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Hidden in Plain Sight? Looking for the Indigenous Agricultural Fields of Gran Canaria, Agüimes and Temisas, Canary Islands, Fifteenth and Sixteenth Centuries

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Abstract
The location, size, and structure of the farmlands and hydraulic systems built by the Indigenous inhabitants of Gran Canaria, Canary Islands, Spain, remain unknown. This hampers our ability to understand how they organized agricultural production and how European settlers transformed local landscapes to build commercial plantations in the late fifteenth century. This paper combines an analysis of archival sources with the study of agricultural landscapes and practices to identify and describe the fields that were employed by the first colonists of Agüimes and Temisas, and to derive information about the location, design, and management of the pre-Hispanic farmlands.

Keywords Settler Colonialism · Agricultural Landscapes · Plantations · Canary Islands · Spain

Introduction

The European colonization of Gran Canaria following the invasion of 1478–83 radically transformed the landscapes that had been built and managed by the Indigenous inhabitants of the island. The invaders preferentially devoted the land to producing a limited variety of commodities, namely, sugar, wine, and woad– destined to be sold in European and, later, American markets (Aznar 1983; Aznar and Viña 1989; Camacho 1961, 1966; Fernández-Armesto 2003; Macías 2000; Morales and Macías 2003; Ronquillo 2008; Vieira 2004; Viña and Ronquillo 2006). In a few decades, most of the Canarian coastal plains and piedmont were covered with European

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settlements and cash cropping plantations that effaced the pre-existing agricultural landscapes almost completely. Although it is generally presumed that settlers took advantage of Indigenous fields and hydraulic infrastructures and repurposed them to produce commercial crops (Díaz 2006:125–128; Macías 2000:182, 267, 2009:718–719; Sánchez and Martín 2003:69), little is known about how this appropriation actually took place and how it determined the colonization process and the construction of colonial farmlands. In part, this is due to the fact that our knowledge regarding the location, size, and structure of the farming areas of the Canarians is fairly limited. Thus, identifying and studying the farmlands of the Indigenous inhabitants of Gran Canaria is key to understanding how the colonial appropriation and adaptation of the local agricultural landscapes unfolded.

This paper shows how combining the analysis of archival sources with the study of modern agricultural landscapes and practices can be used to identify and describe the earliest fields that were employed by the European colonists and, therefore, to approximate the location of the Indigenous farming areas and derive information about their design. This methodology, originally developed to research the medieval Christian conquest of al-Andalus, has been applied for the first time in the Canaries to study the colonization of Agüimes and Temisas, Gran Canaria, as the first stage of a larger historical and archeological research project on the Canarian Indigenous farmlands.

Farmers without Farmlands

The increasingly interdisciplinary archeological research of the last three decades has delivered precious information about how the Indigenous inhabitants of Gran Canaria managed agricultural production during the millennium prior to the Castilian conquest (for the debate on the chronology of the North African settlement, see de Nascimento et al. 2020 and Velasco et al. 2020). Carpology, dendrology, archeoentomology, bioarcheology and aDNA studies and the isotopic analysis of soil samples have proven crucial to gain new insight into how the Canarians ate (Arnay et al. 2010; Delgado et al. 2005, 2006; Velasco 1998), allocated labor (Santana 2018; Santana et al. 2015) and used natural resources (de Nascimento et al. 2016, 2020; Morales et al. 2007, 2009; Vidal et al. 2020). They have also delivered large amounts of new data about the repertoire of domesticated plants and animals the Canarians brought with them from North Africa, as well as about how they processed and stored crops, husbandry products, and wild fruits (Alberto et al. 2017; Castellano et al. 2016, 2018; Hagenblad et al. 2017, 2019; Henríquez et al. 2019, 2020; Miranda 2010; Morales 2006; Morales et al. 2014, 2017; Morales and Rodríguez 2014; Olalde et al. 2015; Oliveira et al. 2012; Rodríguez et al. 2011– 12).

Despite recent archeological progress, a key element of Indigenous agriculture remains unknown: we still ignore the location, size, and structure of the farmlands and hydraulic systems that –according to colonial accounts– were built by the Indigenous inhabitants of Gran Canaria (Jiménez 2014:89–91; Morales 2006:244–247; Onrubia 2003:158–162). The ethnohistorical sources and what little remains of the fifteenth- and sixteenth-century land allotment records offer almost no information

about the appropriation and management of the agricultural landscapes of the Canarians after the invasion. In most cases, they only make indirect references to micro-toponyms associated with pathways, livestock-related structures and isolated irrigation channels, and water tanks. By themselves, these passing mentions do not allow us to picture the pre-Hispanic agricultural landscapes of Gran Canaria, thus limiting our ability to understand how the Indigenous inhabitants organized production and how European settlers appropriated and modified their farming areas to build the new colonial agricultural system.

Since the mid-twentieth century, several attempts have been made to either approximate the Indigenous network of settlements and working spaces or to describe the formation of the colonial landscapes. In the 1960s, Camacho (1961, 1966) used the earliest notarial documents of Gran Canaria to study how the cultivation of sugar cane, vines, cereals, and other garden crops spread throughout the island between 1510 and 1537. Some decades later, Santana (1992) combined various types of written sources with cartography and the available archeological record to analyze the location of the then-known Canarian settlements in relation to locally available natural resources. He also used this methodology to trace the evolution of the island's landscapes between the fifteenth and the nineteenth centuries (Moreno and Santana 1998; Santana 2001). At the same time, other researchers have focused on how the commercial crops that have been successively introduced into Gran Canaria since the 1480s have transformed the insular landscapes (Herrera 1977; Macías 2000, 2009; Morales and Macías 2003; Salas et al. 2006).

From an archeological perspective, there have been some recent attempts to reconstruct the network of Indigenous settlements and burial caves in Gran Canaria using GIS. Ramón (2008), for example, has mapped the distribution of all the caves where Indigenous activity has been documented; while Moreno (2014) and Moreno and González (2013, 2014) have studied the relationship between Canarian dwelling and storage caves with modern arable land. Likewise, some archeologists have strived to gauge the impact the indigenous settlement of the island had on various local environments and how it affected the endemic flora and fauna (de Nascimento et al. 2016, 2020; Morales et al. 2007, 2009).

In spite of their valuable contributions, none of these studies describe how the colonial appropriation of Indigenous farming areas actually took place, how they were integrated into the new agricultural system, and how they determined its development. Taking a local approach and combining the analysis of written sources with the study of modern agricultural landscapes and practices offers the possibility of bridging the rift caused by the Castilian invasion, tracing the transformation of the Indigenous agricultural landscapes into colonial spaces.

The imposition of new agricultural systems through settler invasions, as in the case of Gran Canaria, leaves traces on the landscape that work as material evidence of the transformation of the Indigenous farming areas. Combining their analysis with the information provided by archival sources enables us to gather detailed information about the location, characteristics, and management of farming areas before and after the imposition of a particular colonial regime, providing insight into how the settler agricultural system incorporated or substituted previous ways of organizing

production. This methodology has been developed since the 1980s (Barceló et al. 1996; Glick and Kirchner 2000; Kirchner 2015; Retamero forthcoming) and it has been extensively used in the Iberian Peninsula and the Balearic Islands to identify and study the fields and hydraulic systems that were built by the Andalusi Muslim peasantry and to distinguish them from the modifications that were introduced by Christian settlers between the eleventh and the sixteenth centuries (some recent examples and reviews can be found in Kirchner 2020; Torró 2019; Torró and Guinot 2018). This is the first time this methodology has been employed to study the European colonization of the Canary Islands and it has enabled us to approximate the location and size of the oldest irrigated fields of Agüimes and Temisas, which lie at the core of the towns' gardens. As will be explained, these are good candidates for being the fields that were seized by the first European settlers.

Working Backwards

Agüimes (*Aragüimes*) and Temisas (*Themensas*) were recorded by the European chroniclers of the fifteenth century as pre-Hispanic settlements (Aznar et al. 2008:144–145, 207–208; Morales 1978:160, 320, 350, 387–391, 420, 515). They are located in the piedmont of the dry southeastern corner of Gran Canaria. The town of Agüimes is 5.5 km from the coast line, some 285 m above sea level, next to Guayadeque Gully. The smaller hamlet of Temisas is further inland, at almost 700 m above sea level and is part of the modern municipality of Agüimes. Both are located near the natural harbor of Gando (Fig. 1), where Majorcans, Catalans, and Castilians established the first European settlements of Gran Canaria in the fourteenth and fifteenth centuries (López 2016:68–70, 85–90; Onrubia and González 2004, 2018; Rumeu 1986; Tejera and Aznar 1992). After the Castilian occupation of the island in 1478–83, the Catholic Monarchs created the Lordship

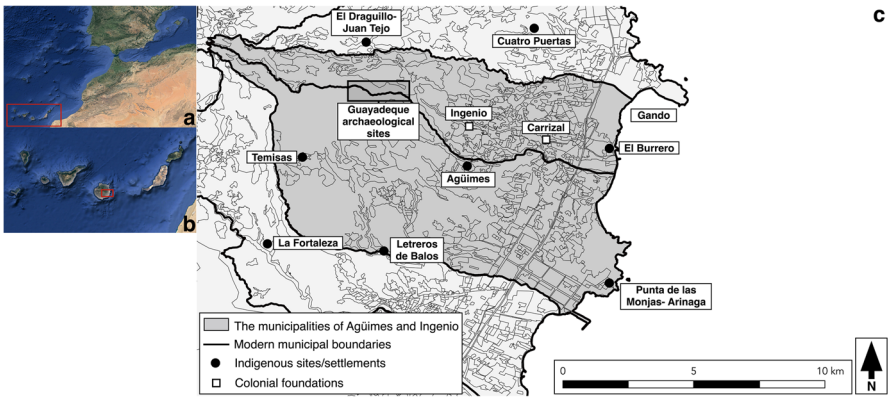

Fig. 1 Location of the Lordship of Agüimes and the main Indigenous sites in the area **a**. Location of the Canary Islands in the Eastern Atlantic. **b**. Location of the Lordship of Agüimes within Gran Canaria. **c**. Main Indigenous sites and colonial settlements in the Lordship of Agüimes

of Agüimes –which approximately encompassed the modern municipalities of Agüimes and Ingenio– and granted it to the bishop of the Canary Islands (Cazorla 1984:11–23; Suárez and Quintana 2003). Most of the local inhabitants seem to have either perished or been deported and enslaved during the late fifteenth century, even if some individual Canarians survived and were able to join the settler community (Rodríguez and García-Correa 2014:22). It has been estimated that Gran Canaria lost around 85% of its Indigenous population between 1478 and 1483 (Onrubia 2003:263).

In the aftermath of the invasion, the towns of Agüimes and Temisas and their surroundings were filled with traces of Indigenous activity. The written sources mention at least 20 "Canarian houses" located within the historic center of Agüimes (Quintana 2004:65–77), and the archeological excavation of the chapel of Sant Antón in 1998–99 revealed two outdoor open spaces that were used in the thirteenth and fourteenth centuries to process meat, cereals, and legumes (Alberto and Velasco 2003; Morales 2006:198–211; Morales et al. 2001, 2017:199; Rodríguez et al. 2011– 12:107–108). The Canarian settlement of Agüimes was part of a network of habitation, working, and burial places that extended several kilometers around it (see Fig. 1). Indigenous habitation had been particularly dense in the middle course of Guayadeque Gully, where dozens of dwelling, storing and burial caves have been documented (Cuenca 2008; Jiménez 1946:71–73; Velasco and Alberto 2005:29, 173–181, 212–215; Velasco et al. 2012:119–126).

The hamlet of Temisas was part of this larger network of Indigenous sites within the Lordship of Agüimes. Although no significant archeological excavation has been conducted within the hamlet itself, several areas of pre-Hispanic activity have been recorded in the locality, such as the collective granaries of Risco Pintado, the caves of Cueva del Gigante, the funerary caves of La Sorrapada and the stone houses, caves and *tagoror* –assembly place– of Lomo de la Cruz (Jiménez 1946:98–100, 1952:25–32; Quintana 2004:65; Velasco and Alberto 2005:29–30, 56; Velasco et al. 2012:91–96). Recent research conducted on one of the granaries of Risco Pintado has found seeds of barley and wheat, as well as traces of lentils, fava beans, and figs, which have been radiocarbon dated to between the ninth and the fifteenth centuries (Henríquez et al. 2019).

The data gathered by archeobotanists and archeoentomologists from the excavation of granaries and processing areas in Agüimes and Temisas has provided crucial insight into some of the agrarian practices of the Canarians that inhabited the southeastern corner of Gran Canaria. Barley was the staple crop of both communities and it was complemented with wheat, lentils, figs, and –in Temisas– fava beans. These crops were cultivated in perennial fields and soil fertility was probably maintained by combining alternate harvests of winter cereals and legumes with manure provided by sheep and goat herds (Morales 2006:197–210, 247–248; Morales et al. 2001). Local communities also implemented strategies aimed at maximizing the preservation of harvested crops and gathered fruits, even at the expense of losing storing space –such as keeping grains and legumes within their ears, pods, and husks to protect them from plagues (Henríquez et al. 2019; Morales et al. 2014; Morales and Rodríguez 2014).

Fieldwork in Agüimes and Temisas was carried out during the summer and autumn of 2018. The irrigated fields that surround both towns were mapped using orthophotography and recording the GPS coordinates of particularly relevant features –namely water tanks, mills, and channel diversions. Later, field maps were digitized with QGIS and a drawing software –EazyDraw– and they were revised and corrected using historical maps and aerial photographs from between the 1950s and 1970s, to account for the arable surface lost to urbanization and neglect in the last decades. All photographic and cartographic materials were obtained from the National Centre of Geographic Information (CNIG), the Infrastructure of Spatial Data of Gran Canaria (IDE Gran Canaria) and Google Earth. During fieldwork, non-systematic ethnographic surveys were carried out to gather information about traditional land-use and water management practices.

Maps and the other data gathered during fieldwork were combined with the information extracted from archival sources to identify the oldest fields and irrigation channels within the gardens of Agüimes and Temisas. The sixteenth-century records from the notaries of Agüimes proved a key source of information. The transactions they registered contained details about forgotten place names, the location, size and usages of plots, and property and usufruct rights. These were integrated with the information obtained during fieldwork to approximate the extension and distribution of the irrigated fields of Agüimes and Temisas 500 years ago. However, the earliest complete series of notarial records for the Lordship of Agüimes start in the 1540s, 60 years after the invasion, and the dearth of earlier written sources has conditioned the development of the investigation, forcing us to work backward. First, we determined the size and structure of the gardens of Agüimes and Temisas in the 1570s, because there is enough information about that period to locate individual plots. Then, we traced back their development, extrapolating from fragmentary data extracted from earlier documents, the structure of the modern hydraulic systems and plots, and the shape of the local terrain. This approach has allowed us to identify the core fields of both irrigated areas, which were operational immediately or soon after the 1478–83 invasion.

The Bygone Cane Fields of Agüimes

Agüimes is surrounded by a belt of terraced and irrigated fields known as the Vega of Agüimes, which covered some 142 ha of land in the mid-twentieth century, prior to the urban development of recent decades. Its gardens are watered using two hydraulic systems run by different irrigation associations (*heredades)*: the Heredad de Santa María and the Heredad de Los Parrales (Fig. 2). Each association owns a large tank (*albercón*) that was used to administer the access rights to water of its members until the twentieth century. Both institutions draw their water from springs located in the upper and middle course of Guayadeque Gully, which are also shared with Ingenio, a neighboring town that grew in the 1500s on the northern side of the ravine, around the lordship's sugar factory (Sánchez and Martín 2003:107). Since the 1520s, Agüimes is officially entitled to one fourth of the water of Guayadeque, and it is divided into thirds –two for Santa María and one for Los Parrales.

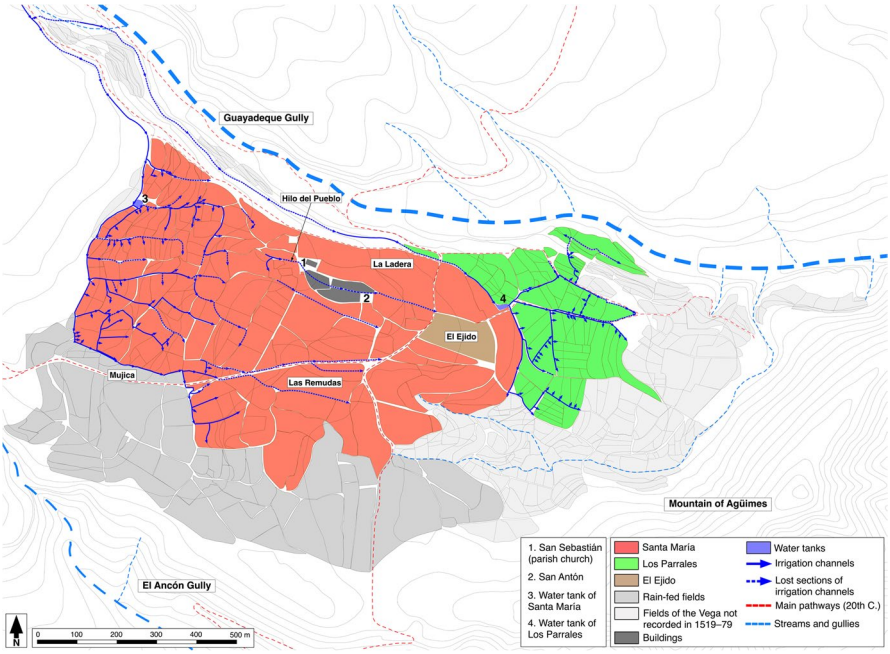

Fig. 2 The Vega of Agüimes in 1579

Additionally, Agüimes has the right to a trickle of water known as Hilo del Pueblo, which is not subject to partition between the two towns nor between Agüimes' irrigation associations (AHPLP 1661, L.2500:51r-52v; AMC 1514–1750, L.10, doc. 9:18r). It was still used for domestic consumption and to water a number of gardens in the mid-twentieth century.

The foundation date of the hydraulic systems of Agüimes remains unknown, but their construction was well underway by the end of the first half of the sixteenth century. Los Parrales and its water tank were documented for the first time in 1519 and 1521, respectively (APA–SS 1506–1627:47r, 50r); while the channel network of Santa María already extended to the areas of Mujica and Las Remudas in 1547 (Ronquillo and Aznar 1998:124v-125r and 259r) (see Fig. 2). The Hilo del Pueblo does not feature in the written record until 1561 (AHPLP 1561– 67, L.2484:95r), but it must have been operational at a much earlier date, since the privileged access to its water flow enjoyed by the inhabitants of Agüimes was considered to be a customary right by 1571 (AHPLP 1661, L.2500:53v).

The study of different written sources has allowed us to identify at least 60 distinct properties within what nowadays is the Vega of Agüimes before 1579 (Table 1). Six were large rain-fed fields located outside the irrigated area, near Ancón Gully. The remaining 54 properties were considered to be an integral part of the Vega, even though some of them may not have been regularly irrigated yet. Contemporary measurements are only available for 33 of them, which amounted to 51.3 ha. The mode of these measurements is 1.45 ha per property, exactly one of the standard units or *suertes* used during the land allotments (Lobo 1989:39–44). If we

Table 1 Properties identified within the Vega of Agüimes between 1519 and 1579

	Properties measured in the sixteenth century	Mode of property size	Unmeasured properties with estimated measurements	TOTAL
Santa María	24 (42.9 ha)	1.5 ha	13 (18.9 ha)	37 (61.8 ha)
Los Parrales	9 (8.4 ha)	0.7 ha	8 (5.8 ha)	17 (14.2 ha)
Rain-fed fields	4 (18.3 ha)	3.5 ha	2 (7 ha)	6 (25.3 ha)
TOTAL	37 (69.6 ha)		23 (31.7 ha)	60 (101.3 ha)

AHPLP 1545–1553, L.2484; AHPLP 1555–1561, L.2484; AHPLP 1561–67, L.2484; AHPLP 1567, L.731; AHPLP 1568, L.731; AHPLP 1569, L.731; AHPLP 1590–98, L.2487; AHPLP 1611–19, L.2490; AMC 1543–1750, L.10, docs. 18–23, 35; APA–SS 1506–1627; Aznar 1981; Pérez 1992; Rodríguez and García-Correa 2014; Ronquillo and Aznar 1998

extrapolate the mode of each *heredad* to the remaining 21 unmeasured properties, the Vega would have added up to some 76 ha in 1579, that is, 54% of its twentieth-century size. This is a rather conservative estimation, though, since it is very likely that there were properties that do not feature in the written record. In any case, we can confidently assume that the Vega of Agüimes had already reached more than half of its twentieth-century size less than 100 years after the invasion –almost three quarters if we include the rain-fed fields that would later be artificially watered (see Fig. 2).

The rapid expansion of the irrigated farmlands of Agüimes during the first half of the sixteenth century and the dearth of written sources predating 1545 make it difficult to identify the foundational core of the Vega. But there is enough evidence to claim that the oldest fields were located in a narrow strip of land known as La Ladera that lied between the town of Agüimes, the common fields of El Ejido and Guayadeque Gully (Fig. 3). It is here that the oldest properties documented within the Vega were located. Diego de Carmona, Pedro Álvarez Osorio, and Alonso de Matos el Viejo owned 1.5 ha of land there, next to the parish church, sometime in the early sixteenth century (Pérez 1992:194, 260). The first two had taken part in the conquest of Gran Canaria, while Matos arrived in the island before 1500 and was one of the first owners of the sugar factory of Ingenio (Cebrián 2003:148, 330, 369; Sánchez and Martín 2003:107). Bordering their land was the vineyard of the Genoese Orrigo Riso (AMC 1514–1750, L.10, doc. 23:5v, doc. 35:2r), who most likely was a member of the merchant family Grimaldi-Rizzo, which was heavily involved in the colonization of the Canaries in the 1480s and 1490s (Egea 2012). Adjacent to Riso's property, was the land of Juan Vélez de Valdivieso (AMC 1514–1750, L.10, doc. 35:2r), who was either the conquistador who had been in charge of allotting land in the district of Telde in 1485 or his son (Cebrián 2003:466–467). And, immediately below La Ladera, next to the water tank of Los Parrales, lied the garden of another conqueror, Martín Ibáñez de Arístegui (APA–SS 1506–1627:47r, 50r, 144r), who was one of the

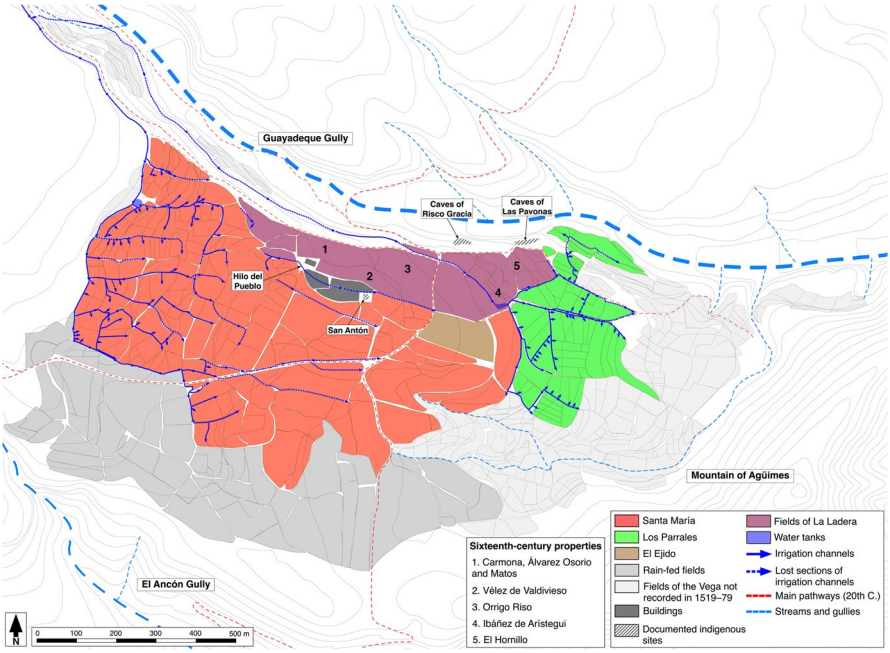

Fig. 3 The fields of La Ladera and the neighboring Indigenous archaeological sites

first municipal officers of Agüimes (Cebrián 2003:279; Rodríguez and García-Correa 2014:173).

The design of the fields of La Ladera was also exceptional. The vast majority of the channels that watered the gardens of Agüimes flowed to the east and south to irrigate as much land as possible before reaching the Mountain of Agüimes and Ancón Gully. By contrast, the channels of La Ladera ran northward toward Guayadeque, restricting the potential for future expansion of these fields. Thus, while the rest of the Vega seems to have been designed to expand as long as there were enough water and land available, the layout of La Ladera incorporated strict physical boundaries that restricted any significant enlargement beyond 12 ha (Fig. 3).

La Ladera was urbanized between the seventeenth and nineteenth centuries, but the notarial documents record at least two irrigation channels that ran through or around it: the aforementioned Hilo del Pueblo, which crossed the town center of Agüimes, and the Acequia Real del Barranco de Guayadeque, which probably marked the outermost border of La Ladera. Information about these channels is scarce, but some features suggest their construction predated that of the rest of the Vega. As has been previously said, the Hilo was not subject to the partition agreements established in the 1520s and the inhabitants of Agüimes who owned property next to it were entitled to its waterflow, regardless of their access rights to the other channels (AHPLP 1661, L.2500:51r-53v; Suárez and Quintana 2003:531–532). The Acequia Real del Barranco de Guayadeque or Acequia Real de Agüimes was only mentioned thrice between 1543 and 1571 (AMC 1514–1750, L.10, doc. 23:5v, doc. 35:2r; AHPLP 1561–67, L.2484:192r-192v), and almost nothing is known about it.

Rights of access to its waterflow were divided into time lots, but no document states whether it was ascribed to any association. At any rate, the adjective *real* ("royal") included in its name is a sign that it was considered to be older or more important than the other channels of the network, since it was often reserved for the first-built or the main channel of a hydraulic system. That is the case of the Acequia Real de Aguatona (Ingenio) and the Acequia Real de la Vega de Telde (Navarro 2008:91). All this points towards the fact that the channels of La Ladera were built before the systems of Santa María and Los Parrales, which would explain their unusual design, their name denoting seniority –in the case of the Acequia Real– and their privileged access to water –in the case of the Hilo. It would also help to elucidate why the water tanks of Santa María and Los Parrales are not located at the head of their respective hydraulic systems, but on the margins of La Ladera (Fig. 3).

The early settlers of Agüimes must have employed the fields of La Ladera and their channels to grow sugar cane immediately after the invasion. By the time we document them in the mid-sixteenth century, they were almost exclusively planted with vines and cereal, but it is possible that there were still some small cane fields left (AHPLP 1561–67, L.2484:192r). Furthermore, some of the early proprietors of La Ladera, such as Alonso de Matos and Martín Ibáñez, were actively involved in the Canarian sugar industry. The highly intensive monoculture of sugar that was implemented in sixteenth-century Gran Canaria depleted soils rapidly and generated a constant demand for fertile land (Moore 2009, 2010 explains this in detail for Portuguese Madeira). Applying the policy known as *remuda de tierras cansadas* ("replacement of exhausted land"), the colonial government allowed for the expropriation of poor farmers who owned rain-fed fields, which were then granted to planters with access rights to water that turned them into new sugar plantations (Aznar 1983:235–236, 261–263; Aznar and Viña 1989:178–180; Macías 2000:184, 2009:730–732; Morales and Macías 2003:268; Sánchez and Martín 2003:71–74). As the need for new land grew, it became impossible to alter the constrained design of La Ladera and expand it beyond the town and El Ejido. To supersede the strict limits of these fields, settlers were forced to divert water upstream to create the hydraulic systems of Santa María and Los Parrales, which grew following an orthogonal layout on the upper and lower margins of La Ladera (see Fig. 3). Significantly, the channel of Santa María was still known as the "upper" or "higher channel" of Agüimes in the 1550s (AHPLP 1555–61, L.2484:60r; AHPLP 1561–67, L.2484:92r, 95r). These new hydraulic systems had the geometric and "open-ended" design that was characteristic of the ones built by Christian settlers in Iberia (Torró 2009:104–110), which allowed for the uninterrupted expansion of the channel network until it reached Ancón Gully and the Mountain of Agüimes. The terraces of Santa María and Los Parrales multiplied around the old plots of La Ladera, engulfing and obscuring them and claiming ever-increasing amounts of water. Ultimately, La Ladera was among the first parts of the Vega to be urbanized from the seventeenth century onwards, which further fragmented and obscured its original structure.

Although we are not yet in a position to claim that the gardens of La Ladera were built by the Indigenous population of Agüimes, there is circumstantial evidence that leads to that conclusion. Not only does the written record indicate that these fields were operational in the years following the 1478 invasion, but the study of

the landscape also shows that their design and management was different from that of the rest of the Vega and contrary to the common practices of Iberian settlers. Additionally, the location and toponymy of the fields at the lower end of La Ladera point to a direct link between the colonial gardens and the pre-Hispanic past. These plots were known as El Hornillo in the mid-sixteenth century (AHPLP 1561–67, L.2484:192r; Rodríguez and García-Correa 2014:55–56, 266, 305), a term used by the Spaniards to describe Canarian cave settlements and burials –likening them to dovecotes or honeycombs– and its survival as a toponym has been linked to the presence of Indigenous sites in other parts of Gran Canaria (Pérez 2010:364–365, 2017:142–143; Trapero 1999:242). Incidentally, there are a dozen artificial caves and modified natural caverns on the cliffs below El Hornillo of Agüimes –at Las Pavonas and Risco Gracia– where traces of lithic industry, mollusks, and pottery have been found, according to the Carta Arqueológica Insular of 2005. If the caves of El Hornillo were part of the Indigenous settlement network of Agüimes, this would place the fields of La Ladera between them, the processing outdoor spaces of San Antón and the dwellings documented in the town center (see Fig. 3). Such closeness between farming fields and habitation structures might be a marker of agricultural intensification, since it would have enabled farmers to monitor their crops closely and manure their plots more frequently (Jones 2005; Van der Veen 2005). This is congruent with the conclusion reached by archeologists through the analysis of carpological remains that the Indigenous Canarians practiced intensive forms of agriculture (Morales 2006:247–248, 304–305).

All the evidence presented above points to the sixteenth-century gardens of La Ladera being the descendants of the agricultural fields that were farmed by the Indigenous community of Agüimes before the invasion of 1478. However, further archeological research is needed to go beyond the earliest written records and ascertain whether the plots of La Ladera were built by the Canarians and whether they were irrigated before the Castilian occupation, or if this was a modification introduced by the first European planters.

The Woad Plantation of Temisas

The hamlet of Temisas consists of three clusters of buildings or "neighborhoods" (*barrios*): Barrio del Medio, where the parish church was built in 1720, Barrio del Henchidero, and Barrio del Callejón (Fig. 4). Until the modern road was constructed in the early-twentieth century, going from Temisas to the municipal capital of Agüimes was an arduous job, which rendered it a relatively isolated area (Sánchez 2002:56–57). The remote location of Temisas and the very slow rate at which its population grew until the mid-eighteenth century led to the conclusion that it was colonized at a comparatively late date and that most of its settlers were humble peasants and shepherds looking for land to feed themselves and produce foodstuff for the insular markets (Santana 2001:127; Suárez and Quintana 2003:82, 131, 741–742). However, the sixteenth-century notarial record not only shows that Temisas was colonized in the wake of the Castilian invasion, but also that its fields were used to produce cash crops for export to European markets from the very beginning.

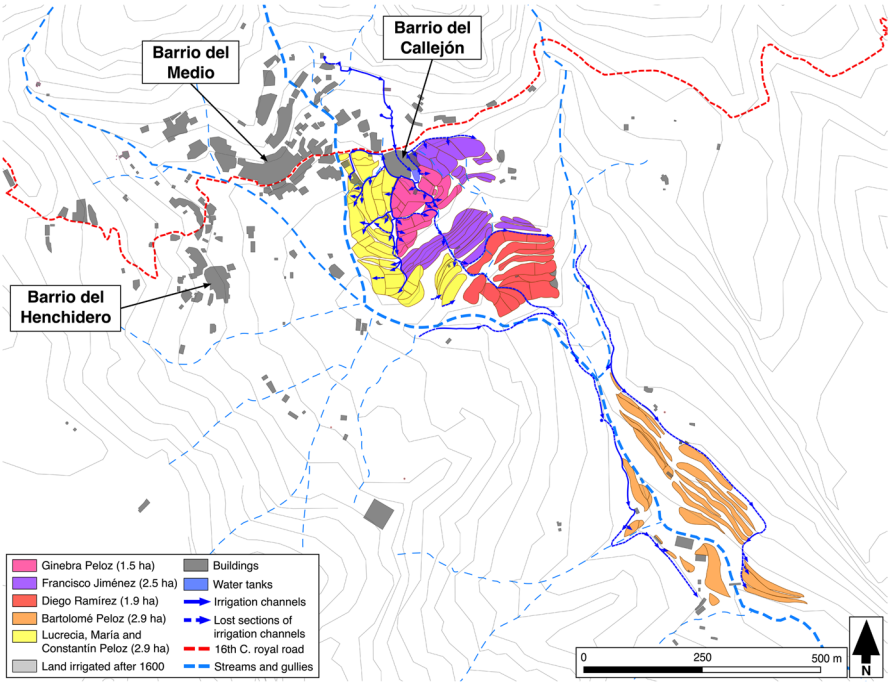

Fig. 4 The fragmentation of the estate of Temisas around 1570

The first reference to the colonial settlement of Temisas dates back to 1514, when one Pedro Castellanos sold an estate of irrigated land to his son-in-law, Honorato Peloz (AMC 1514–1750, L.10, doc. 34; see also Rodríguez and García-Correa 2014:319–320; Sánchez 2016:418). The origins of Castellanos' estate are obscure, but it seems likely that it was granted to him by either the governor of Gran Canaria or the bishop of the Canaries when he arrived in the island sometime in the 1490s (Rodríguez and García-Correa 2014:27–28). The sales letter offers no information about the size of the property, but it vaguely mentions its boundaries and the fact that it included a woad plantation with a factory, four enslaved Africans and some draught animals. Woad (*Isatis tinctoria*) was used to produce indigo dyes and it was one of the main commercial crops introduced by Europeans into Macaronesia in the fifteenth and sixteenth centuries. Its production was particularly important in the Portuguese colony of the Azores and it was also extensively planted in Madeira and the Canaries, although its cultivation seems to have quickly declined in the latter during the sixteenth century (Casado 1990; Da Rocha 1981; Frutuoso 1998, L. I:59, L. IV:260–261, L. VI:112–114).

The woad plantation of Temisas stopped working sometime between 1519 –when the last reference to the factory was registered (Camacho 1961:19)– and the 1540s, when the earliest complete notarial records for Agüimes start. Until now, the exact location and size of the plantation, as well as the site of the earliest colonial settlement, remained unknown. It had been assumed that the first European colonists

had established themselves in Barrio del Medio, today's town center. It seemed the obvious choice because this is where the eighteenth-century parish church stands, it is located directly below the town's main water source and it is crossed by the old royal road to Tirajana (Sánchez 2002:51). But the analysis of the written record and the modern landscape has demonstrated that the earliest colonial settlement and its gardens were further to the east, in the area of El Juncal Alto, around El Callejón (see Fig. 4).

In the mid-twentieth century, the irrigated fields of Temisas added up to around 32 ha and they were sourced by five independent hydraulic systems with different irrigation communities and rules. The systems of El Juncal Alto and La Longuera were the largest and the first to be explicitly mentioned in the written sources (Sánchez 2002:24 and 79). The other three –Las Cuevas, Hoya de la Cruz and La Sorrapada– were smaller and they feature little in the historical record. As said, the sales letter from 1514 only included vague references to the boundaries of Pedro Castellanos' estate. But later notarial documents recorded its progressive fragmentation among the heirs of Castellanos, providing enough data about the surface area and boundaries of plots to gauge the extension of the irrigated fields of Temisas in 1570 (AHDDC 1764–1874:13r and 41r-42v; AHPLP 1545-53, L.2484:18r, 44r; AHPLP 1561-67 L. 2484:178r; AHPLP 1567, L.731:6; AHPLP 1568, L.731:111; AHPLP 1569, L.731:72; , AHPLP 1590–98, L.2487:101v-103v, 215r-219r, 213r; Rodríguez and García-Correa 2014:35, 244, 247, 268, 304). By then, the plots owned by the heirs of Castellanos –or the individuals who had bought their property– amounted to 11.6 ha, which were equivalent to exactly eight of the standard lots of land used during the allotments of the late-fifteenth century (see Fig. 4). The fact that the total area of the irrigated fields of Temisas amounted to a multiple of the standard units employed by the allotment officials, suggests that they might have been granted to Castellanos as a block in the 1490s, rather than having been progressively enlarged afterwards.

The same notarial documents that registered the dissolution of the estate of Temisas, have also allowed us to locate the woad plantation. Although it disappears from the written record after 1519, the toponym survived and it was used again in 1592 by the great-granddaughter of Pedro Castellanos, Clara Ramírez, who sold a small estate in Temisas known as Ingenio Quemado – "Burned Factory" (AHPLP 1590–98, L.2487:218v). The name suggests that the plantation and its factory had been located within the fields of Clara Ramírez and they had burned down in the second quarter of the sixteenth century. The sales letter from 1592 offers a description of the property's boundaries, allowing us to identify it as a part of the area still known as Los Ramírez that measured 1.6 ha (Fig. 5). It is likely that the woad mill was located somewhere within the plantation –as the toponym suggests– but some of the other infrastructure used to transform the plant into dye might have been located in El Callejón, next to the water tank of El Juncal Alto and the first colonial houses of Temisas (AHPLP 1561–67, L.2484:178r; AHPLP 1567, L.731:6; AHPLP 1568, L.731:111; AHPLP 1569, L.731:72; Rodríguez and García-Correa 2014:244).

Thus, Temisas was settled in the very early days of the colonial history of Gran Canaria, more or less at the same time as Agüimes. The first colonists of

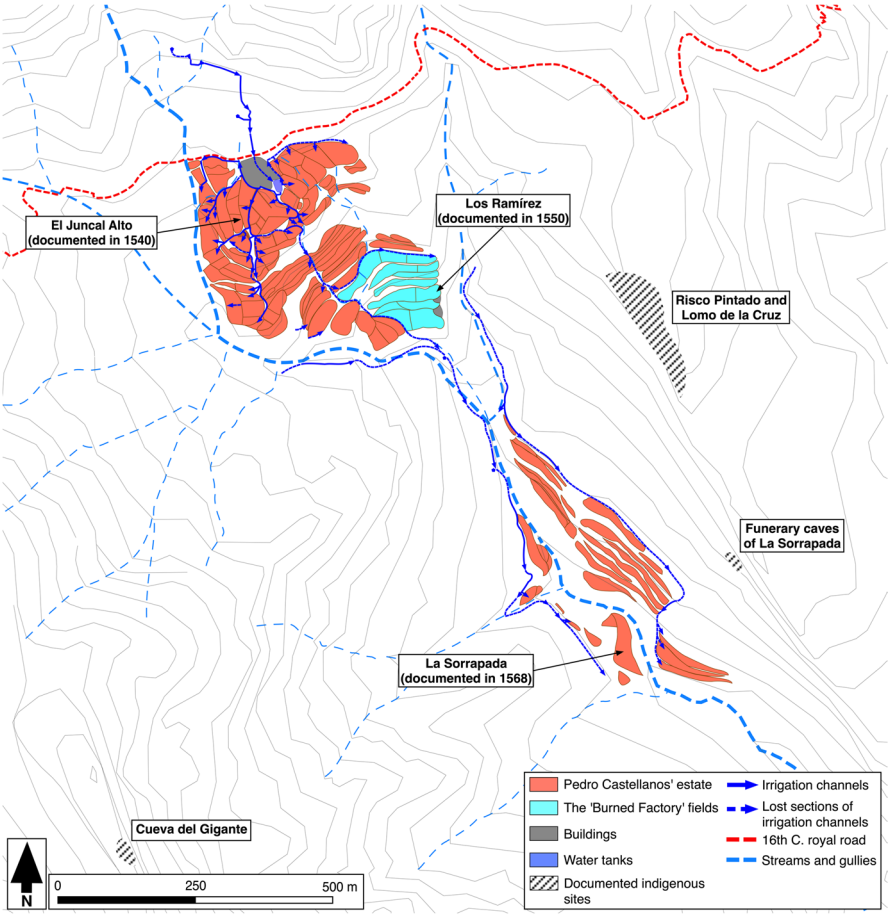

Fig. 5 Location of the woad plantation and the main Indigenous archaeological sites of Temisas

the area, although few in number, were not poor farmers, but entrepreneurs who owned enslaved African slaves and relocated there to produce high-value cash crops for export to European markets. As in Agüimes, more research is required to determine whether Pedro Castellanos placed his woad plantation on fields built by the same people who stored their crops in the granaries of Risco Pintado. Nevertheless, it seems likely. The fact that the woad plantation was located at the lower end of Los Ramírez implies that –at the very least– the 8.7 ha of irrigated land that lie above them had already been terraced by 1514, since they form a continuous block (see Fig. 5). It is rather unlikely that Castellanos and his family were able to build all these from scratch in less than 20 years, even if they owned several enslaved Africans and employed additional free labor.

Ex Nihilo?

The study of the archival sources and the modern agricultural landscapes and practices has allowed us to identify the oldest colonial plots within the modern gardens of Agüimes and Temisas. These were owned by some of the earliest settlers of the lordship and there is little doubt that they were operational shortly after the occupation of Gran Canaria. However, the loss of most of the allotment records and the dearth of notarial documents for the first decades after the invasion preclude us from going any further back in time. Studying the management of these fields prior to the 1500s will require the implementation of different techniques, such as the systematic collection of surface finds, the excavation of test pits and soil sampling, which are still lacking. At the moment, we cannot categorically claim that the first colonial farmlands of Agüimes and Temisas were the lands that had been seized from the Indigenous population in the late-fifteenth century. That said, the pre-Hispanic origin of these fields is the best explanation we can provide for the initial choices made by the European settlers.

The selection of Agüimes and Temisas as cash-cropping centers in the 1480s and 1490s proved somewhat uncomfortable for settlers soon afterwards. The woad plantation of Pedro Castellanos was located in a part of the island that was still regarded as remote in modern times, which must have significantly increased transportation costs. It seems unlikely that Castellanos came to Temisas looking for specific ecological conditions, since woad –unlike sugar cane– can grow on relatively poor soils with a limited water supply (Guarino et al. 2000:398; Sales et al. 2006:37–38). It would have been fairly easy for him to find suitable spots much closer to Agüimes and the main coastal towns, such as El Carrizal (Ingenio), where he already owned two woad factories and some fields in 1514 (AMC 1514–1750, L.10, doc. 34:2r-2v). But the incongruence between the initial choices made by settlers and their later needs is even more apparent in the Vega of Agüimes. As has been previously explained, the design of its core fields seems to have obeyed different principles than the rest of the Vega. To supersede the limitations it imposed on field expansion, settlers built two new hydraulic systems that allowed them to lead water away from Guayadeque Gully and to quickly increase the irrigated surface area –at least, from 12 to 76 ha by 1579. At the exact same time, colonists built hundreds of hectares of irrigated farmland on the other side of Guayadeque, around the sugar factory of Ingenio and in El Carrizal. Here, settlers seem to have found less limitations for enlarging their hydraulic systems and some of them voiced their dissatisfaction with the location of the lordship's capital in Agüimes. In 1530, a group of inhabitants of Ingenio argued for the transfer of the parish church to their side of the gully. They claimed that Agüimes was still scarcely populated 50 years after the conquest because it "was built in a harsh, dry and windy place," and that it would be wiser to relocate the 15 households that lived there closer to the sugar factory and the well-watered cane fields of Aguatona (APA–SS 1506–1627:75r-77v; Suárez and Quintana 2003:237, 724, 1247–1248).

Why did the first European colonists choose such unfavorable locations for their earliest plantations? The most reasonable explanation is that they were looking for

pre-existing Indigenous farmlands that could be used for producing foodstuff and, most importantly, commercial crops to start yielding returns for the investments made during the invasion. The availability of already terraced and ploughed land and –at least in some cases– irrigation channels would have considerably cut the expenses of creating sugar, woad, and vine plantations, reducing the required labor and time inputs. This could give an explanation as to why the sugar industry of Gran Canaria flourished much faster than that of Portuguese Madeira. It took 20 years between the introduction of the cane into Madeira and the beginning of regular exports in the 1450s because settlers had to build the entire hydraulic infrastructure of the island de novo (Moore 2000:417). The first sugar plantations in Gran Canaria, on the other hand, were already operational by 1483 and they were subject to tithe payments two years later, although military operations in the center of the island continued well into 1485 (Fernández-Armesto 2003:14, 80, 129; Gambín 2014:247–251). The availability of Indigenous fields and irrigation channels would have greatly cheapened initial investments, allowing planters to start producing immediately at a relatively low cost and granting them an advantage that was not available in uninhabited Madeira. Utilizing Indigenous infrastructure to ensure the viability of the colonial enterprise is, in fact, well documented in Gran Canaria in the case of caves and houses, which were either occupied after the invasion or torn down to reuse their building materials in the construction of new ones (Onrubia 2003:210, 216, 227, 359; Quintana 1995, 2008). Furthermore, recent archeological research at Cruz de la Esquina (Artenara, Gran Canaria) suggests that settlers might have also reused Indigenous collective granaries well into the seventeenth century (Morales et al. 2021).

The contradiction between the initial appropriation of Indigenous fields and settlers' subsequent need to break free from the limitations they imposed on their activities has been well documented in Iberia and the Balearic Islands. There, the Christian colonization of al-Andalus was spearheaded by the systematic appropriation and repurposing of pre-existing infrastructures –fields, irrigation channels, dwellings, and fortifications– that had been built by the local Muslim inhabitants. However, their farming areas were designed to remain relatively small, since they incorporated rigid boundaries that hampered their expansion. It has been proposed that this was an strategy aimed at maintaining an equilibrium between the size of cultivated and uncultivated areas, and between the amount of land being irrigated and the waterflow available, to ensure the replenishment of resources and the reproduction of the communities that depended on them (Barceló and Retamero 2005; Retamero 2006, 2008, forthcoming). Once Christian settlers seized them, they invested large amounts of money and labor to break the limits of the original Andalusi design and expand hydraulic systems to irrigate new land or to accommodate more watermills (Kirchner 2009, 2012; Torró 2009, 2012; Torró and Esquilache 2018; Virgili and Kirchner 2019).

A similar process might have taken place in Gran Canaria after the Castilian invasion of 1478–83. Although the Canarians transformed their environment significantly during the previous millennium, they did not engage in sequences of uninterrupted land clearing and field construction; nor did they irreversibly destabilize local ecosystems (Morales 2006:304–305; Morales et al. 2007, 2009), like the Europeans later did after a few decades of intensive sugar monocropping (Smith 2010; Vieira

2004). Likewise, what we know about Indigenous agricultural practices suggests that they prioritized risk-reduction over strict product volume by implementing strategies such as storing unthreshed grains and legumes (Henríquez et al. 2019, 2020; Morales et al. 2014; Morales and Rodríguez 2014). These behaviors are consistent with the idea that the Canarians –like the Andalusi– might have designed "closed" field and hydraulic systems, aimed at ensuring their long-term sustainability and the reproduction of the community rather than the accumulation of agricultural output.

The methodology employed in Agüimes and Temisas does not allow us neither to unambiguously claim that the earliest colonial fields were built by the Indigenous population nor to infer how they were managed prior to the Castilian invasion. Nonetheless, it has enabled us to delineate the foundational core of the modern gardens that surround both towns, whose origins date back to the very early days of the European colonization of Gran Canaria. And this is the necessary first step to finally answer the conundrum of where and how the Indigenous Canarians farmed and what happened to their agricultural fields after 1478. Presently, the most likely answer is that the Indigenous farmlands lie at the heart of the modern gardens of Gran Canaria and, in some cases, they have remained in use until today, hidden in plain sight. Coupled with the implementation of enslaved labor, these fields were the key stepping stone that ensured the success of the whole colonial endeavor. The land that had allowed for the survival of the local population for thousands of years became the first plantations that enabled settlers to quickly profit from the occupation of the island and the violent subjugation, enslavement, and decimation of its inhabitants. The contradiction between the constrained design of the Indigenous farmlands and the tendency towards expansion of the colonial agricultural system was the price settlers paid for the appropriation of generations' worth of human labor embedded in the landscape.

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