the society of salt workers was under the new name of Gatzagak (which means salt works in the official language of the Basque Autonomous Community) was promoted. This institution was able to bring together, once again, all the salt farm owners, concentrating their opinions and requirements, which made it possible for the public agencies responsible for heritage issues to act

The advantages of creating Gatzagak not only focused on facilitating the intervention in the salt farms but, faithful to the Society's core objective: "The promotion, development and implementation of economic, social, cultural, sport and tourism activities as well as the management of Protected Natural Areas, related to the natural environment that contribute to the development and improvement of the socio-economic environment of the Town of Salinas de Añana (Álava), promoting initiatives that generate wealth and employment", also becoming one of the leading agents in promoting the recovery of Valle Salado.

Another advantage from the creation of Gatzagak is that its charter regulates the internal transmissions of the salt farms. This was achieved

The Local Community proudly displaying the history of Valle Salado by means of a show with light and sound that is held every year on the second Saturday of July.



by dividing the salt works into as many registered shares as evaporation platforms existed making their owners shareholders. They are now obliged to inform Gatzagak - which reserves the right of first refusal - of any sale or transfer of properties.

Actions displaying the commitment and solidarity of the former Community of Heirs to the Agricultural System of Valle Salado are constant and numerous. The first act that proves this without any doubt is the concession granted in the late twentieth century on the use of Valle Salado for twenty years to the Provincial Council of Alava, in order to facilitate operations on private property. It has also purchased buildings directly related to the salt works, such as salt warehouse called La Revilla, to donate them to the Provincial Council. The Council launched a European funded project to recover it and convert it into the Valle Salado Visitor Reception Centre.

Gatzagak has even cooperated actively with the work, hiring staff to perform maintenance tasks in the salt farms.

With the creation of the Valle Salado de Añana Foundation in 2009, a wide-ranging change occurred in the ownership of the salt works. Gatzagak, which consisted of more than one hundred members, performed the greatest act of solidarity and respect for its heritage that can be made by citizens. It donated the ownership of the salt-pans to the Valle Salado Foundation to enable it to take charge of recovering their sustainability. The community of salt workers, who have become part of the Foundation's Board of Trustees, have preserved their rights over the salt water that flows from the springs. For the use of the brine, the Foundation pays them an annual fee of 70,000 euros. Further evidence of their commitment to the project is that half of that money is reinvested in cultural activities in the surrounding area.

The Local Community performing recovery and maintenance work in the salt cultivation areas.



As can be seen, Gatzagak has become a key player in the future of the salt works by generating and facilitating the actions undertaken by the Valle Salado Foundation and by cooperating in most of those actions.

Añana Town Council.

The establishment of the Town Council of Salinas de Añana is similar to that of the Community of Heirs. This local institution emerged in the early twelfth century from the merger of the councils of the various villages that existed in the vicinity of salt works. It grouped all the residents in the valley and was headed by a mayor elected from among the notables of the community. It convened periodically in the former church of San Cristobal until a town hall was built in the town square in the eighteenth century.

The City Council had no powers in connection with the salt works; it did not interfere in any way in the work of the Community of Heirs. Their activities were associated exclusively with the local inhabitants and with the various lords who had jurisdiction over those inhabitants, such as the Sarmiento family, who became Earls of Salinas in the fifteenth century.

The Añana Town Council and the local community it represents are fully involved in the Valle Salado project. They are fully aware that the maintenance and enhancement of the Agricultural System is a unique opportunity for the future and that it would be boosted exponentially with this important global recognition.

The Town Council also plays an active role in all social and cultural activities promoted by the Foundation, such as the Salt Fair or other events organised in the Valley and in the surrounding area. Similarly, this institution stands as a protector of the property's intangible heritage.



Especially in relation to the organisation and funding of various local festivals and processions.

Oral traditions and expressions. Intangible heritage

In Salinas de Añana, the intergenerational transfer of knowledge and skills connected with nature and traditional salt making techniques that have allowed salt production to survive in Añana after six thousand years of history is especially important. These salt production techniques are, without a doubt, the site's most prominent examples of intangible cultural heritage, since they are the source, in turn, of life in the Valley.

However, there are other examples of intangible heritage in connection with the salt works and salt production, such as traditions, rituals and festive events that combine to configure an intangible heritage linked to this environment.

Relevant examples of this include the legends on the discovery of the saline springs, the typical vocabulary and oral traditions linked to the salt works, the survival today of toponyms documented a thousand years ago or traditional forms of social organisation.

Legends on when and how the salt water springs were discovered have existed since salt production began. Among the inhabitants of Salinas de Añana the belief still exists that it was a cow that detected the taste of the salt while grazing and, scraping the ground, uncovered the spring that would transform the life and luck of the inhabitants of the valley.

The use of the language in Salinas de Añana is also associated with salt production and with the natural elements that affect its production.

A vestige of the social forms of interaction around the salt production still occurs in the word *amo*, which until recent years was used to refer to the owners of the salt-pans, who, in the past, used to employ the people from the village. This use of the word *amo* survives in the memory of the community of salt workers even though most of the older workers or labourers became the owners of the salt-pans during the twentieth century.

Examples of this usage can be found in the words used to define the winds (*regañón* or *regaña* for a Northwest wind, and *ábriego* for winds from the south).

Many words originated from the elements and structures generated for the production of salt, such as canals (channels), *repartideros* (distribution wells), *eras en terrén* or *socarreñas* (salt-pans), *paredes de piedra tobeña* (stone walls), *capas de greda bien maceadas* (layers of well compacted clay), *empedrados de cascajo* or *teguillo* (pebbles), *rebostas*, *alar*, *anteparo*, *chaveta*....

Other key elements are the names given to the tools and devices made with traditional techniques and local materials: *pisón* (rammer), *trabuquete* (scoop), *cestas* (baskets), *rodillos* (rakes)...

Salinas maintains oral expressions used in salt production tasks for centuries. A popular expression among the inhabitants states that salt production requires three agents, "the salt worker, the sun and the wind", which shows the importance of the climate in the day to day work at the salt farms. The springs, the water, the sun.... were worshipped in this land. Even today, some locals greet the sun each evening, saying: "blessed sun, God bless you; whoever sees you will tell you this" ("sol bendito, Dios te bendiga; cualquiera que te vea, esto te diga") or even "sun, little sun, blessed sun, heat the grain, kiss the salt-pans, fill them with salt and



do no wrong" ("sol, solito, sol bendito, calienta el grano, besa la era, llénala de sal y no nos hagas ningún mal"), as a way of mentioning the main concern of the valley, the production of salt.

There are also many traditions that link salt production to nature. The word Tentenublo (stop the clouds) is used to refer to the tolling of the bell that each neighbour performed in turns in Salinas de Añana when they saw a storm appear in the Sobrón, Gobeá or Cellorigo mountains. This special way of ringing the bell, known as Tentenube, was performed at noon from the day of the May Cross Festival to the day of the September Cross Festival (a tradition still maintained today by the nuns in the monastery). When the brine was in the salt-pans, the bell ringing was accompanied by the rhythm of the following verses:

"Stop cloud, stop where you are, do not come over me. If you have water, do not drop it here, and if you have hail, go one hundred leagues from Miranda and a little bit further" ("Tente nube, tente en ti, no te vengas sobre mí. Si es agua, no eches aquí, y si es de piedra vete allí, a cien leguas de Miranda y un poquito más allá".)

The survival of place names is also an aspect to be highlighted in Salinas as an example of oral transmission. In some cases, they have been documented for over a millennium and are justified by the salt industry itself because as they depended on a limited resource (brine), the distribution of which was based on tradition and customs, for centuries the salt workers had to memorise and transmit the customs, rights and boundaries of the salt farms acquired by their ancestors throughout history orally.

We can highlight the word "terrazzo", which is the name currently given to the storage areas inside the salt farms and to an area at the southern end of Valle Salado. This name indicates the position of the ancient village of Terrazos, documented in the year 945.

We can also note the existence of traditional forms of social organisation that still exist today. The "Community of Heirs of the Royal Salinas de Añana" ("Comunidad de Caballeros de Herederos de las Reales Salinas de Añana") dates from the thirteenth century and includes all the owners of salt-pans in the Valley, considered "Caballeros" (Gentlemen) and who played an active role in the General Assembly besides being part of various traditions, such as representatives of the so-called "nobility" during the Easter Sunday processions, for example.

Rituals and festive events

The most important festivals of this town are linked to the two main occupations: the production of salt and agriculture.

The Fiesta del Entroje (Sacking Festivity) coincides with the end of the salt harvest season (October), when the salt was introduced into sacks and then carried on their shoulders to the warehouses. Today it is also celebrated on occasion of the Tribute to Salt Workers.

The Festivity of San Cristobal, in homage of the Patron Saint of Salinas de Añana (10th July), also celebrates the beginning of the harvest season and opening of the market; an occasion when special dances take place in the village. In the village, the festivity of San Cristobal was known as the "feast of the rich", while the poor had the festivity of Santa Ana.

Today, this is the most important festivity on the salt workers' calendar as it involves the entire local community in a performance of light and sound



Residents of Salinas de Añana enjoying their festivities.

Comparison of medieval and modern text referring to Salinas de Añana displaying the same content passed down through the years.

948 Et iussit comes ut acciperent ipsam sal- sam homines Sancti Emiliani dominica die summo mane, in auro- ra, usque ad vesperum	: 1760 On Sundays, the salt-pans known as San Millán enjoy the channel for the same number of hours, from dawn until three o'clock in the afternoon
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978 en na fonte maiore cum illo rege in die ver- nis la tercera parte	: 1548 Every Friday, from dawn until three o'clock in the afternoon, a third of the entire channel of the entire spring.
--	--



that takes place at night in the salt farm. More than 100 local people and salt workers contribute to this theatrical performance on the past, present and future of the salt works, playing pre-historic people, Romans, people from the Middle Ages, who left their mark on this site. For one hour and a half, the performance fills the wooden structures and salt pans with sound and multi-coloured lights, creating a magical atmosphere.

The Festivity of Santa Ana (patron saint of the Valley), every 26th July, also known as the Festivity of the Poor, was one of the great events (pious and secular) which brought all the inhabitants of the village together. In this festivity, the highlight was the procession with the statue of the Virgin, which used to be paraded over the entire surface of the salt works. Vespers and Mass before the image of Santa Ana were intermingled with bonfires, dancing and a famous meal to which the king's representative was invited. Although these festivities are no longer celebrated as they were in earlier times, there still remain numerous celebrations and festivities associated with them. In recent years, some of them, such as the festivity of Santa Ana, have been recovered

The Burning of Judas. One of the typical festivities in Salinas takes place on Easter Sunday, when the "Burning of Judas" takes place. Judas is represented by a full-size straw-dummy which is hung from an elder tree, cut the day before by the young men in the surrounding mountains. On the morning of Easter Sunday, Judas is mounted on a donkey, which is accompanied by a "defence attorney" and paraded through the streets, enduring the taunts of all the people. After this ride, the dummy is hoisted into the elder tree with a bag of money in its pocket (the proceeds from having betrayed Jesus) and a sign that reads: "Thus die traitors", after which the dummy is burned with a roar, as the dummy contains fireworks or cartridges to generate more noise. The Judas festival has similarities with other festivities documented as far away as Africa, America and, of course, Europe, where they also make a doll that is paraded, tried and burned for a number of reasons.

1	2
3	4



1. Concert in Valle Salado with a traditional musical instrument known as a txalaparta.
2. Feast of San Cristobal in honour of the patron saint of Salinas.
3. Salt Fair Market during the Festivity of San Cristóbal.
4. Traditional Burning of Judas to cleanse the town of sins, with a sign: "Thus die traitors".



The Valle Salado de Añana Foundation

The decline in profits obtained from the production of salt towards the middle of the twentieth century led to the decline in the maintenance work on the production infrastructures. The community of salt workers who were still struggling in Valle Salado began to organise themselves and lobby public institutions for assistance. First to request subsidies to conduct studies on making salt production activities profitable again, even if unsustainable methods were required, and, later, to convince the institutions to become directly involved in the conservation of their tangible and intangible heritage. This situation made the institutions realise that Valle Salado was not only the oldest Agricultural System in the province, but also an essential part of our cultural and natural heritage that had to be safeguarded.

The turning point for Valle Salado occurred in the late twentieth century, when the Provincial Council of Alava embarked on a series of direct actions to generate the conditions required to restore sustainability. This set in motion the drafting of an Action Plan, the contents of which are being implemented today under the direction of a not-for-profit foundation set up by the local community and the main political institutions in the province.

The Valle Salado de Añana Foundation was established in October 2009. Its key goal is to continue with the process of enhancing the sustainability of the Agricultural System of Valle Salado and regaining that optimal point that was, in general, achieved in past centuries. The main system to achieve this goal is to follow the guidelines established in the Action Plan that, if necessary, can be adapted to new circumstances and opportunities that may arise over time. Consequently, this enables the foundation to recover the sustainability of Valle Salado in order to preserve, maintain, use and display the property and, through its various functions, ensure its survival.

Since the inception of the Foundation, we have been aware that our tasks could not focus solely on the Agricultural System of Valle Salado de Añana and its salt farms, but that it had to go beyond and set the stage for a multi-functional future. After more than a decade of work, we have already demonstrated that compliance with the roadmap established at the beginning of the Plan has transformed Valle Salado into a key element of the economic and social revitalization of the area.

The Foundation's three main lines of action, which are completely interrelated, are: A) Maintenance of the Agricultural System of Valle Salado de Añana. B) Build a sustainable salt production activity with a view to producing different types of high-quality salt and selling them to generate enough revenue so that the project can fund itself in the future. C) Develop a range of cultural activities to keep Valle Salado alive and contribute to the social and economic regeneration of the district.

Based on a long-term programme, the Valle Salado de Añana Foundation is also promoting a number of social, operational and landscape actions that are open to the public. At the same time, it is conducting research work and promoting respect for and awareness of the agrobiodiversity and the traditional construction and production systems, as well as the encouragement of other resources that, functioning in a symbiotic manner, will enhance this unique Agricultural System.

The actual development of the Action Plan, together with all the activities that have been implemented since its completion, have resulted in a turning point for Valle Salado de Añana as, over the last twelve years, the necessary tools and means have been provided to achieve the recovery of the heritage, economy and social values of Valle Salado and

its surroundings.

In order to create the Valle Salado de Añana Foundation, an agreement was reached the salt worker's association, Gatzagak. This agreement is one of the most important events in this ambitious project. The owners have donated all the structures that comprise the salt works to the Foundation. This demonstrates the full involvement of the society of salt workers in the enhancement and sustainable recovery of this Agricultural System.

The Town Council, in turn, is actively cooperating in the tasks undertaken by the Foundation. From an economic viewpoint, it has pledged to support the project by not charging fees for building permits involving work in Valle Salado.

The Board of Trustees of the Valle Salado de Añana Foundation consists of three trustees: The Provincial Council of Álava (6 representatives), the Basque Government (2), the Town Council of Añana (1), and the Community of Salt Workers (2).

The Board of Trustees of the Valle Salado de Añana Foundation represented by the Local Community (Gatzagak and Town Council) and Basque public institutions (Basque Government and Provincial Council of Alava) receiving the Grand Prize of the Jury of the 2015 European Union Prize for Culture - Europa Nostra Awards.

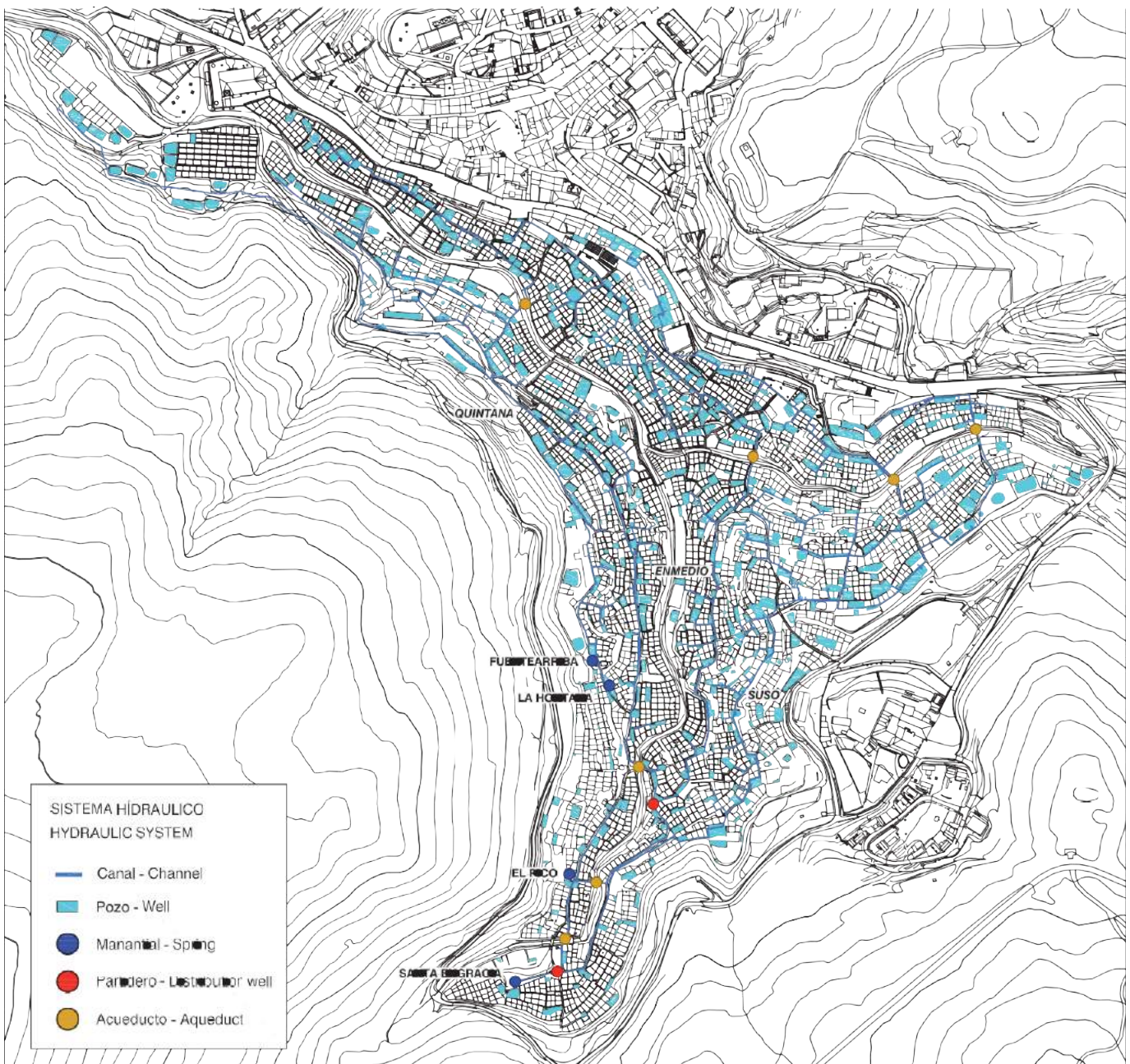




The salt water distribution system

The most important resource Valle Salado has had throughout its long history is, without a doubt, the salt water, more commonly known as brine. This liquid gold emerges naturally from the interior of the earth at a few specific points. However, it presents three major problems regarding its efficient use in the production of salt: the ownership of water, the need to transport it to all points of the valley, and the limited amount of liquid that flows, about 2.4 litres per second, which requires the building of storage wells in each of the salt farms.

These problems have existed at the salt works since their origins and got worse as the number of salt farms and owners increased. The agreements reached to resolve these issues have been one of the main cultural practices associated with the management of resources, making it possible to ensure the conservation of the agricultural system



and promote the regulated use and access to this natural resource. The solutions have adapted to the needs of each period, but they have always been based on the communal control of the resources, respecting the legitimate individual rights of the owners. This has resulted in achieving a balance for Valle Salado by enhancing the resilience and operation of all the elements and processes that are critical to the functioning of the Agricultural System.

Valle Salado sits on a large bubble of salt, which comes from the drying-up of an ancient sea 200 million years ago. Thanks to the existence of freshwater streams that penetrate the solid salt, a number of springs of hypersaline water naturally come to the surface. The salt content of the said water is 240 grammes per litre (ocean water has about 36).

The emergence of the brine at the surface is a great advantage for the traditional production of salt and is a rare occurrence in inland salt works where wells usually have to be built to reach the underground water and systems are required to raise the brine to the surface.

Salt water flowing from the main distribution junction.





Salt water spring on the Santa Engracia terrace.



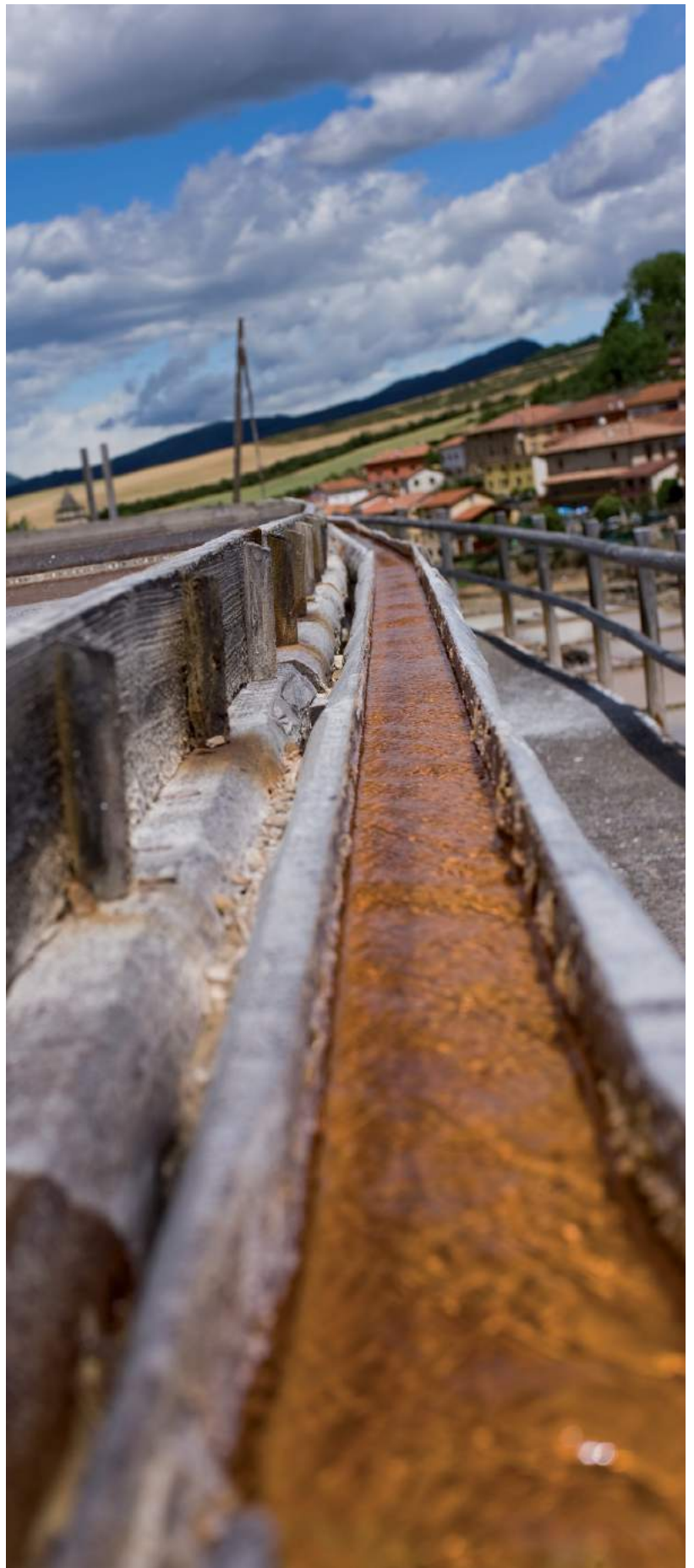
The way the brine is distributed at Añana is really exceptional given its wooden constructions, but also because it is based on a system of springs and on ancient rights to the brine that has been documented for over 1200 years. It should be borne in mind that the current configuration of the system is based on the same factors that the community of salt workers had to overcome to distribute the brine, such as the need to strictly maintain the slope of the channels so that the system could work through gravity, the abrupt morphology of the site, characterised by steep slopes and crossed by rivers, the need to ensure the liquid was not contaminated or the large number of evaporation pans the system eventually had.

The community of Añana salt workers devised a distribution system based on hollowed out tree trunks that were not dried to ensure they were waterproof, that extended over three kilometres in length, and that used a number of support systems to maintain the necessary slope for the water to flow to almost all the pans thanks to the force of gravity. This led to the creation of a unique and impressive system, where the channels were supported by wooden pillars or structures that once measured up to 10 metres high to bridge the gap between both slopes.

The salt water distribution system at Añana can be compared to the circulatory system of the human body, where the heart of the salt works would be the main spring, Santa Engracia, and the distribution well. From this point, the two main arteries or channels emerge. The first of these is called Royo de Suso. It is 1,168 metres long and carries the valley's "blood", the brine, along the eastern hillside of the salt works. The other is called Quintana and, after running along the western slope, comes to another distribution well known as Celemín, where it divides into two branches. The one that continues along the same slope is also known as Quintana, and measures 1,314 metres long, while the one that runs through the centre of the system is called Royo del Medio, and measures 434 metres.

A large number of minor channels branch out from the main arteries in order to distribute the salt water to the salt farms, using a complicated rationing system.

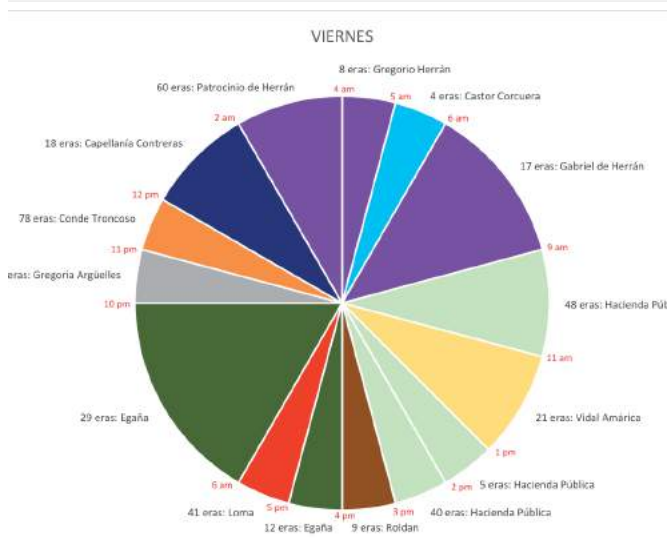
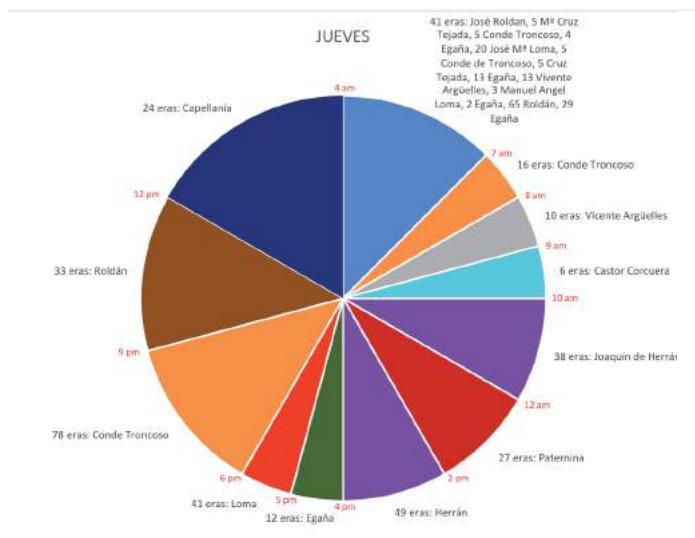
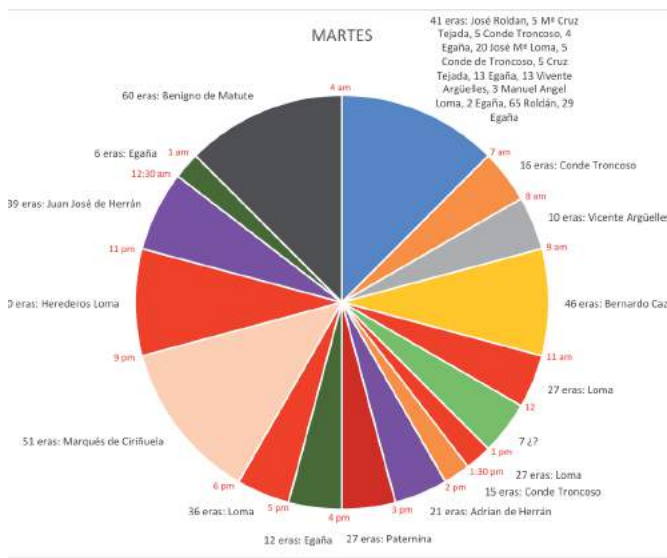
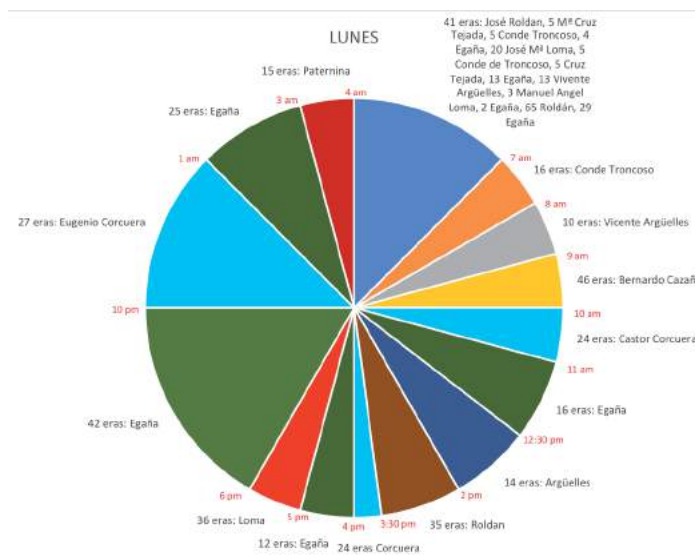




Given the limited amount of water that flows from the springs, the large number of existing evaporation pans, the concentration of production tasks in a few specific months, and the existence of many owners who need their own, independent production system, a large number of salt water storage wells are needed. Thanks to these wells, the community of salt workers were able to continue with the production process throughout the entire production season. The morphology of the wells has also evolved throughout history. Some are open while others are concealed below the production pans and they have been built and waterproofed using different types of materials. They are all present in Valle Salado, because, being an essential element in the production process, when new wells were needed, the older ones were extended and new infrastructure was built adapted to each period.

The limited amount of salt water that flows from the springs and the great number of owners generated the need to regulate and control its distribution in order to have enough water for all the farms.

All throughout the year, both day and night, all the brine from the mountain springs was assigned to different owners in





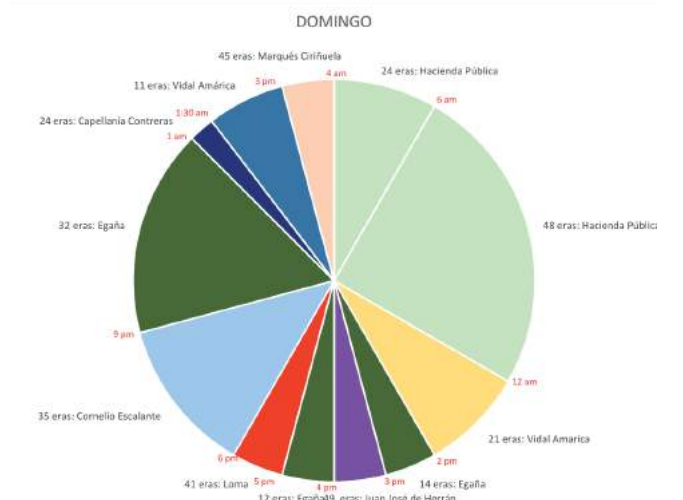
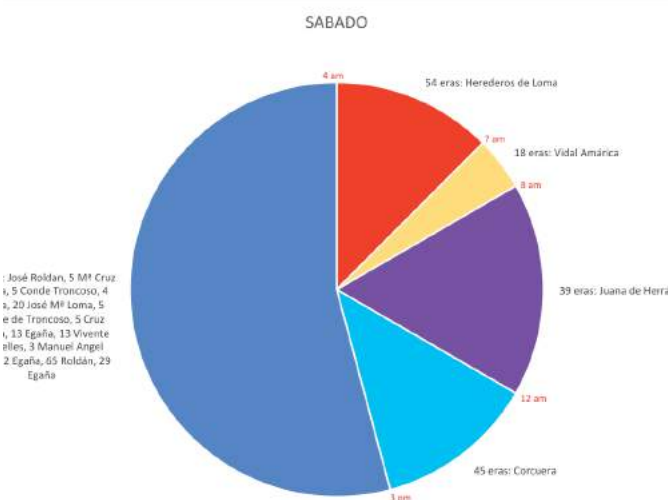
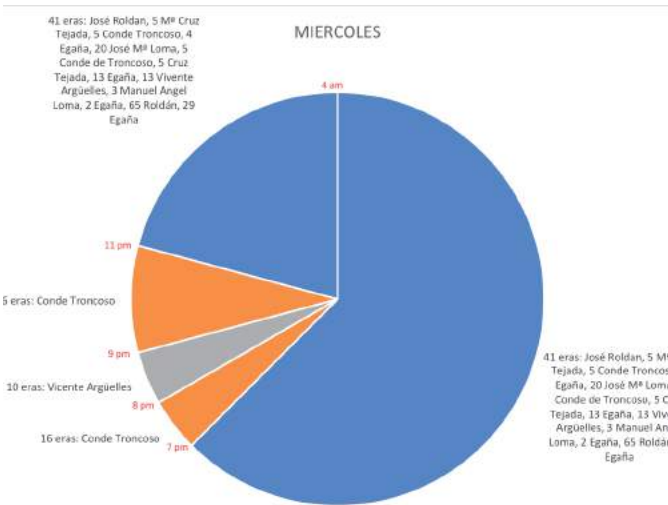
turn. Following a strict schedule, the community of salt workers blocked the course of the salt water in the main distribution channels using clay to direct the liquid to their own wells and salt-pans for the time they had been allotted.

The water was divided in two ways: by the hour or by rations. In the former case, salt workers could channel the water from some evaporation platforms to others if they belonged to the same channel. In the latter, the water could only be used in the relevant pans, although salt workers had to let the liquid flow in the springs if they did not need it.

We have no data on when the brine distribution system was created exactly, since there are no documentary sources prior to the year 822. However, the system must have been in operation for a long time previously. The first time the rationing of the springs is mentioned in a written document is in connection with the donation of some salt-pans. Equally, although it also had to be earlier, certain regulations or a charter that regulated the distribution of the brine were mentioned in 1,078.

The terms of this regulation were transmitted through generations of salt workers by word of mouth until the 16th century when, due to the forced take-over of all the salt farms by the Crown, profound changes in the internal organisation of the salt farms were introduced and the said rights had to be regulated. The document acknowledges "that the said distribution of brine is an ancient custom and that it is governed by tradition and practice among the salt workers rather than by what can be deducted from reading the explanation in the text" (1860). This charter, as was the case throughout the system, was of an evolutionary nature, since it has varied over the centuries in order to meet the needs and circumstances of each period.

This document is of a truly exceptional nature because, in addition to indicating the complications in the distribution of the brine, it is a unique source of information on the multiple aspects connected with the evolution of Valle Salado, from the owners of over a thousand years ago to the productive systems and the location of the ancient villages that obtained the salt.



In spite of the existence of this regulation based on the ancient rights of the owners, conflicts over the brine were constant and, therefore, it became necessary to create governing bodies to solve them. The community of salt producers clearly understood, since the origins of the site, that the most important elements in Valle Salado were not the production structures, but the brine. They, therefore, fiercely defended their rights against counts, monasteries and kings.

Consequently, in order to be entitled to the salt brine in a salt producing village of the 10th century, a person had to be a resident and, therefore, it was the village council that resolved the problems between neighbours and surrounding villages, with which they shared the distribution systems under communal arrangements. When a higher power encroached, the highest authority had to be consulted.

An example of this dates back to January 2 of the year 945, when the Count of Castille, Fernan Gonzalez, granted the monastery of San Millán de la Cogolla rights over the brine. The rights of the inhabitants of one of the villages, Fontes, were affected and they had to by what they had to turn to the Count and finally managed to solve the conflict in 948.

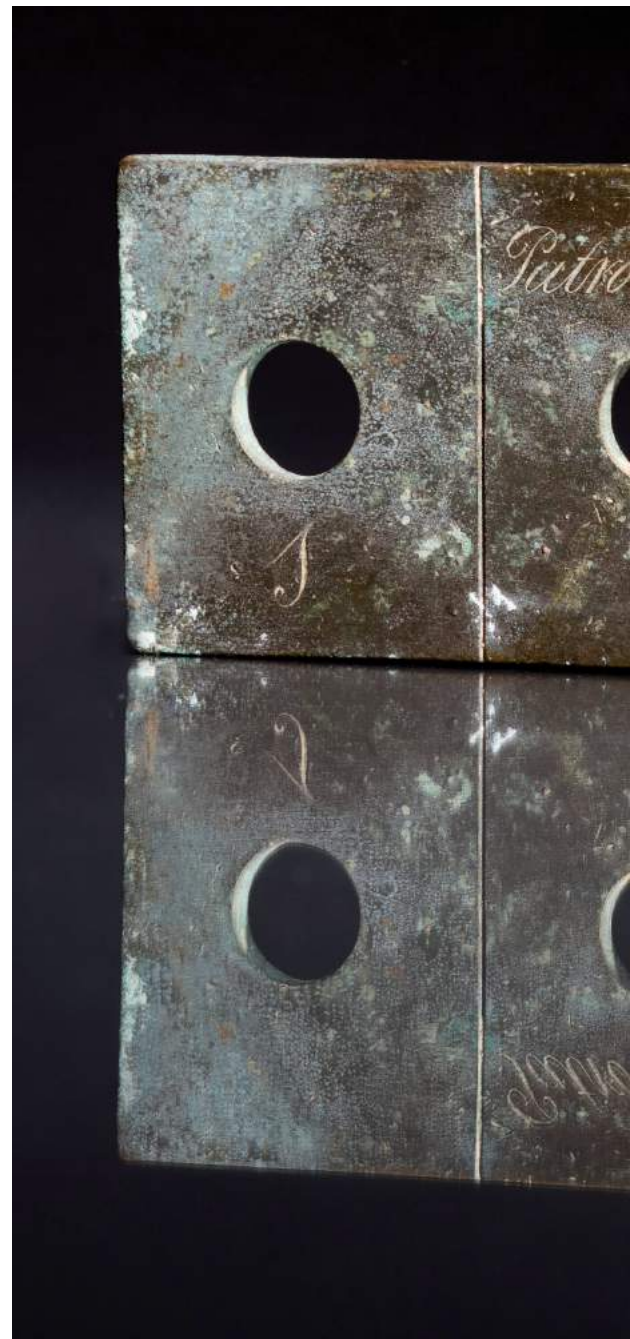
The disappearance of the settlements during the first half of the 12th century led to significant changes in all fields, both in the habitat and in the salt farms. It was at this point, almost 900 years ago, when a governing body was created in Valle Salado known as the Comunidad Herederos (Community of Heirs), which grouped together all the owners with a view to the internal organisation and control of the system.

This community had a "Guarda Fontanero" (Guard of the Springs), who as paid by the community and was responsible for the care and maintenance of the springs and of the brine distribution network. He also oversaw the distribution of the salt water and was responsible for updating of the sharing times. The Board only took action in cases of conflict between owners.

The crisis affecting the production of Añana salt in the 20th century resulted in many owners leaving their farms and fleeing to industrialised areas. Their share of the brine was divided among the owners who remained, and, therefore, in the second half of the century the brine ceased to be a scarce commodity, losing much of its value. This also resulted in the beginning of the deterioration of the distribution system, since the community no longer had the same economic resources.

To establish the Valle Salado de Añana Foundation in 2009, Gatzagak, which consisted of more than one hundred members, performed the greatest act of solidarity and respect for its heritage that can be made by citizens. It donated the ownership of the salt-pans to the Valle Salado Foundation to enable it to take charge of recovering their sustainability.

The agreement signed between the Valle Salado Foundation and Gatzagak in Vitoria on 19 June 2009 also established that the former owners ceded the rights to the use of the springs and the collection of the brine to the Foundation for a period of 90 years. In exchange for this concession, the Foundation pays an annual fee of 70,000 euros, the net profit of which (income minus expenses) must be reinvested by Gatzagak on projects of interest for the area surrounding Valle Salado.

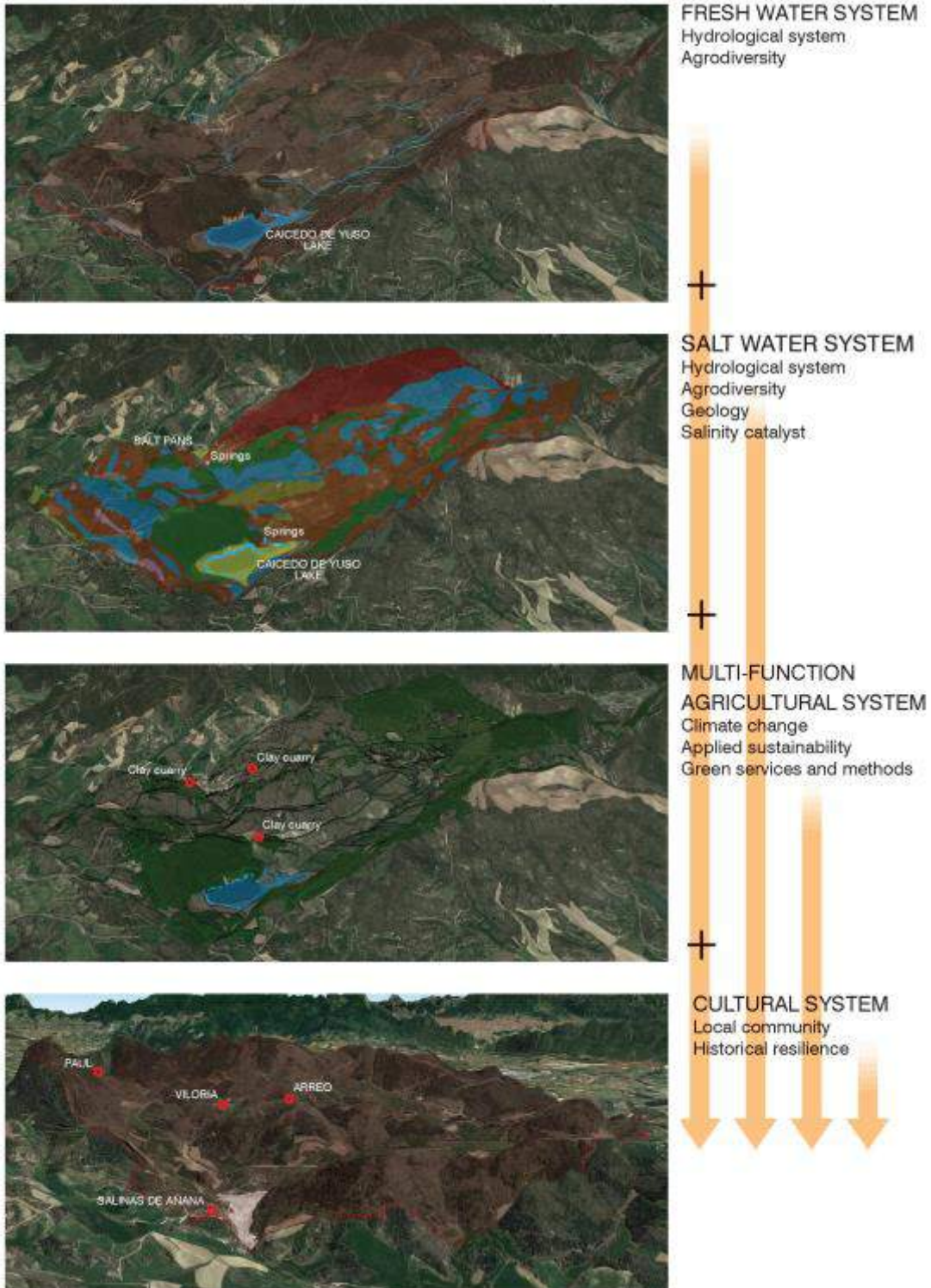


Template used to measure the holes that distribute the brine to the salt production salt-pans traditionally used by the Community of Heirs of Royal Salt Works of Añana



II. Characteristics of the proposed GIASH site

v. Landscapes and seascapes



The beauty of a natural landscape

The ancestral adaptation of the salt-workers' knowledge to the harsh saline environment around them has led to a harmonious coexistence between the intelligent use of natural resources and the lifestyle and economy of the salt-workers, resulting in an Agricultural System of astonishing natural landscape quality.

By contemplating the landscape of Valle Salado, observers are embarking on a multi-sensory act in which the sensory, cognitive and attitudinal processes depend on individuals' characteristics and on their mindsets in terms of the learning, beliefs, values... that individuals living in society have built.

Therefore, this landscape is not only a scene of the complex natural and anthropic system mentioned in the first section, nor a purely formal landscape structure as mentioned in the second; it is also a landscape with an attitude and value that individuals grant it based on social acknowledgement. Just as the landscape of the valley has been created, thus the view of that landscape is created.

Thanks to its values, both natural and anthropic, the system has been acknowledged for its singularity. These acknowledgements include, together with Lake Caicedo-Yuso or Arreo, its inclusion in the List of Wetlands of International Importance of the Ramsar Convention since 2002, and in the Catalogue of Unique and Outstanding Landscapes of the Historical Territory of Álava, in which it is listed as a Unique Landscape and its values are described as unique to the Basque Country, and as of extraordinary cultural value.

The factors that have contributed to the creation of this system are its history regarding sedimentation, tectonics and erosion that have created the terrain, the climate that affects the water, soil and vegetation; as well as cultural landscape factors, such as the primeval salt substrate related to the brine and all the economic, social, political and religious activities that have developed around it.

As a result, we have an agricultural, livestock and forestry landscape that is singular in itself and that consists of a series of landscape features that, based on their intrinsic value either as cultural heritage or natural heritage, or on their visual capacity, can be considered scenic landmarks of importance. Among them, we can mention the conglomeratic spur of La Islilla, which combines physiographic, historical and visual values.

It is a narrow formation of steeply dipping conglomerates that result in a high knoll which affords a wide panoramic view of Valle Salado and of the entire cohort of hills and valleys that form the south-west border of Alava with Burgos and La Rioja. The Frontón hillock, where the church of San Cristobal used to stand and where one can see the medieval wall, provides visual access to the salt works, the town of Añana and the agricultural landscapes Omecillo Valley.

The Convent of San Juan de Acre gives an idea of religious empowerment in the salt industry. The visual features of the site have led to the existence nearby of a viewpoint of outstanding didactic significance overlooking the salt works.

There are other minor landmarks, among which we can mention: the Santa Engracia spring, the clay and gypsum scars on the hillsides, or the extinct aqueduct of the Terrazos stream. Others correspond to the area of the diapir, such as Lake Arreo or Caicedo-Yuso, or the landscape of the Cantoblanco and the Atalaya-Somo Mountains and the peaks of the former.

But among all these elements, Valle Salado is the major scenic landmark.

It is an outstanding example of the uniqueness in the use of a resource, of the community's interaction with the environment, and of a scenic and beautiful element of the natural landscape.

In 1908, Benito Pérez Galdós, one of the most important international Spanish authors, published his novel, “Episodios Nacionales: España sin Rey”. Valle Salado de Añana was part of the plot. It is worth reproducing the paragraph in full, because his words perfectly described the salt farm:

“Some nights Urries was at the salt farm; by day, the spectacle of this strange salt-water operation amazed and surprised him. It was a wide and deep ravine, whose two slopes had been converted with terraces or wooden pans, staggered as the gardens of Babylon. Vertical stakes endured these stalls; the farthest seemed galleries or porches stacked on top of each other; the upper surfaces where water stagnated to let it evaporate were perfectly horizontal. The supports and some pieces of wall that served as the framework for such an industrious task, offered the most picturesque complexity and variety. From one side to the other and even throughout the space that separated both sides of the valley or ravine, ran wooden channels to distribute the water. This flowed down from the spring and was distributed through the tangled web of highs and low



channels. What gave the system a unique and exotic beauty was that when the brackish water evaporated, on the uneven or straight channels in which it flowed, and at the intake and outlet of the pans, it left clots of salt everywhere. Here hung icicles and stalactites, there horizontal crystalline chords. These effects and the piles of harvested salt, together with the sharp whiteness of the pans, gave the impression of a snowy country or a city of arcades, partly wood, partly of the richest marble of Paros. The overall brightness far exceeded that of the snow thanks to the effects that the brightness and clarity of bright light and direct sunlight had on such a splendid whole”.

The image that Benito Pérez Galdós describes has not changed substantially since he observed it over a century ago. This is because Valle Salado is a living system that is undergoing a permanent and very slow transformation process caused both by the forces of nature as by the hands of humans. It is forced to continually adapt to the requirements of each period to achieve the maximum quality and quantity of salt with the minimum effort.

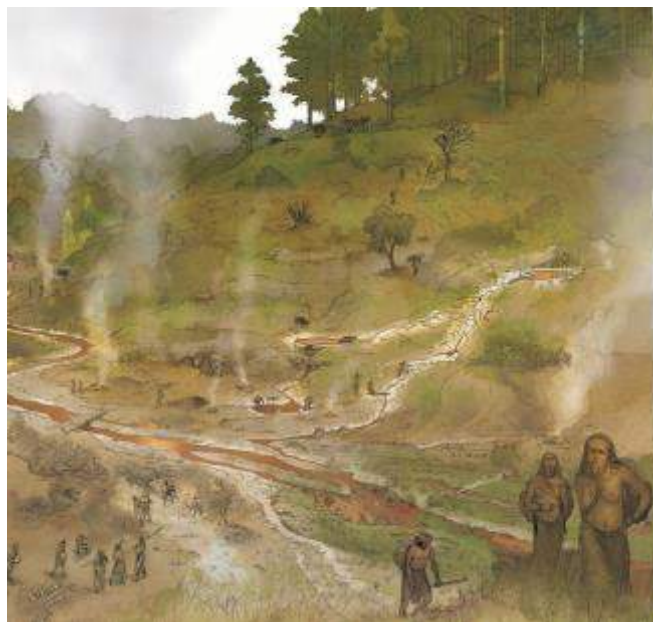
The following sections will discuss the characteristics of the Agricultural System that has been developed in Añana over time. The Community of Salt Workers has learned to interact and coexist with the environment to make a living from the salt, taking advantage of a saline agro-biodiversity and natural geological resources in a sustainable manner, demonstrating its resilience.

Historical persistence: The seven millennia of history of the Valle Salado system.

Throughout its history, the system has been, without doubt, the backbone of endogenous development, promoting a high-value food production system, a symbiotic and sustainable relationship with the natural environment, while maintaining its landscape, and preserving a culture and tradition that has lasted until our times.

From our perspective today, it is almost incomprehensible that salt, which is so abundant and low-cost, has been one of the key products in the history of mankind. However, we must bear in mind that salt was and is essential in many industrial processes as well as in human food and animal feed; more so when industrial cooling systems had not been developed, as it was one of the most effective methods of preserving food.

The most widespread hypothesis says that Palaeolithic hunters obtained their necessary intake of salt from their diet; primarily based on fresh meat, which is rich in physiological salts. The problems for humans came with the great change that occurred in the Neolithic, when agriculture became widespread and the amount of salt in people's diets decreased markedly. Therefore, humans had to boost their salt intake from the minerals that were readily available in nature. Salt was also needed in ever increasing quantities given the growing need to preserve food and because stabled cattle feeding on hay also needed that extra intake of salt. In this sense, we must bear in mind that sheep need about two kilogrammes of salt a year and a cow, twenty.



From the Neolithic to the Iron Age

Ongoing research is revealing that the origins of salt production in Valle Salado de Añana go back about 7.000 years. In prehistoric times, the salt works were very different from what we can see today. This is because the production system was different. It was not based on the exposing the brine that flowed from the springs to the elements (sun and wind) but on forced evaporation using log fires. These Prehistoric salt sites correspond to a phenomenon known at European level as "briquetage". In the archaeological record, this is identified by piles of waste where the remains of salt-making activities leave traces, especially ash, areas with traces of fire and ceramic fragments caused by the breakage of the containers in which the salt crystallized.

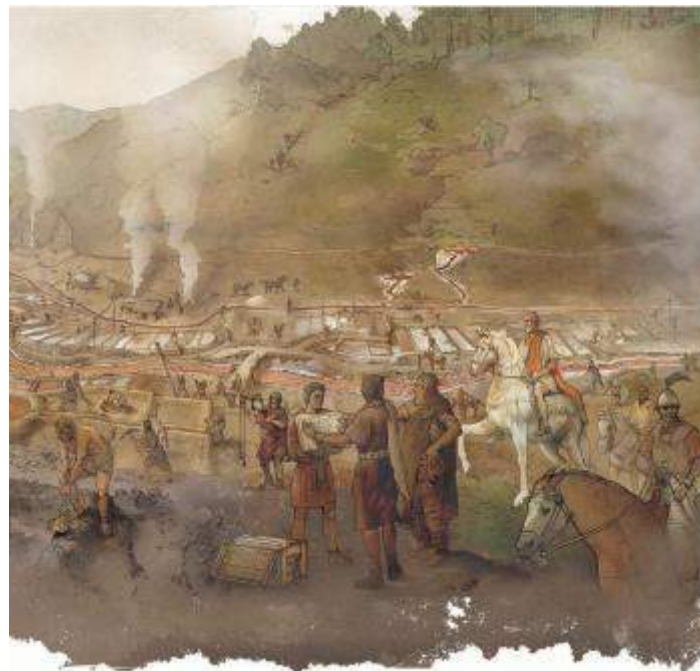
This production system, which consists of filling ceramic pots with brine and placing them on a fire until the liquid saturates, was used at Añana. These pots, which were like moulds, created compact cores of salt that had to be extracted by breaking the clay pots.

Changes to the salt cultivation system during the Roman Empire

The change in the evaporation system (from forced to natural) in Valle Salado took place in the first century B.C. (about two thousand years ago), when this area in the north of Spain was taken over by the Roman Empire.

The increasing need for salt by a society that was so advanced compared to the local tribes, not only led to significant changes in the habitat, but also in the production and distribution systems. Consequently, Valle Salado adopted a natural evaporation system that, although it implied higher construction costs, multiplied salt production exponentially.

Archaeological investigations being carried out within Valle Salado are certifying the change of the evaporation system. More specifically, the first salt-pans have appeared built over the remains of the old fire-based salt operation. They were built of compacted clay with raised edges to seal the surface.



All the elements used in Valle Salado came from the surrounding area.

The changes not only led to radical changes to the production system, but also to a complete transformation of the settlement. The inhabitants of Valle Salado and of the surrounding area gradually moved to a large Roman site known as “Las Ermitas” (located six miles from Añana) that can be associated with the town of Salionca cited during the second century by the famous Roman geographer, Ptolemy, in the territory of the Autrigones tribe.

The importance of this civitas lay not only in controlling the production of salt, but also in the convenience of its location for distributing the product. We must not forget that it was located on a branch of the XXXIV road that linked Astorga (León) and Bordeaux (France) and also linked Deobriga (Miranda de Ebro) with Flaviobriga (Castrourdiales), becoming one of the main lines of communication between the centre of Spain and the Bay of Biscay.

Regarding the socio-spatial organisation of Roman Salionca, the settlement and the workplaces were physically separated. The individuals dedicated to supervising salt production, storage and marketing resided in the city, as did the salt workers. We must keep in mind that salt was obtained through evaporation only during the summer months and, therefore, it is reasonable to assume that workers only went to Valle Salado during the period when the salt-pans were in use.

The Valle Salado Agricultural System in Late Antiquity

Research conducted on the ancient Roman city of Salionca has revealed its abandonment and destruction in the late fifth century AD. This event seems to be linked to barbarian invasions, indicated in the archaeological record by the appearance of traces of a great fire and the hiding of a significant collection of tools as can be seen in the attached image.

However, what did the disappearance of the political, social and economic hub imply for the salt works? Salt continued to be a product of vital importance to the economy and, therefore, control over the salt works must have been a key aspect in the new reorganisation of the territory.

The disappearance of the central power exercised by Roman Salionca, as well as the difficulties the new rulers had to control the difficulties quickly and effectively led to the direct presence in Salinas of individuals who worked there and of local and regional aristocracies who came to control the site. This led to the development of a complex salt working community in the valley that continued to make salt on the evaporation platforms and market the product.

The people who settled in Añana did not concentrate in one location, but built their dwellings and storage facilities near the salt works. This resulted in a scattered settlement that began on the lower slopes of the system - among the salt-pans - and worked its way up following the terrain and layout of the tracks.



Origins and development of Salinas de Añana. From the 8th to the 12th century.

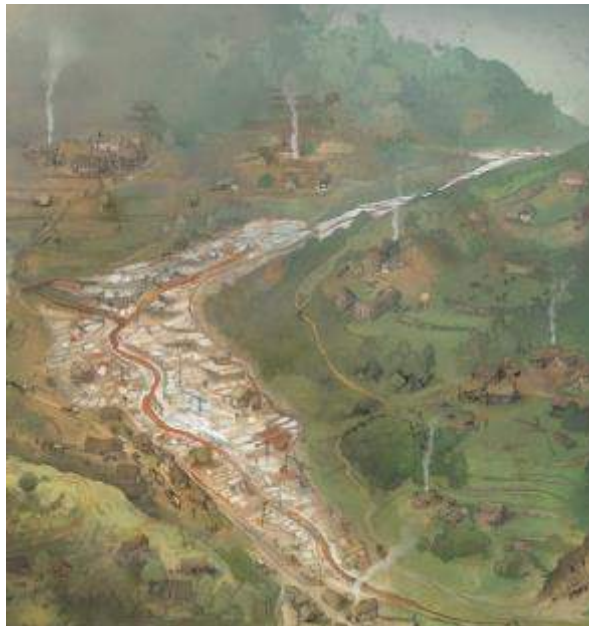
Between the eighth century and the first half of the tenth, the ancient community of Valle Salado changed and a network of independent villages appeared. The origins of this significant change in the organisational model of the ancient system of Salinas were not based on a single cause, but on a combination of various factors.

As an example, during this period, the area became increasingly unstable due to successive confrontations between the Basques, the Visigoths and the Franks and to the Muslim invasion, which led to pressure being exerted on this area by the emirs, who organised a score of raids between 767 and 886 to loot and destroy the area. Noted among them is the raid that took place in 865 when Emir Abd-al-Rahman ibn Muhammad sent his troops north to raid the castles of Earl Rodrigo and Salinas de Añana, which is mentioned in the text as Al-Mallaha.

This instability led to the development of important feudal powers, both within the community and in the territory. This eventually led, among other factors, to the great community that exploited the salt works to become divided into a network of six completely independent villages that shared Valle Salado with the most important monasteries of the time.

Surviving texts from the tenth century show that at least six villages were established in the valley: Fontes, Terrazos, Villacones, Villanueva, Olisares and Orbón. The residents of the six villages in Valle Salado joined forces with a view to counteracting the growing pressure of the feudal powers and the systemic crises; this also enabled them to preserve the ownership of the salt-pans and brine from the springs, improve the production system and, thus, the productivity and marketing of the salt.

Communal cooperation was advantageous in several steps of the production process, such as in the construction of the terraces and channels, in their maintenance and, above all, in the “entroje”, which is the manual transport of the salt from the on-site storage areas to external warehouses, near the workers’ homes.



Establishment of the town of Salinas de Añana From the 12th to the 16th century

complicated process began in Añana in 1114. Its main consequence was the abandoning of the network of independent villages created between the eighth and tenth centuries and the concentration of the population in a single settlement that eventually became known as Salinas de Añana.

Valle Salado de Añana, which had belonged to various counties and boroughs over time, such as Fortaleza de Termino (Santa Gadea del Cid), was finally subjected to the power of the kings in the early twelfth century.

The solution adopted by Alfonso I of Aragon, who granted the village charter around 1114, and by Alfonso VII of Castile, who confirmed it, was to avoid direct confrontation with the major monastic institutions established in Añana. The tactic used was to respect the jurisdiction of the individuals who were under the authority of the most powerful religious centres - San Salvador de Ona, Santo Domingo de Silos in Burgos and San Millan de la Cogolla - and try to attract the rest of the inhabitants (from the villages of Añana and surrounding area) by granting privileges to those who voluntarily decided to live in the area chosen by the king to build the first royal village in the Basque Country.

After this concession, most of the residents of the six villages left their homes and settled in the area chosen by the king to build the walled town of Salinas de Añana; creating unique governing bodies at the municipal and salt works levels to control Valle Salado. This led to the creation of the Community of Knights Heirs of the Royal Salt Works of Añana, which was managed by two individuals elected on a regular basis: one represented the interests of the religious owners and the other the interests of secular owners.

The political strategy apparently paid off, leading to an increase in production and trade. However, progress was occasionally affected as it depended, to a great extent, on the power exercised by the monarch occupying the throne. If he was a weak king, the aristocracy took advantage of the situation to impose its will, even using violence, with a view to achieving maximum profitability.

A clear example of royal weakness that directly affected Salinas de Añana in certain periods was the loss of its status as Crown land in 1308, when it became the property of the Monastery of Huelgas in Burgos. The situation changed again with Enrique II, who granted the Estate of Salinas de Añana to the lineage of the Sarmiento, thereafter known as the Earls of Salinas.

The town, as the rest of the territory, suffered from the conflicts among landowners in the late Middle Ages. Documents preserved from this period clearly give this impression from the thirteenth century. These conflicts prompted the council of Salinas de Añana to join the Hermandad de Castilla (Brotherhood of Castile), established in 1295, then the General Brotherhood of all the kingdoms established in 1315 and, finally, to join the Brotherhood of Alava in 1460.

Regarding commercial activities; we must note the permanent conflicts between the various salt works in Castile to control exclusive sales areas. In this clash of interests, the Añana salt works won on several occasions, as evidenced by the privileges granted by Alfonso X in the so-called "Las Partidas" or by Sancho IV at the Court of Burgos in 1315, where Añana was granted the monopoly of selling salt in the current territory of the Basque Country and in large parts of Castilla la Vieja.

The salt monopoly. The king appropriated all the salt in the Kingdom From the 16th to the 19th century.



In 1564, King Felipe II took control of all the salt works in the kingdom by means of the so-called “Monopolio de la Sal” (Salt Monopoly). Although he honoured the ancient privileges and the Community of Heirs of Añana

preserved their rights of ownership, they were forced to surrender the entire production to the new royal warehouses and to work under strict rules established by the king’s officials who settled in the Valley

The Royal Officials and the workers had been aware, since at least the sixteenth century, that the Añana salt works could produce much more than it was producing, and that this shortfall was due, in a large part, to the poor infrastructures of the previous phase. Therefore, in 1801, the royal authorities, headed by the Architect General of Royal Revenue, Juan Manuel de Ballina, forced the owners to overhaul Valle Salado completely with a view to improving the quality of the salt and increasing production by changing the production system.

During the nineteenth century, after the French invasion, which delayed the project, we can detect a significant change in the ownership regime of the system. We are referring to the confiscation of church property that took place in Añana in August 1843 and that led to many salt farms

- recently renovated by churches and monasteries - changing hands and being taken over, through purchase transactions after a previous phase of speculation, by former employees. This resulted in the fragmentation of the ownership of the system.

Finally, we must mention, as one of the key events in the history of the system, the repercussions of the overthrow of Isabel II in 1868 and the 1869 Constitution, of a liberal nature. That year, the Mining Act was passed, leading to the sale of all the state-owned salt works and putting an end to the salt monopoly.

The main consequences of the new law were the cancellation of the comfortable contract for 30,000 bushels that the Añana salt workers had with the state and the liberalisation of the sector regarding production and marketing. Although this measure was not well received at first, the competition actually led to the maximum expansion period of the salt works.

Due to the changes introduced in the early nineteenth century, Valle Salado enjoyed great advantages over its competitors because it greatly increased production and managed to produce high-quality white salt that was put on display at the universal exhibitions in London (1851 and

1862), Paris (1855, 1867, 1878 and 1889) and Philadelphia (1876). Consequently, Añana salt was a financially profitable business until the mid-twentieth century.

The revival of the salt-making activity From the XXh to the XXIth century.

The immediate effect of the liberalisation of the salt market once the Monopoly had come to an end was the strong competition in the markets, in which production and transport costs played a key role.

The coastal salt operations soon took over the markets by installing railway lines and thanks to their low production costs. The Añana salt workers reacted by trying to reduce costs. This led to the introduction of new materials, such as cement, that no longer required the permanent maintenance that had been performed traditionally.

This broke one of the basic principles of the process: the use of reusable materials, which had been the basis for the survival of Valle Salado for millennia. There was also an increase in the number of salt-pans, which now occupied a total area that largely exceeded the limit of sustainability. As expected, once the know-how of the salt workers was lost and the maintenance work abandoned, the conditions and state of the operation began to deteriorate.

However, Valle Salado is noted for its resilience, its ability to absorb negative impacts, to change, introduce innovations and recover its existence based on knowledge, tradition and respect for ecology.

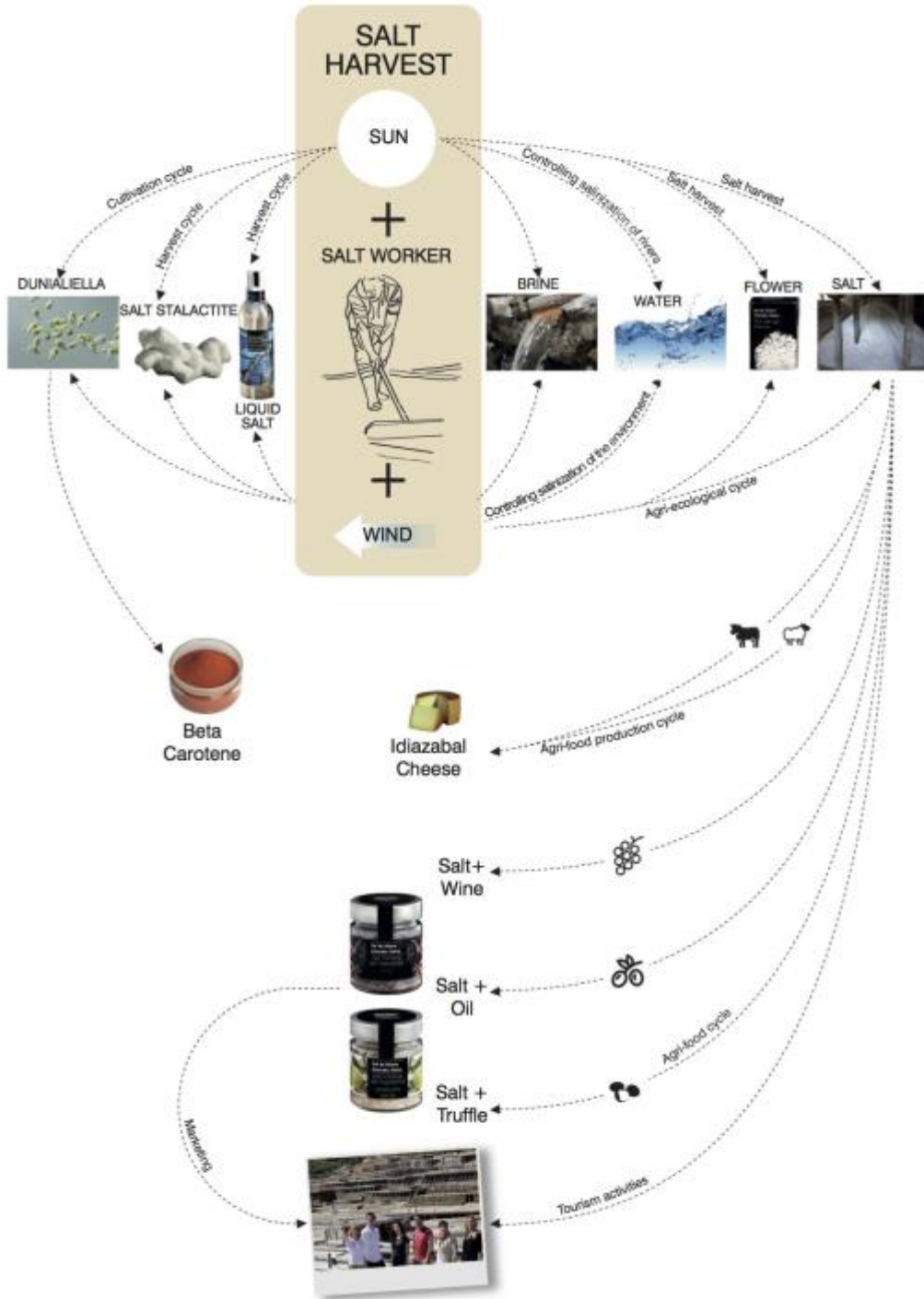
Proof of this is that, in the late twentieth century, a complicated project was launched headed by the Valle Salado de Añana Foundation, which integrated the Community of Heirs of the salt works and the most important institutions in the Autonomous Community of the Basque Country.

This non-profit institution is now in charge of recovering and enhancing the system, looking back to the past and recovering the basic principles that have governed its history over millennia. Today there is still work to be done, but Valle Salado can, once again, look to the future.





III. Action Plan for the Valle Salado de Añana Agricultural System



III. Action Plan for the Valle Salado de Añana Agricultural System

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III.1.- Introduction

In general terms, the Action Plan that we present is based on a solid plan developed between 2000 and 2004 and updated in 2013, which has been implemented by a large multidisciplinary team that studied the Valle Salado from all its perspectives and proposed the way forward to achieve its implementation. The evolutionary nature of the project and the experience accumulated throughout this period have led to the obligation to develop new lines of work and introduce changes and improvements to those already outlined above.

In 2017, in order to present the Candidacy of the Valle Salado de Añana to the Global Important Agricultural Heritage System (GIAHS), the Action Plan is updated again, after carrying out a new analysis of the Threats and Challenges, as detailed in section III. 3. The updated Action Plan includes proposals based on policies, strategies and actions that are added to all the proposals implemented until 2017, with emphasis being placed on the Environmental Program, the Program for the Production of Artisanal Salt as the axis of the Agrifood Development and Promotion of the System and, finally, the Program for the Promotion and Dissemination of the Valle Salado.

In summary, the actions Programd and developed in the Agricultural System Valle Salado can be classified into two groups: between 2000 and 2017 and those from 2017 until 2021, specifically developed to present the Candidacy of the Valle Salado de Añana as Global Important Agricultural Heritage System (GIAHS).

III.2.- Programs and actions developed between 2000 and 2017

Following a precise methodology, based on Documenting and Analysing and, thereafter, Proposing, we keep these objectives present:

- Recovering and preserving the material culture and the agricultural and environmental landscape values, to guarantee its sustainability.
- To produce with traditional techniques, in a sustainable way and respecting the millennial know-how of salt makers, a high-quality salt whose revenues are contributing to the self-financing of the project.
- To develop cultural and tourism initiatives, within the approach of a recovery open to citizens, that are being the driving force of social, economic and tourism development in the region.

The following Programs were developed:

III.2.1.- Program for the creation of a Managing Body

At the end of 2009, the Managing Body -a trust- was created under the name "Fundación Valle Salado de Añana", with the participation of trustees representing the salt makers (Gatzagak), the City Council of Salinas de Añana, the Basque Government and the Provincial Government of Álava, which has been leading the project since its inception.

III.2.2.- Program for a Project Open to Society and Cultural Activities

The project had to be open to society, for which it was necessary to prepare the site beforehand, developing infrastructures for visitors (since 2000) and a Visitor Program (since 2005), both with the idea of continuing over time.

III.2.3.- Environmental Program

The fact that the Valley is a Ramsar Wetland, and that it has a mutually interdependent relationship with the Diapiro de Añana Protected Biotope and the Special Conservation Area of Lake Arreo-Caicedo de Yuso is both a conditioning factors and an added value. The valley acts as a reservoir of water for the aquifer, ensuring the quantity and quality of the water flows needed for the dilution of brine for the production of sal. It thereby regulates the flow and prevents the salinization of the land downriver. The Management Plan of the Dipairo de Añana Protected Biotope was developed between the years 2004 and 2017, providing a normative basis for the environmental protection of the Agricultural System Valle Salado of Añana.

III.2.4.- Historical-Archaeological Program

Based on a series of activities for the Maintenance and the Recovey of the salt making facilities, which started in 2000 and has a permanent character.

III.2.5.- Program destined to Other uses

Different activities have been developed, among which the art shows performed in the valley, which started in the year 2006 and will continue to do so in the future.

III.2.6.- Program of Health-related actions

It encompasses all those activities that are being developed since 2005 at the saline spa, with maniluvium, pediluvium and flotarium, as well as beauty treatments and cosmetic products related to salt, under the generic name Therapeutic Visits and that will continue to be developed.

III.2.7.- Program of Cooperation with the World of Gastronomy

Among the most noteworthy are the cooperation established with the Basque Culinary Center (from 2017 onwards), the cooperation agreements with the Hospitality Schools of the Basque Country (2017), the agreement with Slow Food Araba (2013) and the Gastronomical Visits (2013).

III.2.8.- Promotion and Dissemination Program

Essential in this respect have been the cooperation with tourism and cultural stakeholders (since 2009), the development of International Work Camps (2009-2016), the participation in EU-funded Programs (SAL project 2004-2007 and ECOSAL ATLANTIS Project 2010-2012) as well as the participation in international salt-related venues (2nd International Conference on Salt).

III.2.9.- Salt production Program

The maintenance of a good part of the salinas has been recovered, to produce salt. The idea is not to produce a salt of low quality and in a massive way, as it was done previously, but a diversity of high level products has been sought -made in an artisanal and sustainable way- that can compete in the market with the European salinas that occupy this market for sale. Since 2010 salt for sale is being produced again in a sustained way.

Results obtained

All these actions have been developed from 2000 to 2017, and the fruits of these developments can be objectively proven:

- The Valle Salado of Añana receives 80,000 yearly visitors.
- It has earned a good number of awards, which consolidate it as one of the agricultural and environmental jewels of the Basque Country.
- It is an example of economically sustainable heritage recovery, as it has attained a 40% degree of financial self-sufficiency.
- Its economic activity is becoming an economic engine for the maintenance and settlement of dwellers in the Cuadrilla de Añana area, a fact supported by the following data:
 - Impact on the Production of 1.48.
 - Impact on Employment, with more than 50 employees.
 - Tax Return of 87%
 - Self-financing above 40%.

Overview of the actions developed between 2000 and 2017

PROGRAM	ACTIVITY	PERIOD OF ACTIVITY	Years of activity																	
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
III.2.1.- Managing body	III.2.1.1.- Functioning of the Fundación Valle Salado (*)	2004 - 2009																		
III.2.2.- Project Open to Society and Cultural Activities	III.2.2.1.- Development of Visitor Infrastructures (*)	2000 - 2021																		
	III.2.2.2.- Development of the Visitor Programme (*)	2005 - 2021																		
III.2.3.- Environmental	III.2.3.1.- Management Plan of the Biotope Añana Diapir	2004 - 2017																		
III.2.4.- Historical-Archaeological	III.2.4.1.- Maintenance and Recovery activities (*)	2000 - 2021																		
III.2.5.- Other uses	III.2.5.1.- Art performances (*)	2006- 2021																		
III.2.6.-Health Related	III.2.6.1.- Therapeutics Visits (*)	2005 - 2021																		
III.2.7.-Cooperation with the World of Gastronomy	III.2.7.1.- Cooperation with the Basque Culinary Center (BCC)	2013 - 2021																		
	III.2.7.2.- Agreements with the Basque Hospitality Schools	2016 - 2021																		
	III.2.7.3.- Agreement with Slow Food Araba	2013 - 2021																		
	III.2.7.4.- Gastronomics Visits (*)	2013 - 2021																		
III.2.8.- Promotion and Dissemination of the Valle Salado	III.2.8.1.- Cooperation with Tourism and Cultural stakeholders (*)	2009 - 2021																		
	III.2.8.2.- International Work Camps	2013 - 2016																		
	III.2.8.3.- Participation in EU funded programs	2004 - 2016																		
	III.2.8.4.- International calls related to salt	2016 - 2017																		
III.2.9.-Production of Añana salt	III.2.9.1.- Production, storage, packaging and distribution of Añana salt.	2010 - 2021																		

(*) Actions to be continued in time.

III.3.- Threats and challenges

The System Valle Salado of Añana has always lived under the influence of negative situations and the effects of pressure that could negatively affect its stability and development. Fortunately the strong resilient character of its people has allowed to accept and overcome them. At present, it is undeniable that there are negative situations, external to the project of the Agricultural System Valle Salado of Añana, which may threaten it, so that, where appropriate, it will be necessary to design an adequate strategy to circumvent them. These are the threats that are most clearly perceived at this moment:

III.3.1.- Threats

III.3.1.1. - Competition with other salinas

The production of salt is the element that ensures the sustainability of the entire Valle Salado System; without this production, all the additional elements that enable the harmonious development of the whole would collapse. However, producing salt but failing to find a sensible outlet for the stocks generated would be senseless; the salt produced by the Valle Salado System must find its place in the local, domestic, and international markets, where it faces fierce competition.

In the middle of the last century, coastal satworks and salt mines quickly took over the markets by using railroads and taking advantage of their low production costs. This situation has remained unchanged since then, and it would be impossible to compete in the agri-food markets (preserves, bakeries, and dairy products, mainly). Nor with the table salt market that is not linked to quality considerations, where price is more important than quality and where the importance of traditional and sustainable production systems goes unnoticed.

As an alternative those, Añana Salt has found a niche in gourmet markets; however, the competition in these is also very strong. Consequently, we must compete against excellent salt products, such as: pyramid salt from Cyprus, Himalayan Pink Salt, Kala Namak black salt, Murray River salt, smoked salt from Sierra Nevada, red salt from Hawaii, Namibian pearl salt, Persian blue salt, Maldom salt or Guérande salt; all serious competitors of Añana Salt that are offering quality products and have very powerful marketing policies.

III.3.1.2. - The decline of agriculture and stockbreeding in the area

The limited capacity of the primary sector to develop alternative services and products in the district, has resulted in the salt system losing a travelling companion that, for many years, generated synergies that resulted in a balanced and sustainable production model based on salt-agriculture-stockbreeding.

The predominant agricultural model in the region is based on traditional extensive farming. It is a fact that the number of farms has declined but not the surface of cultivated land, as the established farmers rent or buy the lands available. In the Agrarian Census of 1989, 673 agricultural holdings were registered, summing a SAU (Useful Agricultural Surface, in its Spanish acronym) of 23,704 ha and 408 stockbreeding holdings, counting 4,695 UGM (Larger Cattle Units, in its Spanish acronym). In 2016, 396 agrarian holdings were reported, with a SAU of 23,821 ha and 196 stockbreeding with a herd of 4,282 UGMs.

In this respect, we indicate that the average age of the heads of agricultural holdings has increased from 51.3 years in 1999 to 53.9 years to 2009, which indicated a lack of generational replacement and dynamism in the agrarian sector.

Their production system is based on volume, not on adding value to their products. In fact, there is no star product in the district, other than Añana salt. The strictly agricultural and stockbreeding production of Añana is not identified in the markets by its provenance, nor can it be consumed/distinguished locally by consumers or restaurants.

There is no food processing industry, or relevant vegetable and fruit production. There have been some minor, recent initiatives based on organic farming, and a local market every first Sunday of the month in Villanueva has become a highly appreciated venue where several farmers sell their produce directly.

Agriculture and stockbreeding in the area has always been a sector for salt workers who did not own salt pans or do not currently work for the Fundación Valle Salado de Añana in winter. The decline of these primary sector activities can result in the loss of the economically active population and have a negative effect on the salt production.

The Valle Salado area needs a carefully groomed environment to prevent the salt being polluted during the production process by leaves, pollen, etc. Stockbreeding and agriculture contribute to this care and their disappearance could become a threat.

III.3.1.3. – Depopulation and ageing of the local community

The Valle Salado de Añana System is located in the municipality of Añana, which belongs to the administrative unit of the “Cuadrilla de Añana”, in the province of Álava, in the Autonomous Community of the Basque Country in Spain.

According to official data of the municipal register of inhabitants (INE, 2013), there is a total of 8,822 inhabitants in the Cuadrilla de Añana, of whom 1,514 are over 65 years of age. This figure represents 17.2% of the total population, i.e. almost 2 out of every 10 citizens in the “Cuadrilla” are elderly.

Of this figure of elderly people, 499 are octogenarians, which accounts for 6% of the total population of the Cuadrilla and 33% of the elderly population.

Women are the dominant gender among the population of octogenarians, almost doubling the number of men in the same age group. When compared with the information on the province of Álava, the Basque Country, Spain, and Europe, we find that the rate of elderly people in the Cuadrilla is a few percentage points below the rate for Álava (19%), 4 percentage points below the data of the Basque Country, and very close to the figures for the State (18%) and the European average (16%).

When studying the data at municipality level, we can find significant differences. Among the municipalities that make up the Cuadrilla de Añana, for example, Salinas de Añana has a total of 165 people, and Iruña de Oca, had a total population in 2014 of 3,108. These differences in the figures represent enormous differences in the population structures in the various municipalities.

The current data regarding the percentages of children, the elderly, and extremely elderly people represent the demographic profile of the municipalities. Those that contain a higher percentage of elderly population are: Salinas de Añana (29.7%) and Valdegovía (28.7%), where they account for almost one-third of the total population; Berantevilla (24.5%) and Kuartango (24.4%) where 1 out of every 4 people are elderly; or Lantarón (21.9%) and Zambrana (20.4%), municipalities where more than 20% of the population are elderly. The municipalities with younger populations are Iruña de Oca (11.0%), where only one person out of 10 is elderly, and Armiñón, with a rate of 15.6%. Therefore, although the overall figures for the Cuadrilla may seem to present a group of municipalities with a low overall rate of elderly people (17%) compared to provincial or regional rates, the truth is that, at municipal level, these rates are quite high.

According to the data provided by Eustat (the Basque Institute of Statistics), the variation of the population over the last decade has been different in each of the municipalities. Armiñón is, for example, the municipality that has seen the highest increase in population in relative terms, 54.32% in 2014. It is followed by Iruña de Oca with an increase of 48.49%, and Ribera Alta with an increase of 29.48%. In contrast, we have Salinas de Añana, which has experienced a 10.81% population decline; Kuartango, where the population has decreased by 2.2%, and Valdegovía or Lantarón where the population has declined slightly, a case where it could be argued that it has remained the same over the last 10 years.

Consequently, the Valle Salado System is located in a demographic area that is clearly losing population and that presents an ageing population pyramid.

III.3.1.4. – Global Change

It is clear that we live in a complex, multi-faceted world where any strategic project (the Valle Salado project) facing the future and ensuring sustainability must necessarily consider a number of uncertainties. Among these, and without wishing to underestimate those arising from specific issues (social and economic developments in the area), those related to Global Change are particularly relevant. This concept refers to all transformations that have a significant impact on the dynamics of a territory, either affecting biophysical components (water and biodiversity, among others), altering the behaviour of the ecosystems and/or generating effects on social-economic systems at various levels. As a result, the prediction of future scenarios, which must be necessarily flexible, requires a certain knowledge of the uncertainties to take them into account in the overall management process.

However, the uncertainties not only relate to future scenarios, they may also refer to the current scenario, if the knowledge of key elements in the functioning of the relevant system presents significant gaps.

In the Valle Salado System, the entire project revolves around salt, as a resource, and the culture of its production, with a socio-economic and local-regional development approach. However, speaking about Salt implies speaking about the Water that supplies this resource to the salt pans of the system. To date, and since far back in time, the settlers used the salt water that flowed from the surface to extract salt, using various methods that are now part of that culture we wish to recover/preserve.

Here lies the first uncertainty, the diagnosis: we are not sufficiently familiar with the underground water flow scheme (water and salt), far less with its temporal dynamics, which determine the contribution of the resource to the Valley. There

are many questions (let's not forget that asking the relevant questions is essential to establishing the scope of the answers): From where and how does the salt reach the springs? Is there any hydrochemical variability in the water over time? How does rain affect the flow of salt water? And the use of the land in the surrounding area? What is the area of influence of the saline flows? What could the expected impact of Climate Change be? Would the provision of salt to the springs be guaranteed? Can we expect the quality of the dissolved salt to change?

Global Change has not been confirmed as a threat, but prudence dictates it should be considered... and studied as such.

III.3.1.5. – Natural disasters

The Action Plan included geological studies that examined potential geological hazards such as flooding, landslides, erosion... A plan was also designed to include prediction and prevention measures for those hazards. In general, we analysed the potential external and internal hazards. The first group refers to geological processes outside Valle Salado but that may affect its existence and the second refers to those that can be generated within the site.

We have studied the activities and uses which would alter the geotic environment and, consequently, affect the salt. Among them, special attention has been paid to the protective perimeter of the springs that supply brine to the productive infrastructure.

The type of natural disaster that poses the greatest risk to Valle Salado is flooding. There are historical records of floods that caused significant damage. Currently, the state of the structures and the accumulation of debris at certain points in the course of the Muera river, increase the risk that a flood would result in significant damage. Work is under way to clean the river bed of these materials. This action will limit any damage in the event of future flooding.

The last big flood that hit Valle Salado and placed its future at risk took place in 1787, when the flood destroyed the platform of the main springs. To avoid new threats, the king's architects built a large stone dam that served to protect and centralise the brine in a single spring. They then channelled the river by lining the course with stone and wood to reduce the effects of future floods.

With regard to potential geological hazards associated with landslides, human action within the salinas has not involved major cuts in the hillside that may have destabilised the area. The only environment that has suffered from such treatment is the former clay quarry, where clay was obtained to waterproof the production salt-pans, located on the southern slope of the valley in the area known as "lesares". This quarry was mainly used in the nineteenth century and was subsequently abandoned. There have been minor landslides in this area, but they did not affect the salt production structures. The vegetation that has grown on the site has helped to stabilise the ground. Regarding the rest of the Cultural System, and based on the historical records, there have been no significant landslides. Therefore, it can be assumed that the area does not need special protection measures for this type of geological hazard.

Seismicity, which usually occurs at around diapirs, is normal, in line with the levels usually found in such enclaves. Based on historical records, according to which there has been no seismic activity that has generated significant damage, and according to the National Geographic Institute, Salinas de Añana is located

in a low-risk area. Therefore, regarding this kind of geological hazard, Valle Salado does not require any special type of protection.

III.3.2.- Challenges

Since the inception of the trust, we have been aware that our tasks could not focus solely on the Agricultural System of Valle Salado de Añana and its salinas, but that it had to go beyond and set the stage for a multi-functional future. After more than a decade of work, we have already shown that compliance with the roadmap established at the beginning of the Plan has transformed Valle Salado into a key element of the economic and social revitalization of the area.

The three main lines of work followed by the trust, which are fully interconnected and that ultimately seek to continue the process of sustainability of the Valle Salado Agricultural System and recover the optimum level it once enjoyed, in general, in past centuries, are:

III.3.2.1. - Maintaining the Agricultural System

III.3.2.2. - Building a sustainable salt production activity with a view to producing different types of high-quality salt and selling them to generate enough revenue so that the project can fund itself in the future

III.3.2.3.- Developing a range of cultural activities to keep the Valle Salado alive and contribute to the social and economic regeneration of the district

III.3.3.- The strategy

The Valle Salado is threatened by strong competition from the salt markets exerted by industrial coastal saltworks and salt mines, due to the undeniable decline of its traditional supporting activities, such as agriculture and stockbreeding in its immediate area of influence; the consequences of population loss and ageing in the area; the undeniable consequences of global change, among which climate change is of outstanding importance, and the possible emergence of natural disasters. The strategy that inspires this Action Plan is to eliminate the threats and, if not possible, to minimize them; and, as a last resort, to adapt to the consequences they bear, or, at the least to be prepared upon their emergence.

III.4.- Action Plan 2017- 2021

Between the years 2000 and 2017, a fair number of activities have been developed, which have been described above. These activities have had good results, but we have seen there are some threats to avoid and challenges to overcome, which we have considered in our Action Plan for 2017 -2021.

III.4.1.- Innovations in traditional salt production

As mentioned above, we live in a time when the competition in all salt market segments is fierce, and the salt production system used at the Valle Salado System must adapt to what the markets demand.

Based on the studies conducted by the Fundación Valle Salado, which included the assistance of experts on agri-food marketing, two key aspects were identified that required innovations regarding the traditional production of salt:

III.4.1.1.- Achieving the production of ground artisanal salt from Añana

To date, the production of salt at the Valle Salado de Añana System has focused mainly on the production of Salt Flower (fleur de sel), Mineral Salt, and Liquid Salt.

The gastronomic features of these three products are not in line with the type of salt that is most widely demanded: table salt.

While it is not possible to produce this type of salt directly on the salt pans in the Valle Salado System, a simple grinding process will produce Table Salt from Mineral Salt without any organoleptic alteration in the new product and, even more importantly, without affecting the sustainability that the production technique used ensures.

III.4.1.2.- Improving the efficiency in the production of flower of salt

The production of salt at the Valle Salado System is quite modest. It is adjusted to the amount that can be sold on the markets, guided by the philosophy behind the project: sustainability and tradition. To mention a number, we could be speaking of an annual production of 15 tonnes of Salt Flower (Fleur de Sel) and 150 tonnes of Mineral Salt.

The sale of the Salt Flower harvest falls short in the current market conditions: there is potential to sell quite a bit more Salt Flower than is currently produced.

For this reason, we are experimenting with traditional and sustainable production methods, which reduce the amount of Mineral Salt produced and maximise the amount of Salt Flower. The 2017 harvest will be indicative in this respect.

III.4.2.- Promoting local agro-biodiversity values

The 2016 Rural Development Plan for the Cuadrilla de Añana envisages a number of issues: a diversified agri-food sector with added value for the entire Cuadrilla de Añana, the consolidation of heritage and nature tourism so that it can become the driving force behind other sustainable economic activities, the coordination and collaboration between the local administrations and private stakeholders to provide high-quality provincial services, while respecting the environment and strengthening the identity of the district.

The Valle Salado System is aware of its potential as a driving force thanks to Añana Salt and, therefore, it is committed to collaborating with farmers and livestock breeders to develop an added value to a diversified primary and agri-food sector. With this idea in mind, it is planning the following actions aimed at products that can use salt in their production processes and those that can be mixed directly with our salt to create new products.

III.4.2.1.- Developing Añana salt blends with local flavors

In order to promote the development of local crops, the Valle Salado System plans to develop two ranges of Añana Salt (involving Salt Flower and Mineral Salt) that incorporate two elements ascribed to the philosophy of sustainability that the Fundación Valle Salado is promoting.

III.4.2.1.1.- Añana truffle

We take advantage of the existence of a Program to promote the growing of fruit in the Cuadrilla de Añana, since the black winter truffle (*Tuber melanosporum* Vitt) grows naturally along with holm oaks and other types of oak trees in various parts of the district. The black winter truffle is a top-quality truffle that is very popular thanks to its importance in gastronomy and is known as the “cuisine diamond”. There are two reserves for this species in the Cuadrilla de Añana. Rivavellosa, which is a few kilometers from the Valle Salado System, is the key municipality regarding the growing and harvesting of these wild varieties.

A good way of generating synergies would be the preparation of Añana Salt with Black Truffles from Añana, products that, in addition to being local and sustainable, would provide added value through the pairing of the black diamond and the white gold of Añana.

The Valle Salado System Project is planning to start the necessary tests to achieve the perfect pairing of salt and truffles. There is a 5-year Program in place to design the product from a technical point of view and to reach agreements with local truffle growers and harvesters to market this new product range.

III.4.2.1.2.- Añana fine herbs

The Cuadrilla de Añana, thanks to the characteristics of the land and soil, is suitable for growing herbs, such as dill, tarragon, star anise, and others.

As in the case of the black truffle, the Action Plan envisages the development of a new product range that will combine Añana salt and herbs, in a process in which Añana salt would add value to a latent and undeveloped line of products, such as the fine herbs found in the Cuadrilla de Añana, by, as in the previous case, designing the product and reaching agreements with the local producers / harvesters of fine herbs, to bring to the market a new sustainable and completely local product range.

III.4.2.1.3.- Commitment to the Basque KALITATEA quality labels

The Action Plan provides for the gradual replacement of three pairings that have been produced to date using products that were not covered by the Eusko Label denomination, a mark, whose symbol is a “K”, and that serves to identify and distinguish products produced, processed and/ or made in the Autonomous Community of the Basque Country whose quality or uniqueness exceed the general average. The three pairings that we intend to achieve throughout the development of the Action Plan are: Añana Salt and Arróniz Olives, Salt with Eusko Label tomato, and Salt with Gernika peppers and Ibarra chili peppers.

III.4.3.- Promoting cooperation with the local transformation industry

III.4.3.1.- Project of the development of a agrifood cluster in Añana

A shy awakening of agricultural and livestock farmers is taking place in the Cuadrilla de Añana. They are starting to produce local products that need to be

processed but the processing facilities are not easy to provide in the area where they are produced.

The purpose of this project would be to develop an Agri-Food Processing Zone on a small estate that exists in the municipality of Tuesta, where it would be possible to take advantage of the synergies generated by an association of small-scale producers.

The idea would be to group all the primary sector stakeholders that want to participate, at the estate mentioned above, around what would be the facilities of the Fundación Valle Salado, to process the handling, packaging, and subsequent storage and shipping activities based on the following roadmap:

The first part of the process, which is already underway in 2017, consists in studying all the socio-economic stakeholders that might be interested in taking advantage of the synergies generated by the activities of the Fundación Valle Salado, and proposing a cooperation strategy that would involve all of them.

Based on a participatory arrangement, we are contacting all the producers, artisans, and traders of local products with a view to receiving and sorting their views and proposals regarding the possibility of establishing their businesses at the above mentioned estate. This would create the necessary conditions to generate the synergies required to ensure that the above-mentioned stakeholders could develop an economic strategy that this study would advance.

Based on the conclusions of this phase, we would identify the specific needs, in order to develop a project to build the necessary facilities and, based on the availability of funds, to proceed with the construction work.

III.4.3.2.- Provision of salt to the cheese makers of Artzai-Gazta

The Artzai Gazta Association (cheese from the indigenous “latxa” sheep) is a non-profit association that brings together shepherds in the area of influence of the Idiazábal Designation of Origin. It was created in the 1980s to improve the quality of the sheep cheese and enhance its identity. It currently brings together 116 members from the three provinces of the Basque Country: Álava, Gipuzkoa and Bizkaia.

The work method of Artzai Gazta differs from the rest and one of the most important steps in the cheese-making process consists in salting the cheese in brine, which takes place for 14 to 16 hours at 12°C. It can be wet or dry, and the maximum duration is forty-eight hours when immersed in the brine; in the case of cheeses up to two kilogrammes, only sodium chloride is used.

The proposed cooperation between the Fundación Valle Salado and the Artzai Gazta Association is aimed at producing a high-quality product by introducing the innovation that consists in the absolute respect for the “0 km” proximity food production concept and using an order management system based on ICT. Thus, this type of traditional cheese will cease to use general marine salt produced by industrial techniques, and far away from the areas where the cheese is made.

III.4.4.- Promoting agricultural innovation and development

III.4.4.1.- Dunaliella salina Project

The project proposes setting up crops of Dunaliella in two consecutive phases:

Phase 1: The medium-term objective is to develop a small local farm in the salinas, supported by an extensive farming technique that will only exploit the resources listed above, causing zero environmental impact to the saline ecosystem.

Phase 2: The scope of the long-term objective is to establish of a crop based on intensive farming techniques, to be established outside the boundaries of the salinas. In addition to the resources listed above, it will require a power supply to stir the crops, the supply of nutrients, and the harvesting and processing of the biomass produced.

As a result of the Project, the following products will be available for marketing: Dehydrated Dunaliella algae (10% Carotene) as an animal feed supplement and Beta-carotene extract as a food additive and in wellness products, as well as a dehydrated flour as a secondary product resulting from the extraction of beta-carotene, to be used as animal feed supplement, due to its protein value.

III.4.4.2.- Project Seasoning with other products: cider, wine and txakolí

When making wine and cider from grapes and apples, respectively, a large number of by-products are generated that are not sufficiently valued today.

The objective of the project is to develop new native seasoning products based on combinations of Añana salt and the by-products from Basque wine and cider makers that have an outstanding phenolic and fibre profile. Such a combination would combine a series of essential features for their commercial success and to meet the current demand of consumers.

The idea would be, therefore, to develop new 0 km products based on local raw materials that are deeply rooted in the tradition and culture of our territory (spring salt, by-products from apples and grapes from the cider and wine industries), that would have an impact on our gastronomy and gastronomic tourism while maintaining their Basque identity, based on the use of a technology developed in the Autonomous Community of the Basque Country that will have an impact on employment and on boosting the regional economy.

The participants in this project would be Ekonek (which would provide the agri-food by-product drying technology); the txakoli winery Itsamendi and the Rioja Alavesa winery Baigorri, which would provide the grape lees; the Petritegi cider cellar, which would provide the lees from preparing cider; the Fundación Valle Salado, which would provide various types of salt (Mineral Salt and Salt Flower); and Tecnalia Research & Innovation, which would be the main research entity that would coordinate the entire project.

The project would be developed in five phases throughout 2017 and 2018.

The funding will be obtained from the 2017 HAZITEK Aid account for Projects in support of R&D; it would be based on a Win-Win Business Strategy to achieve a result based on new products validated for commercial use, based on local products and guided by the 0 Km idea.

III.4.5.- Underlining the Environmental Aspects of the Valle Salado

III.4.5.1.- Environmental Itinerary

The project for the new interpretative itinerary on the geological and environmental values of Valle Salado is the result of the need to create a new route through the valley that displays the site's ecological aspects and features and pays special attention to the agrobiodiversity of the salinas. We must not forget all the cultural, historical, archaeological... elements that are essential to understand the rich and varied environment of the salinas.

Nature and culture are inextricably linked, resulting in a characteristic and unique habitat. There is now an interpretive tour that mainly focuses on the history, activities and production of salt, which includes certain points that refer to the environmental features. However, the correct understanding of the valley requires a new route that focuses on the ecological values and on diversity, on specific ecological and biological aspects, as well as explaining how this biodiversity is involved in the salt production process. All this would be combined with cultural information.

The new route would include the key points and adapt to group tours, ensuring the safety of the visitors and including basic visits and milestones (river course, wells...) needed to interpret and understand the biodiversity found in the valley.

The project has been approved and will be executed in three phases during the years 2017, 2018 and 2019.

III.4.5.2.- Botanical enclave at the Santa Engracia spring

This unique addition to the Valle Salado will be located on the Santa Engracia plot, next to the source of the saline Muera river and with a surface area of 1,800 square meters. It is precisely at the spring where a boundary is created between the saline and the non-saline zones, which, with recovery and regeneration work, will allow to count again on typical riparian vegetation. All this is accompanied with specific halophilic or saline species, such as *Frankenia pulverulenta*, *Juncus acutus*, *Hordeum maritimum* or *Puccinellia fasciculata*, among others.

In addition, the botanical enclave and the vegetation regeneration work will contribute to botanical study and research, given their uniqueness.

The project will be fully implemented in 2017.

III.4.5.3.- Biosphere Certification

One of today's most important challenges, and a responsibility of all the actors involved in tourism, is the design of sustainable tourism models that allow to develop "products" and "sustainable destinations".

In relation to this vision, the ITR (Institute of Responsible Tourism) has created the System of Responsible Tourism (STR). This system develops a series of certifications to ensure compliance with certain requirements regarding the principles of sustainability and continuous improvement in line with these principles.

The Responsible Tourism System is developed through a system of standards such as a private, voluntary and independent certification system.

Biosphere certification is based on standards based on the 17 UN Sustainable Development Goals (SDGs) integrated in Agenda 2030, following the guidelines and recommendations of the World Charter for Sustainable Tourism +20 proclaimed at the Second World Summit on Sustainable Tourism, an event sponsored by COP21, UNESCO, UNWTO and UNEP.

We plan to achieve this certification between 2017 and 2018, for which we have already begun the preparatory work.

III.4.6.- Commitment to an Inclusive Society

III.4.6.1.- Visitors with functional diversity and virtual reality

The Valle Salado de Añana intends to be a salt-based agricultural and cultural system that is accessible to all people, regardless of any functional diversity they may have.

Bearing this in mind, we have adapted tours that make it possible for people with functional diversity to take a specially designed itinerary that offers a complete experience: understand the agricultural process of salt, understand why and how salt is produced, appreciate its unique biodiversity, and enjoy the therapeutic benefits of saltwater at the Salt Spa.

From the year 2017, we are improving the degree of accessibility to Valle Salado de Añana by incorporating a model that represents a salt farm for visitors with impaired vision and a video for people with hearing difficulties. The video will provide a complete virtual tour that will also complement the range of tours during the low season.

III.4.7.- Cooperation the the University and the academic world

Inspired by the vision of the Valle Salado System as a giant outdoor laboratory, this section of the Action Plan aims to establish the basis for collaboration with the University and the better established scientific organizations.

The collaborative scope in which the above is produced is important, which not only includes the Fundación Valle Salado but also important stakeholders such as the University of the Basque Country - Euskal Herriko Unibertsitatea, NEIKER - Basque Institute of Agricultural Research and Development and URA - Basque Water Agency.

III.4.7.1.- Spatio-temporal monitoring of the environmental features of the Valle Salado System

As mentioned previously, in the case of the Valle Salado System, the entire project revolves around salt, as a resource, and the culture of its production, with a socio-economic and local-regional development approach. However, speaking about Salt implies speaking about the Water that supplies this resource to the valley's salt pans. To date, and since far back in time, the settlers used the salt water that flowed from the surface at several points in the valley to extract salt, using various methods that are now part of that culture we wish to recover/preserve.

ere lies the first uncertainty, the diagnosis: we are not sufficiently familiar with the groundwater flow scheme (water and salt), far less with its temporal dynamics, which determine the contribution of the resource to the valley. There are many questions (let's not forget that asking the relevant questions is essential to establishing the scope of the answers): From where and how does the salt reach the springs? Is there any hydrochemical variability in the water over time? How does rain affect the flow of salt water? And the use of the land in the surrounding area? What is the area of influence of the saline flows? What could the expected impact of Climate Change be? Would the provision of salt to the springs be guaranteed? Can we expect the quality of the dissolved salt to change?

It has not been confirmed that Global Change is a threat. However, it would be prudent to take it into account...and study it as such, and in that regard, we intend to carry out a series of activities that will begin in 2017.

The activities planned for 2017 are intended to update the geological knowledge of the hydrological environment of the Valle Salado based on implementing and operating a hydrological and hydrochemical monitoring network (springs, piezometers, streams).

The information thus gathered will provide a better understanding of the subsurface flows and how they affect the emergence of the salt springs. At the same time, they will provide criteria to be taken into account for the future management of the resource.

Based on prior information available in the studies conducted by the Fundación Valle Salado, there are several springs in the valley that emerge under different conditions (altitude, flow) and with different saline levels, including those from which salt water has been collected for many years. Despite this, the available data (flow, quality) are very limited and, in many cases, old. There has not been a commitment to monitor the spatial- temporal aspects (monitoring) of the hydro-geological-hydro-chemical variables, which would have allowed the appropriate conceptualisation of the water and salt flow schemes.

In order to achieve the proposed goals, the following lines of action are established, to be developed in 2017 and 2018: implementations of a control network, data collection, physical-chemical analysis of salt and water. All of which within the framework of the cooperation agreement between the Fundación Valle Salado and the University of the Basque Country. The plan is to renew this agreement, so as to deepen this line of cooperation.

III.4.8.- Promotion and Dissemination of the Valle Salado

Program in which two activities exist, to be developed in 2017 and 2018: The presentation of the candidacy to GIAHS in July and the preparation of Salinas de Añana as a venue of the 3rd International Conference on Salt to be held in 2018.

Overview of the Action Plan between 2017 and 2021

PROGRAM	ACTIVITY	Period of activity	Years of activity				
			2017	2018	2019	2020	2021
III.4.1.- Innovation in the production of salt	III.4.1.1.- Achieve the ground artisanal Añana salt	2017 - 2021	●	●	●	●	●
	III.4.1.2.- Improve the efficiency in the production of Salt Flower	2017 - 2021	●	●	●	●	●
III.4.2.- Strengthening the values of local agrobiodiversity	III.4.2.1.- Developing Añana salt blends with local flavors	2017 - 2021	●	●	●	●	●
III.4.3.- Promoting the cooperation of the local transformation industry.	III.4.3.1.- Development of a agrifood cluster in Añana	2017 - 2021	●	●	●	●	●
	III.4.3.2.- Provision of salt to the cheese makers of Artzai-Gazta	2017 - 2021	●	●	●	●	●
III.4.4.- Promoting agrarian innovation and development.	III.4.4.1.- Dunaliella salina Project	2017 - 2021	●	●	●	●	●
	III.4.4.2.- Project Seasoning with other products: cider, wine and txakolí	2017 - 2021	●	●	●	●	●
III.4.5.- Underlining the environmental values of the Valle Salado	III.4.5.1.- Environmental Itinerary	2017 - 2021	●	●	●	●	●
	III.4.5.2.- Botanical enclave	2017 - 2018	●	●			
	III.4.5.3.- Biosphere certification	2017 - 2018	●	●			
III.4.6.- Commitment to an inclusive society	III.4.6.1.- Visitors with functional diversity and virtual reality	2017 - 2021	●	●	●	●	●
III.4.7.- Cooperation with the university and the academic world.	III.4.7.1.- Spatio-temporal monitoring of the environmental features of the Valle Salado Sys	2017 - 2021	●	●	●	●	●
III.4.8.- Promotion and dissemination of the Valle Salado	III.4.8.1.- SIPAM - GIAHS	2017 - 2018	●	●			
	III.4.8.2.- 3rd International Conferenc on Salt	2018		●	●		

III.5.- Contribution of the GIAHS Valle Salado System

The acknowledgement of the Valle Salado System as a GIAHS would have positive effects on several aspects.

The implementation of the Action Plan we have presented would result in the possibility of overcoming the challenges we have set out and it would cancel or mitigate the threats that we have identified.

All this would contribute to recovering the lost sustainability that the Valle Salado System once knew and that we are struggling to recover.

The contributions would be distributed at various levels

Recognising the Valle Salado System as a GIAHS would have an undeniable first effect on the community of salt workers and all aspects that make up their socio-economic base by strengthening their sense of identity and pride of belonging to a group that has managed to preserve this legacy.

Secondly, we must bear in mind that the safest way to ensure these people remain committed to preserving and improving the Valle Salado System will be by ensuring improvements in their daily living standards, in the coverage of the basic needs and expectations of the local community; i.e. meeting one of the goals set out by the Fundación Valle Salado, and ensuring that the Valle Salado System becomes a driving force in the economic, social and tourist development of the region.

There is no doubt that the recognition would bring about these improvements and would ensure a greater involvement, if possible, of the community; achieving that long-awaited cohesion of the local community.

We can be sure that the Province of Álava, and the Autonomous Community of the Basque Country, would share in the above-mentioned pride and in the improvements in the daily living standards of the local community.

In a situation in which there is no GIAHS recognition in Europe, the granting of this recognition would be a boost to the cultural, environmental, agricultural, and rural development policies being promoted by the EU, the Spanish State, and Local Governments, demonstrating that it is possible to combine territories that respond to socio-economic systems based on industrial and service economies with sites that have managed to preserve their ancestral culture and know-how, going through tough times and surviving.

The Valle Salado de Añana experience would be easy to replicate at existing inland salinas in other parts of Spain (Salinas de Peralta de la Sal, Salinas de Calasanz, Salinas of La Rolda, Salinas de Léniz, etc...) and in other countries, such as Argentina, Peru, Chile, and Bolivia.

Replicating the Valle Salado de Añana System would be very interesting, the experience accumulated over more than 15 years could be placed at the service of other countries that could benefit from it and even opt to be recognised as GIAHS systems, giving rise to a new Agricultural System among Globally Important Agricultural Heritage Systems: salinas.

III.6.- Marco económico y políticas estratégicas aplicadas

The board of trustees of the Fundación Valle Salado de Añana currently consists of four trustees: The Provincial Council of Alava, the Basque Government, the City Council of Salinas de Añana and the salt workers' association, Gatzagak.

The Provincial Council of Alava is the institution that has driven the project since its inception and had taken on much of the economic effort and responsibility for the work performed until the trust was established. Its annual economic contribution guarantees a portion of the project. The Basque Government, which also net contributor of economic resources, while the Town Council of Añana, and the salt workers' association, Gatzagak, contribute indirectly to the funding but, above all, they contribute the ownership of all the salt-pans in Valle Salado and provide support and collaboration, becoming a driving force regarding the cultural activities in the area.

The trust's funding is completed by several strategic partners with which agreements are reached, involving varying amounts and periodicity:

- The Department of Culture of the Provincial Council of Alava
- The Department of Culture of the Basque Government
- The Department of Consumer Affairs, Trade and Tourism of the Basque Government
- The Department of the Environment of the Basque Government
- URA, Basque Water Agency
- Kutxabank – Fundación Vital
- The Department of Agriculture - Basque Government Leader Program
- European Funds - EAFRD
- 1.5% for Culture of the Ministry of Civil Works of the Government of Spain

The structure of the board of trustees and the strategic partners ensure the involvement and financial support of the public administrations in the project, as well as full social support. Although the world crisis we are going through has led to a reduction in the contributions from the various entities, there are multi-year agreements that guarantee the continuity of the project.

Institutional financial support is complemented by the economic resources that the Fundación Valle Salado is capable of generating through its own activities. Part of the income is generated by the guided tour Programs that have been introduced to make the Agricultural System available to society. However, we have one differentiating element, salt. Progress in the production, marketing and sale of different types of Añana salt, as already demonstrated, has a great potential to become, in the not too distant future, the driving force for Valle Salado and the surrounding area.

The Fundación Valle Salado has prepared the following Economic Management Plan for the 2017 - 2021 period, based on the funding that can be obtained from the Strategic policies that we have outlined above, and that are promoted by the various institutions, together with its own resources generated from the activities performed at the Valle Salado System:

Origin of the Funds	Action Plan 2017 - 2021					Total Action Plan
	2017	2018	2019	2020	2021	
Own resources	770.360	822.558	858.476	886.001	914.607	4.252.002
Institutional contribution	1.194.058	978.247	978.504	983.206	987.524	5.121.539
Total Resources (€)	1.964.418	1.800.805	1.836.980	1.869.207	1.902.131	9.373.541

These Financial Resources will be used to finance the Programs detailed in the Action Plan 2017-2021 and those Programs that the Fundación Valle Salado has been promoting since 2000 and that have made possible the results obtained to date.

Use of funds: Financed programs	Action Plan 2017 - 2021					Total Action Plan
	2017	2018	2019	2020	2021	
III.2.1.1.- Functioning of the Fundación Valle Salado (*)						
III.2.2.1.- Development of visitor infrastructures (*)						
III.2.2.2. Development of the Visitor Program (*)						
III.2.4.1.- Maintenance and Recovery Activities (*)						
III.2.5.1.- Art performances (*)	1.089.050	963.435	976.569	989.785	1.003.083	5.021.922
III.2.6.1.- Therapeutic visits (*)						
III.2.7.4.- Gastronomical visits (*)						
III.2.8.1.- Cooperation with Tourism and Cultural stakeholders (*)						
III.4.1.- Innovation in the Production of salt						
III.4.2.- Strengthening the values of local agrobiodiversity						
III.4.3.- Promoting the cooperation of the local transformation industry.						
III.4.4.- Promoting agrarian innovation and development.	875.368	837.370	860.411	879.422	899.049	4.351.620
III.4.5.- Underlining the environmental values of the Valle Salado						
III.4.6.- Commitment to an inclusive society						
III.4.7.- Cooperation with the university and the academic world.						
III.4.8.- Promotion and dissemination of the Valle Salado						
Total:						9.373.542 €

Each and every one of the actions contained in the proposals that form the backbone of this Action Plan 2017-2021, regularly implemented since the year 2000, are funded through the Strategic Policies developed by Institutions and the Fundación Valle Salado de Añana's own policy to generate our own resources to meet the challenges and overcome the threats identified. The ultimate aim is to recover the sustainability that has been lost, achieving a balance between the social, economic, productive, and environmental components of the Valle Salado de Añana System.

III.7.- Indicators to measure the evolution of the System

The agricultural system of Valle Salado de Añana is a small site when compared with other landscapes considered GIAHS, that is also managed completely by a trust and the Provincial Council of Álava, being both the repository of all the information provided by other agencies and institutions. This implies the existence of many regular inspections on the state of conservation, as Valle Salado is a living system and its very activity contributes to its conservation. However, the possibility of being recognised as a GIAHS has led us to submit a new proposal of indicators to measure the evolution of the agricultural system.

These are the indicators that will be used:

General Domain	Specific Domain	Type of indicator	Frequency of measurement	Implementing agency
Capacity to create R+D+i	Institutional commitment	Actions supported by institutions	Yearly	FVS
	Cultural projects	Developed cultural projects	Yearly	ADR
	Projects in support of agriculture	Developed projects	Yearly	EHU/FVS
	Documentary projects	Research performed	Yearly	
Dissemination, Publicity and Integration	Training	Developed programmes	Yearly	FVS
	Dissemination and cooperation	Developed activities	Yearly	
Ecological Conservation	Agricultural land	Land use	Continuous	FVS
	Agrobiodiversity	Changes in flora and fauna	Yearly	DFA / URA
	Agricultural landscape	Conservation of productive elements	Continuous	DFA / FVS
	Agricultural services	Physical-chemical analysis of water and brine	Continuous	FVS / EHU
Economic Development	Agrifood products	Species and varieties	Continuous	FVS
	Sustainable tourism	Quality and data from visits	Continuous	
	Economic indicators of the system	Production and sale of different types of salt	Monthly	
	General economic indicators	Economic data	Biyearly	GOVA
Social Cohesion	Commitment of the local community	Activities organised by the local community	Yearly	CA / ADR
	Demographic indicators	Demographic data	Biyearly	GOVA
	Female participation	Women taking part in the activities of the system	Continuous	FVS
	Inclusion	Inclusive activities organised	Yearly	
Cultural Tradition	Knowledge of agricultural traditions	Conservation of know how	Continuous	FVS / ASG
	Cultural traditions	Conservation of historical documents	Continuous	DFA / AA
	Urban cultural centres	Conservation of urban spaces	Continuous	
	Cultural events	Events developed	Yearly	FVS / AA

FVS: Fundación Valle Salado

DFA: Diputación Foral de Álava / Provincial Council of Álava

EHU: Universidad del País Vasco / University of the Basque Country

ADR: Asociación de Desarrollo Rural / Rural Development Association

GOVA: Gobierno Vasco / Basque Government

ASG: Asociación de Salineros Gatzagak / Salt Workers' Association Gatzagak

CA: Cuadrilla de Añana