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Local Development

The forest, the sea and the lagoon: an analysis of local development scenarios in Ca' Roman, Venice

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1 Introduction

1.1 Objectives

The island of Ca' Roman, at the southern end of the Lidi di Venezia, has an intrinsic value from a naturalistic point of view due to the variety of habitats and species it hosts, its geomorphological peculiarities and its position as a borderland between the lagoon and the sea. In particular, the island has a forest of anthropogenic origin that is undergoing a process of progressive re-naturalisation: this process involves abandoned buildings of various types and uses that encounter the local vegetation and fauna, triggering unusual dynamics between what we define as human and what is not.

This thesis considers the use of land and resources in Ca' Roman from the early 20th century to the present day through a geo-historical analysis aimed at identifying changes over time and the impact that the development models adopted have had on the territory. In particular, the focus is put on a central element of Ca' Roman, its forest, exploring the relations between the human and the "sylvan" through an analysis of two development scenarios taking place in the Venice Lagoon location: the Recovery Plan for the Former Colony of Ca' Roman and the Compensation Plan for the MoSE works (the so called "*Piano Europa*") – now updated to the Ca' Roman Fort Recovery Plan.

The purpose of this research is to identify guidelines for the implementation of local development programmes capable of taking into consideration the uniqueness of the Venice Lagoon territory from an ecological, political and socio-cultural point of view through a participatory analysis of the development scenarios currently underway in the Ca' Roman forest. The research, based on the discussion with the main local stakeholders and the examination of local press articles, allows to identify the critical factors of the development programmes, insofar as they are mainly configured as operations for the requalification of the island's building stock through intervention plans aimed at increasing its economic and real estate value to the detriment of its environmental heritage and the local communities, which are excluded from the decision-making process. Through such an analysis, therefore, it is possible to identify the forest potential and understand whether it is compatible with future local development projects capable of revitalising a historically underused area while respecting the delicate ecosystem and the lagoon culture.

The analysis of the two scenarios is based on the most relevant works in the literature on local development and land regeneration. It is carried out through a participatory approach aimed at involving the main stakeholders and members of the local community to express their opinions about the scenarios through a series of semi-structured interviews. In addition, the main local media were surveyed in order to identify the collective perception of the regeneration plans.

The thesis is structured in two main parts. In the first part, the historical and geographical context of Ca' Roman are considered separately in Chapter 2 in order to identify which historical and natural processes have contributed to the current conformation of the island and its frontier location between the communities of Pellestrina and Chioggia. The analysis focuses on the events of the last century, as they were crucial for the formation of the main geomorphological elements - such as the backdunal pine forest and the dune system - and the construction of the anthropic structures on the island. Furthermore, a remark is given to the value from an ecological point of view of the Ca' Roman site within the lagoon system, as it presents habitats of Communitarian relevance for the nesting of migratory birds. Finally, Chapter 3 considers the key principles of local development, in particular its participatory aspects and the non-quantitative, place-based approach. In addition, a reflection on the concept of territorial regeneration and various interpretations of the same is given.

The second part considers the Ca' Roman forest from a local development and land regeneration perspective. After examining the main characteristics of the lagoon forest, Chapter 5 explores the relationship between the human and the "sylvan" by studying the dynamics established between the abandoned buildings at Ca' Roman and the forest itself, suggesting new insights from the perspective of local development and land regeneration. Chapter 6 analyses the development scenarios of the Recovery Plan for the former Ca' Roman Colony and the Europa Plan. These scenarios consist in the recovery of abandoned buildings within the perimeter of the forest, potentially entailing a significant impact on the ecological dynamics of Ca' Roman, which is a site of fundamental importance for the entire lagoon ecosystem. Furthermore, the lack of a participatory process to involve the local population in the decision-making process has led to a significant slowdown in the intervention programmes. In Chapter 7, local stakeholders' opinions on the scenarios themselves are reported in order to explore with them the potential contribution they could have made to the projects if there had been a participatory process. Finally, Chapter 8 discusses the results obtained from the research, especially comparing the statements of the interviewed actors with the reconstructions of the redevelopment programmes through press articles in the light of two key theoretical principles of local development - participation and place-based approach. In this discussion, a proposal for a theory of local development and territorial

regeneration adapted to the Ca' Roman context is elaborated. Furthermore, the main critical aspects of the analysed scenarios are identified, as well as the potential of the Ca' Roman forest in a local development perspective that is respectful of the unique characteristics of a pinewood located in the Venice Lagoon ecosystem.

1.2 State of the art

The island of Ca' Roman, being an uninhabited locality in the Venetian Lagoon, is a scarcely investigated reality from a geographical and social perspective, as most of the studies on it focus on its peculiarities from an ecological, botanical (Sburlino et al. 2013) and faunistic point of view, especially regarding ornithological aspects (Borgo et al. 2019). In fact, the area is a Natura 2000 European conservation network site and an Oasis managed by the *Lega Italiana Protezione Uccelli* (LIPU - Italian League for the Protection of Birds): it is therefore possible to list numerous works concerning studies on migratory birds, such as Sighele et al. (2020). Moreover, the dune system that distinguishes the eastern side of the island is a habitat of community importance (Sistilli 2016). Other relevant research focuses on the impacts of the MoSE on local ecosystem stability (Zanella 2017; Fogarin et al. 2019).

As far as the issues of local development and territorial regeneration are concerned, direct references to Ca' Roman are absent in the literature. Much of the research in fact focuses on the most important centres of the lagoon, especially Venice (Musu 2001). Furthermore, research that considers the value of the Ca' Roman forest for its relational character with the anthropic structures present on the island is absent. Lastly, the forest has never been studied as an independent ecological entity, but as an element that is part of the broader ensemble of the Upper Adriatic pinewoods (Campagnolo et al. 2010): detailed analyses on its ecological value and the uses that local communities make of it are therefore absent.

The thesis can therefore provide an original contribution to the literature, as it would add to the already vast body of reflections on local development and territorial regeneration a case situated in the context of the Venice Lagoon, in a location of high environmental value. The research could therefore provide a new perspective on the territorial reality of Ca' Roman, identifying the socio-cultural and political relations that intersect in an area that is only studied as a natural oasis. Furthermore, the forest of Ca' Roman constitutes an interesting case for its geographical position, being located on a narrow shoreline between the sea and the lagoon, and for the buildings of high symbolic value - such as the former colony of the Canossian Sisters - and historical value - such as Fort Ca' Roman, the Barbarigo battery and the Second World War bunkers - that are located within

its perimeter. An analysis of the unusual relationships that can arise between vegetation and abandoned structures can provide stimulating insights into what is meant by local, sustainable and inclusive development.

1.3 Progetto di Ricerca di Rilevante Interesse Nazionale "SYLVA"

The research is part of the Progetto di Ricerca di Rilevante Interesse Nazionale (PRIN - Research Project of Significant National Interest) "SYLVA*: Ripensare la selva. Verso una nuova alleanza tra biologico e artefatto, natura e società, selvatichezza e umanità*" (Miur 2017). The project aims to study spatiality between what is intended as "civil" and what is meant for "natural", not by contrasting the two terms, but rather by showing their hybridization. The "sylvan" is studied as transitional position between natural and "civil", in which the two terms do not arise to be an alternative to one another. This project is about understanding the natural dimension of the urban space, including animals, plants and abandoned artefacts. Abandonment indeed is a relevant topic of the research programme, as «the "drift" of those artefacts that lose function and grow old, also gives rise to a semantic displacement of architecture, not sought-after but efficient» (IUAV 2017).

All the materials produced during the research are poured into the central product of the project: an «experiential guide to the sylvan» (*Ibidem*). The guide is declined in the four sample cities (Rome, Venice, Genoa, Padua) according to a model replicable elsewhere (Miur 2017). The project aim is to provide an operational tool «to make explicit new ways of living with/in the "sylvan" and to direct the management of spaces by clarifying the ambiguity of the relationship between controlled and wild space» (IUAV 2017). The core goal of the research is to analyse by multiple perspectives - urban-architectural, geo-historical, geo-semiotic, socio-demographic, economic, anthropological-cultural and linguistic - the urbanized environment as a space composed by "sylvan fragments" that are "wild" in the urban landscape.

2 Local context. A geohistorical analysis

Ca' Roman is set in a unique environmental and socio-cultural context, which is the result of the deep connection between the lagoon, the mainland and the sea. In order to fully understand the dynamics occurring on the island, it is necessary to proceed with an analysis of its historical and geographical context that outlines its transformation over time and identifies the most important anthropic and natural elements. Indeed, since, according to geographer Lucio Gambi, the natural environment is not a fixed entity, but it is also the product of human actions (which are in turn guided by values that change over time) (Gambi 1956), it is necessary to study the reciprocal interactions between man and the environment and the anthropic impacts on past and present ecosystems. An effective geo-historical analysis, therefore, must consider the study of the landscape, as «it is an instrumental operation that leads to understanding when and how and by what kind of processes the material reality within which we live and work was formed» (Gambi 1999).

In this chapter, the historical analysis of the human impacts on the Venice Lagoon, as well as the history of Pellestrina and Ca' Roman is considered in section 2.1. Then, the description of the environmental relevance of the Venice Lagoon and the main geomorphological and anthropic elements in Ca' Roman are the objects of sections 2.2 and 2.3.

2.1 Historical context

To better understand the social and environmental dynamics occurring in Ca' Roman, it is important to acknowledge the influence of the context the island is set in. First, an analysis of the human-oriented transformation of the Venice Lagoon is done, in order to identify the anthropic impacts on the geomorphological and hydrological structure of the lagoon environment. Then, the major historical events occurred in Ca' Roman are analysed, as they left important landmarks which are defining what is the site today, mostly its environmental uniqueness and its cultural value.

2.1.1 The human management of the Venice Lagoon

2.1.1.1 The Venice Lagoon formation

The Venice Lagoon was created about six thousand years ago, after the last Ice Age (Bonneau 2002), as the result of a slow invasion of sea water of the landmass, which gradually rose in level since the last glaciation. The mainland was crossed by rivers and protected by a system of littoral

dunes formed by the combined action of wave currents and river transportation (Comune di Venezia 2012). Indeed, the Lido and Pellestrina barrier islands were created by a process of accumulation of the sediments carried by the rivers north of the lagoon (Bonneau 2002). The presence of these dunes prevented the water to flow seawards and increased the difficulty of drainage, so that in the areas behind the line of maximum marine regression, swamps and peat bogs were formed due to the flooding and stagnation of freshwater. After the maximum marine regression, a phase of sea retreat began from the Upper Atlantic. The further migration of the coastline was then probably favoured by the contribution of sediment from the Brenta River and, further south, the Adige and Po Rivers (Bondesan 2009). The steady progress over time of the submergence of the land adjacent to the sea and the formation of the lagoon is evidenced by the discovery at varying depths of artefacts from various prehistoric civilisations, as well as archaeological remains from Roman times (Cavazzoni 1995).

2.1.1.2 Human interventions in the Venice Lagoon in ancient history and during the Serenissima Republic

The Venice Lagoon can be considered a human-oriented ecosystem, as its landscape has undergone strong changes in the Anthropocene era (Cima and Ballarin 2013). Indeed, the anthropic presence in the lagoon has been essential for its transformation in the current environment, as the many human interventions occurred during the last 2,000 years shaped its landscape and geomorphological elements. Indeed, the lagoon environment offered many advantages to past local settlements, as it allowed an easy way to move people and goods, offered a food production site and granted a strategical military position for defensive purposes.

Although the lagoon was inhabited since the prehistoric era[1], the first source regarding structures built to protect the lagoon from extreme marine events date back to the end of Roman period[2]. One of the most mentioned sources is the "Letter from Cassiodorus to the Maritime Tribunes", dated around 537 AD, which describes an ancient tradition of the inhabitants of the lagoon to consolidate the ground with woven wicker (De Biasi 1982). Although these first alterations of the environment, it is possible to identify the Venice Lagoon turning point at the end of the 7th century AD, with the constitution of the Serenissima Repubblica of Venice. Indeed, starting from that period, the

[1] One of the most important pre-Roman centres was Altinum, a town founded by the Veneti populations around the VIII century B.C. (Gambacurta 2011).

[2] The Venice Lagoon had different Roman settlements, like *Clodia* (the current Chioggia), on its inland territories which were part of the *via* Popilia, a Roman commercial route which linked the ports of Ravenna to the south and Altino to the north (Semenzato 1992). Although this important presence, the lagoon and its islands were colonised with permanent settlements from the V-VI century A.D., when Roman peoples fleeing the barbarian invasions refuged there: in that period, the major lagoon centres were born, such as Torcello, Murano, Burano and Mazzorbo.

urbanization and regulation of the lagoon environment radically modified its natural evolution (Fogarin 2019), causing what has been defined as a «shift from the Holocene period to the Anthropocene social-ecological system states» (Renaud et al. 2013).

At the beginning of the 14th century, Venice began to intervene for the defence of its barrier islands. Initially, simple defences were built, consisting in earth and sand structures. Later, *palade* - palisades built with rows of oak poles, welded at the bottom by a stone casting - were constructed with stone jetties jutting out into the sea (De Biasi 1982). To consolidate the shoreline of the barrier islands, tamarisk trees were planted to reduce the onshore motion. In 1501, the Council of Ten instituted the Magistrate of the Sages of the Waters, and in 1505 the figure of the Magistrate of the Waters was created - who had the task of safeguarding the integrity of the lagoon environment against marine erosion and the silting up due to sediment accumulation (Da Mosto 1937). Indeed, in the 14th century Venetians became concerned that the sediment being carried into the lagoon from the rivers would end up obstructing the three *bocche di porto*[3] (Bonneau 2002). The Serenissima Republic undertook the work of digging new canals to move rivers' mouths out of the lagoon, thus avoiding the discharge of sediment into its basin. To prevent the silting up of the lagoon, the main watercourses were diverted: in 1540 the Brenta river was deviated and made to flow at Brondolo - a location south of Chioggia - through an artificial canal; in 1684, following previous digging and canalisation works, the Sile River was made to flow at Porto Cortellazzo (De Biasi 1982). The diversion of these rivers brought to the formation of marshes and mudflats called "*barene*" – which have now an important ecological role, since they are home for many species of flora and fauna (Bonneau 2002).

2.1.1.3 The construction of the *murazzi*

The Venetian state invested conspicuous amount of money to strengthen the harbour inlets of Lido, Malamocco and Chioggia. Since these infrastructures, however, were periodically damaged by extreme sea events[4], it was decided to fortify the coastal shores with a «very strong and perpetual wall» (Martinelli 1687). In 1716, the cosmographer of the Republic Father Vincenzo Coronelli proposed the construction of a wall of stone blocks towards the sea to replace the previous *palade* in order to defend not only the barrier islands, but the entire lagoon and Venice itself (Filiasi 1796). In 1752, works began on the construction of the *murazzi*, a system of dams 17-kilometres-long, led by the mathematician Bernardino Zendrini. The construction of the *murazzi* allowed for greater control

[3] The Venice Lagoon has three inlets or mouths, called *bocche di porto*, which allows the flow of water between the sea and the lagoon.

[4] The Venice Lagoon is periodically affected by high water phenomena, called also *acqua alta*, due to tidal cycles.

of sea storms and a reduction in high water phenomena; however, the defences were damaged by the violent storms of 1825 and 1966 (FAI 2020).

Later, other interventions were made to better control the flow of the water between the sea and the lagoon. Indeed, in order to create larger and more defined entrances to the city's port (Bonneau 2002), the natural inlets of Lido, Malamocco and Chioggia were radically reshaped by the construction of long jetties between 1808 and 1933 (Fontolan 2007). Also, the inlets were dredged and deepened from 5m to 15m. These interventions procured a consequent increase in tidal flow and erosive processes in the whole lagoon, modifying greatly its hydrological and geomorphological processes (Tambroni and Seminara, 2006).

2.1.1.4 Commercial canals

These operations proceeded in parallel with a series of works aimed at allowing the transit of big commercial vessels, which were prevented to the entrance in the lagoon because of their dimensions (D'Alpaos 2010). Therefore, for commercial reasons the seabed of the Venice Lagoon has been modified through the excavation of several wide-size canals, like the canals of Santo Spirito (17th century), Vittorio Emanuele III (1920-25) and the Malamocco-Marghera - also called *canale dei petroli*, dug between the 1964 and 1968 (Porto di Venezia, 2022b).

2.1.1.5 The MoSE Project

Since the occurrences of *acqua alta* have been increasing over time in the last 50 years, the Municipality of Venice has developed a plan to protect the city from these high tides. Indeed, after the flooding of the 4th of November 1966, which destroyed the *murazzo* of Pellestrina and procured huge damages, the construction of a definitive infrastructure to face high tides started to be debated in the public arena. In the following years, the MoSE (*Modulo Sperimentale Elettromeccanico* – Electro-Mechanic Experimental Module) project was commissioned as research aimed at defending the city of Venice and the other islands in the lagoon from extreme flood events. Researchers designed a system to protect Venice from these tides by building 78 mobile floodgates laying at the bottom of the three inlets of Lido, Malamocco and Chioggia (Bonneau 2002).

The still ongoing construction (started in 2003 and supposed to be concluded in 2023) of the system of mobile barriers is one of the major engineering interventions in the Venice Lagoon (Trincardi et al., 2016). The mobile barriers represent a paradigmatic example of grey infrastructure in response to flooding in view of global mean sea level rise (Perkins et al., 2015). Although the changes caused by grey infrastructure surrounding ecosystems have not yet been fully quantified and documented in

most cases all over the world (Powell et al., 2018), some negative impacts on the Venice Lagoon ecological and hydrological systems have already been identified (Fogarin 2019).

2.1.2 Ca’ Roman

2.1.2.1 History of Ca’ Roman, from ancient times to the 19th century

The scarce historical evidence pertaining to the locality of Ca' Roman shows that it was not involved in particularly important historical events, as its territory has never been permanently inhabited. Being an appendix of Pellestrina, its main historical past can be traced back to that of the island itself. Nevertheless, Ca' Roman was an important strategic and defensive site, as its geographical position made it an obligatory point of passage to the lagoon through the Chioggia inlet.

During the Roman age, the location consisted mainly of a passing junction for trade routes to Altino and Grado, as evidenced by the presence of traces of an ancient Roman *alzaia* road (Giacomazzo 2022). During the Venetian period, Ca' Roman was included in the fortification system of the Serenissima Republic. In the 18th century, the construction of the *murazzi* directly involved Ca' Roman, which was connected to Pellestrina through this Istrian stone defence work (De Biasi 1982). In 1797, Fort Ca' Roman was erected by the Austrian army occupying the island (Francese 2011).

The lido periodically underwent alterations in its geomorphological structure: evidence of this can be seen in events such the 1686 sea storm which destroyed a large part of the shore (De Biasi 1982). At the beginning of the 20th century, Ca' Roman was a narrow strip of land of a few dozen metres wide separating the lagoon from the sea.

2.1.2.2 Summer colony, LIPU Oasis and MoSE

In 1923 a summer colony was founded by professor Alberto Graziani, which operated for 20 years as a marine village hosting children and women during the summer season. In 1941, the seaside colony was handed over to the Canossian Sisters, who ran the centre until 1990 and expanded the colony with new buildings. In 1943, the island was occupied by the German army, which expanded the fortification system of Ca’ Roman by building concrete bunkers and other military infrastructures. Since the 1990s, the northern part of the colony’s residential complex has been managed by the voluntary association “*Villaggio Marino di Ca' Roman*”, which provides accommodation for people with disabilities and families during the summer months.

The history of Ca' Roman over the past 40 years is deeply intertwined with that of the *Lega Italiana Protezione Uccelli* (LIPU). Indeed, since the 1980s, the local section of LIPU has followed the island's naturalistic and conservationist acknowledgement, promoting the protection of nesting bird species and the conservation of the local environment (Antinori et al. 2018). As the current local LIPU manager L. Mamprin[5] recalls, at that time, the dune system that characterises the coastal strip was in a state of advanced degradation, as it was used by the local population as a place for recreation and sports. In a delicate ecosystem such as the dune system, the spread of practices such as motocross races had an enormous impact (Mamprin 2022). For this reason, in 1986 LIPU requested the establishment of an "Oasis for the protection of the fauna" to the Municipality and Province of Venice, and in 1988 local authorities granted the request by entrusting the management of the Oasis to LIPU (LIPU 2022).

Thanks to the establishment of the Oasis and the agreements and conventions between LIPU and the Municipality and Province of Venice, the association has been able to play a significant role in the Ca' Roman area, providing the technical tools for the site's inclusion in the Natura 2000 network in 2004 as a Special Protection Area (SPA) within Biotype IT32523 "Lido di Venezia: coastal biotypes" (Direzione Conservazione della Natura 2008). Natura 2000 is the main instrument of European Union policy for the conservation of biodiversity. It is an ecological network spread across the entire territory of the Union, established under the Habitats Directive 92/43/EEC to ensure the long-term maintenance of threatened or rare natural habitats and species of flora and fauna at Community level (MiTE 2022). The Natura 2000 network is made up of Sites of Community Interest (SCI), identified by Member States in accordance with the Habitats Directive - which are subsequently designated as Special Areas of Conservation (SAC) - and Special Protection Areas (SPA) established under the Birds Directive 2009/147/EC on the conservation of wild birds (Atlante della Laguna 2022). Pursuant to the same directive, the areas of Ca' Roman, Alberoni and San Nicolò were designated in 2018 as Special Areas of Conservation (SAC) (Venice City Council 2022). Subsequently, LIPU requested the establishment of a Regional Nature Reserve with the Municipality and Province of Venice. Following the "Document of Intent between the Province of Venice, Venice Municipality and LIPU for the establishment of a Nature Reserve in the Ca' Roman SCI-SPA area" of 26 October 2012, Ca' Roman is now a Regional Nature Reserve of Local Interest according to Regional Law no. 5 of 16 August 1984 and the resolution of the Venice Province no. 199 of 19 December 2012 (Antinori et al. 2018).

[5] Luca Mamprin is the officer of LIPU Ca' Roman section since 2017.

Over the last 15 years, Ca' Roman has undergone further transformations, mainly due to the construction works of the MoSE mobile barriers at the Chioggia inlet. These works, which took place in the southern part of the island, led to the replacement of the 20th century *diga foranea*, the construction of a harbour shelter and the creation of an artificial island, called *piarda*, on the SW side, formed by sediments from the excavation works (MoSE Venice 2022a). This islet is currently configured as an accumulation of debris and is partly vegetated - mainly with wild grasses and tall weeds (Antinori et al. 2018). At present, Ca' Roman is the object of interest of two intervention plans - the "*Piano di Recupero dell'Ex Colonia di Ca' Roman*" (Consiglio Comunale Venezia 2011) and the plan of compensatory measures for MoSE works (the so-called *Piano Europa*) - that could radically change the morphological order and the modality of fruition of its territory.

2.2 Geographical context

Ca' Roman is the southern appendix of Pellestrina island, the southern barrier island of the Venice Lagoon. It is connected to the north to Pellestrina through the *Murazzi* dam, while to the south it is separated to Sottomarina by the *bocca di porto*, an inlet which is currently hosting the underwater barrier belonging to the MoSE mobile dams system. Eastward, its shoreline and correspondent dune system face the Adriatic Sea, while the west side of the island faces the Venice Lagoon and hosts the Marine Village, the military fortification system and the backdunal forest which is predominantly composed by pinewood.

Indeed, Ca' Roman is a site with both natural and anthropical elements. From a natural point of view, the location is distinguished by a variety of environments due to its unique position between the lagoon and the sea. The most relevant ones are the shoreline, the dune system and the forest composed by pines, holm oaks and thermophilic essences. Furthermore, the island hosts a great faunistic variety – mostly migratory birds which find suitable habitats for nesting. To protect its biodiversity, in 1992 was instituted a LIPU Oasis of 48 hectares (LIPU 2022). In addition, Ca' Roman is included in the Natura 2000 Network, a Europe-wide ecological network that includes Sites of Community Importance (SCI) and Special Protection Areas (SPA), designed to ensure the long-term maintenance of natural habitats and species of flora and fauna that are threatened or rare at the EU community level (EC 2022).

In the island are also present anthropic elements, mostly touristic and military infrastructures, which are partly abandoned. There are no stable residents in the site. The touristic buildings are the "*Villaggio Marino*" and the former summer colony managed by the Canossian sisters. Due to its former strategic relevance, the site hosts several military infrastructures from different ages which were inserted in the old fortification system of the Venice Lagoon, used by both Venetians and the nations which occupied the local area (Austria, France and Germany) to protect Venice and its islands. The most relevant ones are the Fort Ca' Roman (called also "Barbarigo Fort"), the Second World War bunkers built by the Nazis and the Octagon Ca' Roman - a small octagon island positioned south-west. All these anthropic elements interact with the natural environment in multiple ways, which will be further explored in the last section of this research. This paragraph is structured as it follows: first the major characteristics of the Venice Lagoon are described, and then its environmental and conservation value and the role of humans in its management are considered.

2.2.1 The Venice Lagoon

The Venice Lagoon is the largest coastal lagoon in the Mediterranean area. It covers an area of 55,000 hectares along the Adriatic Sea (Scarton 2016). It is separated by the Adriatic Sea by 50 kilometres of sandbars that end with the mouths of the Lido, Malamocco and Chioggia ports, which are the only points that allow the flow of water between the lagoon and the sea (Piazzano 2000). The lagoon is a microtidal environment[6], with a mean tidal range of 0.6 meters (Fogarin 2019). The largest part of its area is the open water body, with a size of nearly 37,000 hectares and a mean depth of 1.1 meters (Soildoro et al. 2010): its seabed is various, since in the lagoon are present shallow bottoms as well as deep channels and tidal flats[7]. The remaining area is constituted by permanently emerged islands (3,800 hectares), many of which hosts human settlements, and tidally inundated saltmarshes called *"barene*" (3,800 hectares), which have an essential role in the hydrological and ecological balance of the lagoon (Scarton 2016). The water salinity concentration shifts from 27‰ to 34‰, with various peaks according to the season as well to the temperature. The climate is temperate, with a mean annual temperature of 14.5 °C and the mean rainfall is 800 mm per year (Solidoro et al. 2010). Between the months of October and April every year, the city of Venice is flooded by exceptionally high tides referred to as the *acqua alta*. Rising global sea levels, normal tide levels for that time of year, increasing winds, and changes in atmospheric pressure are believed to cause these unusually high tides (Bonneau 2002).

The lagoon hosts a complex insular system, constituted by a major island[8] (Venice) and a constellation of smaller islands. The most relevant ones are: Sant'Erasmo, Murano, Vignole, Chioggia, Giudecca, Mazzorbo, Torcello, Burano, Lido di Venezia, Pellestrina and Sottomarina (Comune di Venezia 2019). For its historical and landscape value, the Venice Lagoon has been recognised by UNESCO in 1987, which inserted its whole territory in the World Heritage Sites list (UNESCO 2022).

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[6] A microtidal environment is defined as an environment with a mean tidal range less than 1m (Fogarin 2019). Although this definition, the Venice Lagoon tide, with a mean tidal range of 0.6 m, is one of the highest observed in the whole Mediterranean (Scarton 2016).

[7] The configuration of the lagoon seabed influences the water transit. Indeed, from the 3 inlets the arterial channels branch off, to which the minor waterways – called *ghebi* – are embedded (De Biasi 1982).

[8] It is important to notice that the largest island surface (with 1,154 hectares) is occupied by the *casse di colmata*, three artificial islands which have been built in the Post-war period as a result of the process of excavation of the *Canale dei Petroli*. The construction of the tide boxes has taken away space from the expansion of the tidal wave, affecting the effectiveness of the water exchange. Nonetheless, these islands have now a naturalistic relevance, since they represent biotopes of great importance especially for the presence of rare bird species (Istituto Veneto 2020).

2.2.1.1 Environment and biodiversity

The lagoon has a huge ecological value, since, according to biologist Zenatello, the «Venice Lagoon is the most important waterbird wintering site in Italy» (Zenatello et al. 2014), and one of the most important in the whole Mediterranean (Scarton 2016). As a breeding site, the lagoon hosts significant fractions of several species, such as sandwich tern (*Thalasseus sandvicensis)*, redshank (*Tringa tetanus*), oystercatcher (*Haematopus ostralegus*), Kentish plover (*Charadrius alexandrines*).

To protect this biodiversity, since 1989 the whole lagoon, including a small area on the adjacent mainland and the coastal strip, has been listed as an Important Bird Area (Heath et al. 2000). In 2007, the whole lagoon was declared a Special Protection Area (IT 3250046 Laguna di Venezia), according to the Birds Directive 2009/147/EC (EC 2022). Several wildlife reserves, which were set up by local authorities or non-governmental organisations and where hunting is permanently banned, are scattered throughout the lagoon (Atlante della Laguna 2022). The preservation of these reserves is essential for many waterbirds, since the lagoon provides them habitats suitable to nest. Indeed, the shoreline offers beaches and low-elevation dunes which are appropriate nesting habitats of Kentish plover, oystercatcher and little tern (*Sternula albifrons*). Furthermore, colonies of seabirds (little tern, sandwich tern, common tern *S. hirundo*) and waders (black-winged stilt *H. Himantopus* and redshank) are present in the saltmarshes (Scarton 2016). Then, bushes and trees that cover minor islands are an important nesting spot. Indeed, apart from Venice and a few other major islands, the lagoon includes about 30 small islands that were used by man in previous centuries, but now most of these are completely abandoned and re-vegetated. Over the last 15 years, a few of these have been occupied by colonies of herons - grey heron (*Ardea cinerea*), little egret (*Egretta garzetta*), cattle egret (*Bubulcus ibis*) - and cormorants - pigmy cormorant (*Microcarbo pygmeus*) and cormorant *Phalacrocorax carbo* (Nardelli 2015).

Also human-shaped environments are able to welcome migratory birds. Artificial sites, such as dredge islands and artificial islands (*casse di colmata*), host several thousands of nesting pairs each year, mostly of the yellow-legged gull (*Larus michahellis*), little tern, sandwich tern, avocet (*R. avosetta*), redshank and oystercatcher (Istituto Veneto 2020). Another important human affected environment is the one of the fish valleys, which encompass about 10,000 hectares along the borders of the lagoon. Indeed, the management activities on the fish farms provide suitable habitats for waterbirds, since the mosaic of open bodies of brackish waters, saltmarsh islets, reedbeds and perennially emerged areas (like small woodlots and arable fields) enable their food provision and provide places where to nest (Solidoro et al. 2010).

The lagoon vegetation presents some recurrent features and distributions. The coastilne is populated by species like *Chritmum maritimum* along with *Cakile maritima* and *Xhanthium italicum*, which presents typical associations. Another characteristic species is the *Ammophila arenaria*, which colonises the dunes close to the coastline (Marcello 1959). Saltmarshes, which are regularly flooded during mean high tides, are dominated by plant species such as *Sarcocornia fruticosa, Salicornia veneta, Limonium narbonense and Halimione portulacoides* (Scarton 2016). Also, the sandy-silty soils of the saltmarshes allow the presence of summer associations of *Limonium bellidifonium* (Marcello 1959).

2.2.1.2 The role of human intervention in the lagoon and the challenges for its preservation

The lagoon is an environment which has been extensively modified by human intervention for at least the last 1,500 years, who shaped its landscape and morphology in order to achieve benefits in terms of food production, transportation, defensive and economic purposes (Ravera 2000). Nonetheless, these interferences affected heavily on the previous environment and created unique habitats which host a wide fan of biodiversity and ecosystems. Since the actual condition of the lagoon are due to human intervention, its peculiarities are threatened by several factors, both of anthropic and natural reason: to preserve its current state, many human works are therefore required in order to protect the delicate balance of the lagoon.

An important issue to keep the lagoon in a healthy state 5is the management of sediments. These deposits are essential for a shallow lagoon such as the one of Venice, since they provide the habitat for many vegetal and animal organisms, as well as they regulate the chemical balance of the waters through the retention of the contaminants (Bernstein 2011). Besides, due to the small granulometry of the deposits, the sediments can be easily moved and therefore change the shape of the seabed, with phenomena of overaccumulation as well as of erosion. The accumulation of sediments transported by channels and waterways reduces the water bodies' surface, as they incur in a process of "terrestrialisation" and eventually turn into small islands (Sarretta 2010). Although this process can menace the hydrological balance of the lagoon, the phenomenon which is most seriously threatening the preservation of the Venice Lagoon is its gradual process of erosion. Erosion involves the disappearance of large areas covered by mudflats and salt marshes, and causes a destruction of the seabed topography, as erosion lowers the seabed and the level the internal morphological differences (Fogarin 2019). Furthermore, this is associated with a constant loss rate of sediment from the inlets, which is far in excess of the inputs from the drainage basin. Some of the factors that have aggravated the lagoon's erosive process are the widening of the inlets and the excavation of the Malamocco-Marghera Canal, an artificial channel which connects the Adriatic

Sea with the industrial harbour of Marghera, constructed to allow oil tankers to reach the refineries at the Marghera petrochemical plant (D'Alpasos 2010). The increased inflow of water has increased the currents and consequently also the erosion process, with a considerable amount of sediments taken away from the lagoon and poured into the sea[9]. Also, the intense daily traffic of oil tankers, speedboats and freighters is accelerating the erosion process, as they increase the wave motion.

Furthermore, the lagoon is experimenting a process of salinisation, as salty sea water is invading its basin: indeed, the lagoon is gradually turning into an arm of the sea into its central portion, and swamp around the edges. These transformations in water concentration could have enormous impacts on the local biodiversity, as many ecological niches could disappear (Piazzano 2000). For these reasons, an intense debate occurred in Venice about the licence of *grandi navi* (the denomination of cruise ships by Italian medias) to ship into the lagoon (Iannuzzi 2022), as the transit of these touristic vessels would accelerate the process of destruction of the Venice lagoon (Associazione Ambiente Venezia 2014).

Also, rising sea level due to human-induced global warming (IPCC 2022) threatens to submerge the terrestrial elements of Venice and the lagoon[10]. The flooding of the lagoon is an old-age issue for its inhabitants, which recurred to several interventions in the past to protect the landmasses from the phenomena of *acqua alta*: between them, the most relevant is certainly the construction of the *Murazzi* during the 18th and 19th centuries (Fogarin 2019). The recent MoSE project, consisting in a set of mobile barriers placed at the level of the 3 *bocche di porto*, is supposed to face these events, which are recurring more often and with greater intensity than before because of climate change[11] (ISPRA 2019). On the other hand, the MoSE project has been heavily criticized, since it constitutes an additional environmental risk factor for the lagoon, because during its operational phase it limits the waterflow, and therefore it prevents the exchange of oxygen, as well as of nutrients and organisms (Fogarin 2019).

In conclusion, the human presence has been extremely important in shaping the lagoon and its environment, as the anthropic interventions produced sites and habitat which now hosts a huge

[9] According to the *Consorzio Venezia Nuova*, 1.2 million of cubic meters of soil are washed away out of the lagoon every year (Piazzano 2000)

[10] The effects of this climatic process are felt more intensely in the lagoon, as the past bad management of the canals' bottom brought to a lowering of the terrestrial landmasses: indeed, in 1998 Venice was 23 centimetres lower than in 1908. The missed cleaning of the canals between 1965 and 1995 actually prevented the tidewater to circulate properly, therefore eroding the foundations of the islands (Piazzano 2000).

[11] A recent climate change-related floodings was the *acqua alta* occurred on November 12th 2019, which reached a maximum peak of 1.87 m tide, causing inconvenience in Venice and nearby islands due to severe weather conditions (ISPRA 2019).

variety of biological life. Nonetheless, the human activity altered many geomorphological, hydrological and chemical balances which are now threatening the balance of the lagoon. As the lagoon is an environment greatly transformed by the humans, it is necessary a human intervention in order to preserve it in its current state.

2.3 Geomorphological and anthropic elements in Ca' Roman

In this paragraph, the main geomorphological and anthropic features of Ca' Roman are defined as to provide relevant information for the analysis of the local development scenarios. Indeed, the presence of the lagoon, the dune system, the former colony, the military structures and the MoSE produce multiple interactions along with Ca' Roman forest which are further explored in this research.

2.3.1.1 Lagoon side in Ca' Roman

The western border of Ca' Roman facing the lagoon has an important conservation role, as it is adjacent to the site IT 3250030 "Middle Lagoon Lower Lagoon of Venice" and to the Special Protection Area IT 3250046 (Natura 2000 Viewer 2020). Indeed, the entire lagoon edge is characterized by the presence of Habitat 1140 "Muddy or sandy expanses emerging during low tide", which hosts feeding areas for aquatic avifauna, in particular, anatids and waders (Antinori et al. 2018). In addition, in the area overlooking the former colony shelduck *Tadorna tadorna*, oystercatcher *Haematopus ostralegus*, little piper *Actitis hypoleucos*, egret *Egretta egretta* are present. The lagoon edge of the Ca' Roman Oasis, along with the innermost part of the mouth of the port of Chioggia is also affected by the presence of grasslands of *Cymodocea nodosa*, which is considered an element of quality biological in accordance with European Directive 60/2000/EEC (*Ibidem*).

Although its naturalistic relevance, the area hosts some infrastructures such as the *Villaggio Marino* and part of the former colony of the Canossian sister, which will be further described. Furthermore, the construction of MoSE that started in 2003 had a strong impact on the balance of the local lagoon system, since the construction works reduced the inlet cross-section from 500 to 350m, significantly changing the seafloor depth due to dredging (Fogarin 2019). These interventions procured a shift in the waterflow, which causes alterations in the saline equilibrium of the lagoon waters and enhance the level of erosion of the seabed, threatening therefore the delicate local benthic ecosystem (*Ibidem*).

2.3.1.2 Dune system

One of the most relevant ecosystems of Ca' Roman is the dune system, positioned on the east side of the island. It is composed by a series of coastal dunes, which are accumulations of wind-blown sand (Bonneau 2002) that origin on the inland side of sandy beaches. They are a part of the larger, more complex coastal ecosystem that includes the beach, the psammophilous flora and fauna, and weather-sea forcings (Sistilli 2016). Indeed, the coastal environment is typically a transitional environment between sea and land, resulting in highly dynamic morphologies that continuously adapt to the meteorological and marine forcings by assuming different configurations, as to dissipate wave energy and redistribute the sediments (*Ibidem*).

In marine environments, the dune systems assume a specific pattern of dune regions which corresponds to its formation, stabilization and erosion process. In this pattern, each dune band has a uniform morphology and ecology, according to its distance to the sea (which determines the level of intensity of erosion agents) and the type of vegetation. The first band is the one of the primary dunes, or foredunes. They are located closest to the water, just behind the wrack line, a stretch of debris along the shore typically found in the beach area that defines the highest tide. These dunes are called "white dunes" because of their typical colour (Pettenò 2007b). Vegetation is present in the form of pioneer species, with a high tolerance to salt, extensive root systems, and rhizomes that grow parallel to the dune surface: these features allow dune vegetation to be highly adaptable thanks to its resistance to sea spray, high winds and sand accumulation. Its presence is essential for dune formation, since plants trap the sand and facilitate the piling of sediment, which usually are about one or two meters in height (Bonneau 2002). Indeed, vegetation acts as a wind barrier, facilitating the further deposition of sand, and so allowing the dunes to grow in size. Vegetation also prevents erosion, since it dissipates the energy of the falling particles so that they cannot dislodge one another: in this way, vegetation reduces the ability of the wind to erode and transport sand out of the dune area. A typical wrack line plants is the *Cakile maritima*, which is one of the main factors of dune formation by trapping sand and debris (Lorenzi 1914). Secondary dunes (called also "grey dunes") are located behind the primary ones. In this sector, grass-like plants such as *Ammophila litoralis* enable the process of dune formation and prevent wind erosion. The vegetation concentrates in the dune slacks, depressions between the dunes which host flood-resistant plants and allow therefore the stabilization of the sediment (Pettenò 2007a). Proceeding inland, the sediments become more cohesive and the dunes are covered by maritime forests, with specific features according to the local conditions.

The dune system of Ca' Roman follows the pattern mentioned above, with primary dunes close to the wreck lines - populated with pioneer species such as *Ammophila arenaria*, *Elytrigia juncea* and *Silene colorata* - and secondary dunes dominated by the *Tortulo-scabiosetum* system. Behind them, the stabilized dunes are colonised by different species of pines, holm oaks and poplars. The Ca' Roman dune system is inserted in the broader ecological ecosystem of the North Adriatic Sea, which crosses all the eastern Italian shoreline and plays a fundamental function of coastal protection (Buffa 2005). In addition to this, thanks to its climatic, morphological and phytogeographical peculiarity, it hosts unique ecological formations such as the *Ammophiletus* and the *Tortulo-Scabiosetum* (Del Vecchio 2016). Ca' Roman foredunes are indeed colonized by the *Ammophiletus*, a pioneer plant community dominated by *Ammophila arenaria*, a grass species that forms tall heads on the sand dunes close to the beach. It is the primary builder of the Ca' Roman dunes, since its highly developed root system allows to trap the sand and enable the rising and stabilization of the dune. Other important plants of this ecosystem are the *psammophiles* plants, which are pioneer species that are adapted to survive on a sandy substratum. They are: *Eryngium maritimum, Elytrigia juncea, Silene colorata, Lagurus ovatus, Calystegia soldanella* and *Vulpia membranacea* (Pettenò 2007a). On the grey and stabilized dunes, a typical Ca' Roman habitat is the *Tortulo-Scabiosetum*, which is a particular biological formation composed by a moss (*Tortula ruralis*) and a small herbaceous plant with purplish or whitish flowers (*Scabiosa argentea*). According to its formation process, the habitat begins to colonize the dune from the slope opposite the sea, sheltered from salty winds and sea water (Del Vecchio 2016). In this way it assumes a stabilisation function, since it covers the dunes and protects them from erosion. Because of overexploitation of coastal areas, this delicate ecosystem is threatened: indeed, this habitat can be found in a good conservation status in fewer than 30 sites worldwide (*Ibidem*). For this reason, the Ca' Roman *Tortolum-Scabiosetum* is subject to special protection, since it is part of the priority habitat of Community interest 2130* "Fixed coastal dunes with herbaceous vegetation (gray dunes)" (Antinori et al. 2018).

The presence of these unique habitats enables a faunistic variety which constitutes the Ca' Roman dune system. Indeed, the site hosts several species of migratory birds, like the Kentish plover (*Charadrius alexandrinus*), the oystercatcher (*Haematopus ostralegus*), and the tridactyl sandpiper (*Calidris alba*) (Antinori et al. 2018). The Kentish plover is the flag species of the LIPU Oasis, since it is one of the most threatened species because of soil consumption in the coastal areas. Indeed, it is very vulnerable because of its nesting habits, as it nests on the beach and it is very sensitive to human disturbances: for this reason, it is protected at the European level. The oystercatcher (*Haematopus ostralegus*) is a stocky-bodied bird, which lives on the shoreline, where it feeds itself using its stout red-orange bill to crack the shells of molluscs or to catch insects. The

tridactyl sandpiper (*Calidris alba*) is a small bird about 20 cm that frequents coastal environments, where it feeds by pecking on the shoreline. It nests in the high Arctic, but regularly visits Ca' Roman during migration and in winter, as it prefers sandy shores interposed between the sea and lagoons (Pettenò 2005). Furthermore, Ca' Roman shoreline is the habitat of *Parallelomorphus laevigatus*, one of more than 100 species of insects of the beetle order detected at Ca' Roman. It was once common along many Italian sandy shorelines, but the destruction of dune environments and mechanized beach cleaning activities have caused its drastic decline (*Ibidem*).

This important biodiversity and variety of morphological elements is threatened by the increasing impact of human interventions: indeed, «coastal areas are becoming one of the environments more exposed in the last decade to fragmentation and habitat loss, as well as to the invasion of allochthonous species» (Pizzo 2014). Currently, the most affecting anthropic activity has been the construction of the MoSE dam in the Chioggia inlet, which had a significative impact in the southern dune area - the one close to the inlet itself. According to biologist Zanella, «a phenomenon of lowering of the sandy floor was observed with altered moisture conditions, accumulation of stone material, development of opportunistic vegetation. As a consequence, the disappearance of species typical of the dune environment was observed» (Zanella 2017). As the LIPU officer Luca Mamprin observes, the works for the MoSE construction disturbed the nesting of the Kentish plover, which is disappearing from Ca' Roman (Mamprin 2022). In addition, Veneto's dune systems have suffered severe alterations due to the invasion of allochthonous species that have undermined the balance of the original ecosystem: «biological invasions represent both a major determinant of the loss of biodiversity, functionality, and economic value of natural environments, and the effects of the combination of changes in climate, nutrient availability, habitat fragmentation, and altered natural and anthropogenic disturbance regimes» (Pizzo 2014). Between the allochthonous species, in Ca' Roman the most invasive species are herbaceous forms which concentrate on the beach and the dune system (Campos 2004). In contrast, woody forms are concentrated in transitional dunes and fixed dunes (Pizzo 2014).

The need for action to protect these environments has been recognized by the legislation of the European Community with the 1992 Habitats Directive 92/43/EEC, which identified in its annex various marine dune-related habitats of community interest. Between them, are listed: "Embryonic mobile dunes", "Mobile dunes of the coastal cordon with the presence of *Ammophila arenaria* (white dunes)", "Fixed coastal dunes with herbaceous vegetation (grey dunes)" (Zanella 2017). The dune systems of the Venetian coast are included in the Natura 2000 network with the sites

"IT3250003 - Cavallino Peninsula: Coastal biotopes" and "IT3250023 Venice Lido: Littoral biotopes" (*Ibidem*).

2.3.1.3 Ca’ Roman forest and pinewood

The Ca’ Roman forest is a former pinewood planted in the 1950s which is going through a process of diversification and expansion, as other species are colonising the terrestrial habitat of the island. The wood is further described in Chapter 5.

2.3.1.4 Military infrastructures

The strategic position of Ca’ Roman, close to the Chioggia inlet, was ideal to place contingents of soldiers, weapons and ammunition to control one of the key entrances in the Venice Lagoon. For this reason, the south-western part of the island was devoted to military purposes and inserted in the fortification system of the lagoon built by the Venetians (UNESCO 2022). Indeed, from the origins of the Venetian state the lagoon was the main tool for its defence, since an eventual attack had to consider the hardships related to the movement in the complex system of channels within the lagoon and, in the case of an attack from the sea, to the crossing of the inlets between the barrier islands (DUPRV 2012). The addition over time of new structures for defensive purposes has created a complex network of fortifications (as displayed in Figure 1) of high historical value, although it is mostly set into the forest and some of its buildings are undergoing a condition of progressive abandonment.

2.3.1.4.1 The origin of the Venetian fortification system and its history

The lagoon proved to be determining defensive factor since the first permanent settlements after the fall of the Roman Empire where set there: indeed, historical sources suggest that the specific conformation of the lagoon was essential to efficiently contrast the invasion of the Franks in 810 AD (Francese 2011). However, a real defensive system developed progressively from the 14th century, when the Republic of Venice designed it to protect the city and its lagoon as a reaction to the aftermaths of the War of Chioggia in 1380, when the Genoese managed to penetrate into the lagoon (De Biasi 1982). Starting from the 1538, forts began to be built in correspondence of the inlets in order to counter the threat of the Empire Ottoman. They were: Fort of San Felice in Chioggia, Fort of Sant'Andrea on the Lido, Fort of Sant'Erasmo in Venice and Fort of Brondolo in Chioggia (Concina 2001). This system was complemented with a set of octagons, fortified island which guarded strategic lagoon waterways. They are: Ottagono Alberoni, Ottagono Ca' Roman, Ottagono San Pietro, Ottagono Campana and Ottagono Poveglia (UNESCO 2022).

With the Treaty of Campoformio in 1797, Venice was conceded to the Empire of Austria. The Habsburg military, fearing the threat posed on the mainland by the neighbouring French Empire, initiated a general renovation of the lagoon's defensive apparatus (Grillo 1989). In 1805 the French took over from the Austrians, until the final fall of Napoleon and the return of Austria in 1814. During this period, the Ca' Roman Fort was built. The French-Austrian fortified complex consisted in the development of the pre-existing Venetian defensive infrastructures (Moro 2001). With the independence of Italy in 1861, the system was managed by the new-born Italian Kingdom, which conducted some renovations on the basis of what had been built before. Indeed, this defensive system was strongly conditioned by the geography and morphology of the lagoon, which revealed all its limitation with the military technological advances. Eventually, the increased range of artillery and the disruptive force of projectiles made fixed fortifications obsolete already in the early 20th century (Francese 2011).

2.3.1.4.2 Ca' Roman Fort

The principal structure for historical and military relevance in Ca' Roman is the Ca' Roman Fort, called also "Barbarigo Fort" – for the name of the coastal defensive battery built inside it in 1912. The fort is placed in SW position, and it was built between the 18th and the 19th century for its strategic location. Indeed, it is adjacent to the former inlet of Chioggia and, along with the Fort of San Felice, it constituted the defence of the lagoon southern inlet. In its late 18th century form, the Ca' Roman redoubt appeared as an earthwork, enclosed, with an irregular layout and a perimeter protected by a moat, which is still present today (Turismo Venezia 2022). The current infrastructure, which can be dated between 1832-1842, was further developed with the addition of the central structure known as the *Blockhaus* in 1860. On the eve of World War I, to upgrade the old fortification, the more modern "*Batteria Barbarigo*" was built in 1912 and the pre-existing Napoleonic works demolished (IIRE 2022). The most recent interventions date back to the last war and 1956, when wooden shacks were built for the Polesine flood victims. Later, these wooden structures were used for many years to host the residents of the seaside colony managed by the Canossian sisters (Grigoletto 2010). The Ca' Roman Fort was provisionally placed in the early 2000s in the Venetian Fortifications visit circuit through agreements with the Maritime Military Department of the Adriatic. It has belonged to the UNESCO site "Venice and its Lagoon" since 1987 (Grigoletto 2010). Decommissioned by the Ministry of Defense in 2007, it is subject to the

constraints of Legislative Decree 42/2004 – known as the Code of Cultural Heritage and Natural Landscape[12] - as ascertained by order of 19/11/2018 (Gazzetta Ufficiale 2004).

The fort consists in a large plot of land of irregular conformation, on which stands the fortified core consisting of four rectangular-plan buildings, circumscribed by an artificial canal not connected to either the Lagoon or the Adriatic Sea (the Ca' Roman canal) which can be crossed by a bridge[13]. Inside are present a linear broken-bodied redoubt with bomb-proof covering, two ammunition magazines, and a cistern (Morsiani 1988). On the sea front, artillery and reserve positions were prepared, defended by an embankment. The four buildings have a load-bearing structure of ordinary solid brickwork and a reinforced, flat, laterocement roofing slab, used for barracks and storage. On the eastern front the Barbarigo battery is present, built entirely in reinforced concrete; it presents on the ground floor a series of vaulted rooms with an opening on the west elevation, connected by a corridor to the east of the rooms themselves from which, by means of vertical shafts, ammunition was elevated to the four heavy artillery emplacements above. Currently, the Fort Ca' Roman is in a state of disuse and, pending the lack of maintenance, is in poor overall condition (DUPRV 2022).

2.3.1.4.3 Ca' Roman Octagon

The Octagon Ca' Roman is an artificial island in the Venice Lagoon, on the western side of Ca' Roman, belonging to the complex of five octagons of the Venetian fortification system. It measures 0.2 hectares. Included in the system of fortifications that the Republic of Venice built against the Othman Empire, it was probably built on a pre-existing fortification made of stones and piles. It was modified under the Austrians and used as a fort until World War II. Currently a guard post and a bunker dating from World War II can be discerned. In the middle of the island stands a circular concrete platform which hosted the artillery (CRA 2022).

The octagon is currently in a state of neglect, with most parts of its surface vegetated and many damaged structures. After years of abandonment, the Octagon was included by the State Property Agency within the "*Valore Paese Fari*" project (Agenzia del Demanio 2015) and taken under management for 50 years by a private who obtained the licence to build a luxury residence (Monitor Immobiliare 2019). The project, subject to a public call for bids, was awarded by the Tommasi Architecture and Restoration Studio of Padua, a firm closely linked to the Veneto Region that specializes in the recovery and restoration of listed buildings (RDL 2020). Although the sustainable

[12] The Legislative Decree no. 42 of 2004, better known as the Code of Cultural Heritage and Natural Landscape, after a long gestation, represented the achievement of a unification, harmonization and especially coordination process of the many regulatory instruments that previously governed the subject (P&S Legal 2022).

[13] The canal that surrounds the fortification possessed only a defensive function and has no hydraulic value as it is not connected to the lagoon and sea area.

approach declared by the architecture studio (Premoli 2020), the renovation project of this island confirms the trend of privatization of public space in the Venice Lagoon, as many public lands – and also entire islands, as the one of Poveglia – are offered for sale without an auction base by the State Property Agency to private investors, often without a public project (Orlando 2021).

2.3.1.4.4 WWII Bunkers

Along the entire NS axis of the island stretches a system of fortifications additional to the Venetian one, consisting of a complex of bunkers, reservoirs and concrete artillery points built by the German army after the occupation of the territory following the events of 1943. This military system served as strategic defensive point to both prevent the access from the sea and control the waterways within the lagoon. Toward the marine side, several artillery points were placed as to intercept any attack from the sea. Furthermore, four concrete M272 bunkers are set in the southern part of the island (Giacomazzo 2022). These structures, although they are starting to suffer a condition of neglect, are a reference point for war history enthusiasts who come to Ca' Roman to visit them. LIPU itself has organised some cultural visits to promote the cultural and historical value of these buildings.

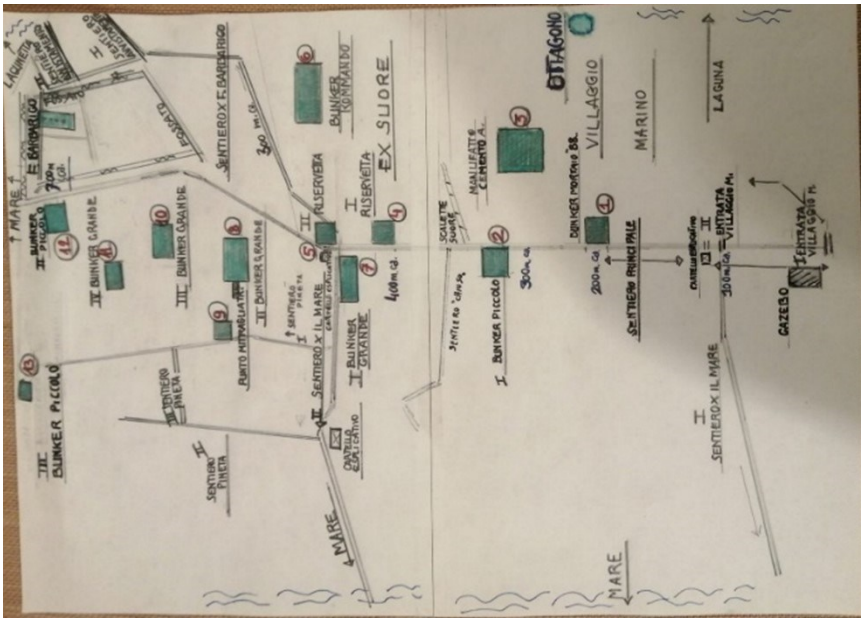

Figure 1: In the image is represented the topography of the military fortification system, designed by P. Casati, a LIPU volunteer. It includes the Ca' Roman Fort , the Octagon and the German bunkers and artillery spots.

2.3.1.5 Former summer colony

The former summer colony of the Cannossian sisters has been for more than half a century the landmark of Ca' Roman. It consists in a complex of wooden and concrete buildings, placed on the

SW side of the island, which are now in a state of deep abandonment and degradation. The colony was founded in 1923 by professor Alberto Graziani, the chief medical officer of the "*Ospizio Marino di Padova ed Istituto Rachitici*" of 1983 (A.V. Villaggio Marino 2020), when he bought the land where today the colony is set and moved there some wooden shacks[14] from San Donà di Piave - which were built to host Italian soldiers during WWI (Consiglio Comune di Venezia 2011). At that time, the colony was called "*Colonia Padovana di Ca' Roman di Chioggia*" and had a family direction. The colony was led by professor Graziani for twenty years, and achieved the capacity to host 370 people as a village and climatic station for «ladies, young ladies and children» (Bellucco 1965).

In 1941 the colony was sold to the Canossian sisters, which kept the same intended use. In 1943, because of the occupation of the island by German soldiers, the Canossian sisters moved permanently there. In the Post-war period the colony became a reference point of Ca' Roman, as the colony expanded with the construction of some brickwork building in 1945 (Consiglio Comune di Venezia 2011). In 1951 it hosted 300 refugees of the Polesine flooding, and the year after 60 children coming from that region were hosted there (Bellucco 1965). In 1968 started a radical transformation of the area, as the nuns started to ask permissions to substitute the old wooden shacks with masonry buildings, which were used as dorms for the customers. In 1985 the Canossian sisters asked for a building amnesty, so that the already present buildings were recognised as legal by the administration (Consiglio Comune di Venezia 2011). In the 1990 the colony ceased to run and was abandoned, with the exception of the infrastructures run by the current "*Villaggio Marino di Ca'Roman, Associazione di Volontariato*" (A.V. Villaggio Marino 2020). The land of the former colony changed its land-use in 2009, when the variant of the PRG (*Piano Regolatore Generale*, or Local Master Plan) was approved by the Regional Council Resolution No. 3886 of Dec. 15, 2009 (published in B.u.r. No. 4 of Jan. 12, 2010) (Tar Veneto 2017), and allowed the construction plan promoted by the current owner Ca' Roman Ltd.

At present moment, the colony is in a state of advanced abandonment and degradation. The organisation of the buildings still reflects the one planned by professor Graziani, which had the purpose to connect directly the lagoon and the sea, so that the hosts could easily reach both. The village is therefore organised in two main parallel axes in east-west direction (the sea-lagoon direction) and in two perpendicular avenues. The buildings are mostly degraded or in a state of advanced abandonment. Nonetheless, in some interiors are present underground artworks, which are described in Chapter 5.

[14] Since the colony land was considered a military area, it was forbidden to build any masonry construction for civil use.

2.3.1.6 Marine Village

The Marine Village of Ca' Roman is located north of the former colony of the Canossian sbisters, and is the only current residential centre on the island, active just during the summer period. The voluntary association "*Villaggio Marino Ca' Roman*" originated in 1986 with the resolution of the Regional Council of Veneto dated 15/06/1986. In 1990, the association has changed its name to the current one - "*Villaggio Marino di Ca' Roman, Associazione di Volontariato (A.V.)*" - following a resolution of the Veneto Regional Council dated 03.15.1990 (A.V. Villaggio Marino 2020). As can be found on its website, «the volunteering association "*Villaggio Marino di Ca' Roman*" was born as a group of people from different realities, united in the common intent to contribute in a direct sense to the reception of families and people with disabilities, through the organization and management of the structure designed ad hoc. This is done through the realization of summer stays in which families find support and comfort for their families, carefully followed by our volunteers» (A.V. Villaggio Marino 2020). The village offers also some structures dedicated used as apartments for families and dorms for parish, scout and association groups.

2.3.1.7 Murazzi

The *murazzi* (*muràssi* in Venetian) are 17 kilometres complex of dams made of Istrian stone which were built by the Republic of Venice to defend the banks of the lagoon from sea erosion. They replaced the previous piles filled with stones – called *palade* - which were very short-lived (FAI 2020). The *murazzi* are divided into three parts: the first one, on the island of Lido, starts at Ca' Bianca and ends after about 5 km near Alberoni. The second, the most extended one, is placed on the island of Pellestrina: it starts from Santa Maria del Mare and ends after 10 km in the northern part of Ca' Roman. The part of the dam which connects Pellestrina with Ca' Roman, 14 meters wide, is the only element which separates the Adriatic Sea with the Venetian Lagoon (De Biasi 1982). The third one, on the Sottomarina coastline, begins at Forte San Felice and ends, after about 1,255 metres, at the centre of Sottomarina Vecchia: this dam is partially no visible, since it is buried by sand dunes and vegetation to the north and by urban cementing to the south[15] (Pellestrina Turismo 2020).

This impressive infrastructure was conceived by Father Vincenzo Coronelli in 1716, and its construction was carried out by Bernardo Zendrini between 1744 and 1782. They were damaged by sea storms in 1825 and on 1966 (Crovato 2020). Especially, the *murazzo* of Pellestrina was greatly damaged by the flooding of the 4th of November 1966, and its partial collapse was one of the causes

[15] At Sottomarina this last wall once continued for a further 570 metres and consisted of embankments and walls, but it is now demolished (De Biasi 1982).

of the exceptional high water that flooded the lagoon and the city of Venice. They have recently been supplemented with a series of breakwaters, placed perpendicularly to the main work, whose purpose is to encourage the formation of shallows and stretches of beach (Semenzato 1992). Out of its importance in contrasting *acqua alta* phenomena, the *murazzi* have also a touristic influence, as the dam connecting Pellestrina with Ca' Roman is an appreciated point of the bike route starting from Lido and ending in Ca' Roman itself[16] (FAI 2020).

2.3.1.8 MoSE

The MoSE (*Modulo Sperimentale Elettromeccanico*) is a system of mobile barriers intended to protect the city of Venice and the Venetian Lagoon from flooding. The project is part of a General Plan of Interventions to safeguard Venice and its lagoon, and was begun in 1987 by the Ministry of Infrastructure through the Superintendency for Public Works of the Triveneto (the Ministry's operational authority in the lagoon) and the concessionary "*Consorzio Venezia Nuova*"[17] (MoSE Venezia 2022b). It consists in an integrated system of rows of mobile gates installed at the Lido, Malamocco, and Chioggia inlets[18] that have the scope to isolate the Venetian Lagoon temporarily from the Adriatic Sea during *acqua alta* high tides (MoSE Venezia 2022e). Together with other measures, such as coastal reinforcement, the raising of quaysides, and the paving and improvement of the lagoon, MoSE is designed to protect the lagoon from tides of up to 3 metres (MoSE Venezia 2022d). The construction works began in 2003, with an original deadline set for 2011. After multiple delays, cost overruns and scandals the deadline was then moved to 2018, and later to 2021. On 10th July 2020, the first full test was successfully completed (ISPRA 2020); on 3rd October 2020, the MOSE was activated for the first time in the occurrence of a high tide event, preventing some of the low-lying parts of the city (such as *piazza San Marco*) from being flooded (Petrobelli 2020). The project is now expected to be fully completed by the end of 2023 (Redazione ANSA 2022). The MoSE project, with its current cost of 5.4 billion euros, is the most extensive coastline defence, restoration, and improvement program ever implemented by the Italian State.

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[16] The bike route is source of a lively discussion, as the incoming of many bikers, mainly during the weekends, is perceived by a part of the public debate as «an invasion» (Mayer 2022).

[17] The "*Consorzio Venezia Nuova*" is a consortium constituted by Italian construction companies, cooperatives and local businesses. It is the concessionary of the Ministry of Infrastructure and Sustainable Mobility - formerly the Venice Water Authority, now the Interregional Superintendency for Public Works of Triveneto - for the implementation of interventions to safeguard Venice and the Venetian lagoon under the responsibility of the Italian State, in implementation of Law 798/84 (MoSE Venezia 2022b).

[18] The MoSE overall defence barriers are four: two at the Lido inlet (which consist respectively of 21 gates in the north channel and 20 in the south channel), one barrier consisting of 19 gates at the Malamocco inlet and one barrier of 18 gates at the Chioggia inlet (MoSE Venezia 2022e).

The design and construction of MoSE has been deeply debated, as its beneficial effects and impacts are controversial. Since the beginning of the works, it was broadly criticized by local and global environmentalist and civic groups - such as the Green Party, Italia Nostra, WWF and LIPU - because the project did not consider the negative influence this massive construction would have exerted on the fragile balance of the lagoon ecosystem (Piazzano 2000). Indeed, they argue that the lagoon's geomorphological, hydraulic and biological balance must be restored before any decisions about the mobile dikes are made (Ercolin 2018). Over the years, nine appeals have been presented, eight of which have been rejected by the Tar (*Tribunale Amministrativo Regionale* - Regional Administrative Court) and the Council of State (MoSE Venezia 2022c). In 2005 the European Commission opened an infraction procedure against Italy for «pollution of the habitat of the lagoon» (Bidinotto and Cerasuolo 2018), as the MoSE project did not «identified nor adopted - in relation to the impacts on the area "IBA 064 - Venice Lagoon" resulting from construction of the MoSE project - appropriate measures to prevent pollution and deterioration of the habitat, together with harmful disturbance of birds with significant consequences» (MIMS 2010).

In addition to this controversy, other issues were arisen, such as the fact that the Department of Water, which depends on the Public Works Ministry in Rome, and the companies that constitute the Consortium - which include major public and private corporations - have no tie with Venice, so that the local population is completely excluded by any decisional process (Piazzano 2000). Another source of criticism is whether the barriers are able to face efficiently the floodings related to rising sea level due to climate change. The University of Padua hydraulics professor Luigi D'Alpaos wrote that «MoSE is obsolete and conceptually wrong» (Harlan 2019): indeed, the major problematic consists in the fact that, since *acqua alta* phenomena will occur more frequently because of climate change, the floodgates would have to rise so often that they would eventually function as a near-permanent wall. This would «affect the lagoon environment by reducing the tidal exchange and increasing the ebb-dominance over tidal flats» (Tambroni and Seminara 2006), reducing dramatically the lagoon's drainage and interchange with the Adriatic Sea, so that the Venice lagoon would become a «stagnant pool for algae and waste» if the gates were usually left up (Harlan 2019).

The MoSE barrier placed in the Chioggia inlet, adjacent to Ca' Roman, is formed by 18 mobile floodgates along the entire 360-metre channel between the two banks of the harbour mouth. The channel of the inlet, 11 metres deep, is mainly used by fishing boats and ships bound for the nearby Val da Rio harbour docks (Collegio Ingegneri Venezia 2022). To the east, a 520 metres long artificial reef has been placed to dampen the tidal current entering the lagoon. To the north side of

the inlet, a shelter harbour is used to allow the passage of vessels when the floodgates are operating and thus close the channel. It consists of two large basins (8 hectares on the seaside and 4 hectares on the lagoon side) connected by a double navigation lock considering the heavy traffic of fishing boats (with peaks of more than 100 vehicles per hour). The two locks are 134 metres long and 16 metres deep (MoSE Venezia 2022a). The embankment on the south side, in Sottomarina, built close to the pre-existing bank, houses the main buildings and installations needed to operate the floodgates, as well as some areas for public use. Its plan dimensions are approximately 330 metres by 80 metres - covering an area of over 2.5 hectares (MoSE Venezia 2022a). In addition, on the SW side of Ca' Roman, a small artificial island (*piarda*) was created by the accumulation of debris from the construction site. It borders the harbour mouth on three sides and is separated from the reserve by a narrow channel (Antinori et al. 2018). The area has been affected by the *Piano Europa*, a plan of measures for compensation, conservation and redevelopment of areas impacted by the MoSE works that is described in more detail in Chapter 6 (Bidinotto and Cerasuolo 2018).

As the whole MoSE project, the Chioggia tidal inlet represents an example where human-induced morphological processes have radically changed the seafloor over time. The construction of the seaside breakwater, built between 2003 and 2006, most likely significantly changed the hydrodynamic configuration of the flow (Fogarin 2019). Furthermore, the construction and excavation activities altered the seafloor, damaging the benthic ecosystem which was vital for many species.

3 Theoretical perspectives

3.1 Local development

Local development is a theory in social sciences based on the identification and use of the resources and endogenous potentialities of a community or a territory to promote social, environmental and economic development, through the consideration of social, cultural, historical, institutional, and geographical aspects. The aim of local development is to «improve the living conditions of the local population» through «a process of transformation of the local economy and society aimed at overcoming existing difficulties» through a «sustainable use of existing endogenous resources, by fostering local entrepreneurial capacities and creating an innovative environment in the territory, and by the creation of an innovative environment in the territory» (Albuquerque 1997). Sustainability, defined as «meeting the needs of the present without compromising the ability of future generations to meet their own needs» (Brundtland 1987), is a key factor for local development, as it is based on three pillars - environment, society and economy (UN General Assembly 2005) - in order to promote a use of natural resources which benefit or at least does not harm - the society and the environment. Although it presents some common aspects, a universal definition of local development has not been formulated, as its theorical and practical features vary depending on the geographical, cultural and institutional context.

3.1.1 The multiple meanings of local development

The concept of development has not a recognised theoretical status, as it is object of different interpretations. According to Sforzi, «it is at the mercy of those who use it» (Sforzi 2005) since the focus has been more on its practical implementation rather than on the search for a theory (*Ibidem*).

Indeed, this variety of meanings is due to the theoretical derivation from the concept of "development", a term that embeds very different, and often controversial, semantic meanings (Ziai 2017). In turn, the different interpretations of this concept can be traced back to the 19th century notion of "progress", which envisaged that human societies were set on a path of linear evolution towards increasingly advanced forms of civilisation (Du Pisani 2006), thus establishing a hierarchical scale between different nations. Such an approach had obvious racist undertones, as it divided human beings into "advanced" and "primitive" people. Later, with the introduction of the concept of "development" into the global public discourse in the post-war period, this opposition took shape in the dichotomy between "developed countries" and "developing countries",

perpetuating the 19th century colonialist and racist division (Ziai 2017). Such a racist approach, which represents the original foundations of the concept of development, is avowedly condemned by today's leading international institutions such as the United Nations, which has instituted since 1966 the "International day for the elimination of racial discrimination" (UN 2022). Consequently, today's concept of development differs from its original formulation, presenting therefore inconsistencies and contradictions which are the result of a transformation in the perception of material needs and values at a global level.

Due to this modification over time, the concept of development, although is a ubiquitous term in the international agenda, hides «very difficult and contentious political and economic issues which have been widely obscured by the apparent simplicity of these terms» (Williams 1983). To understand its interpretative complexity, it is necessary then to briefly consider the history of the concept, starting with its use in the post-war period. Indeed, after the Second World War, it drew its theoretical foundations from Truman's well-known inauguration speech to the presidency in 1949, which was based on the unlimited confidence that economic growth would have finally defeated poverty and inequality (Du Pisani 2006). Basically, the development wished by Truman corresponded to a material and quantitative growth, which focused on physical assets such as infrastructures – bridges, dams, railways, public buildings – and industrial goods – iron, chemical products, food, clothes. This mainstream approach was conceived as universal, since it claimed to be used indifferently in every place it was implemented in. Therefore, those programs were top-down, and their management was assigned to western expertise, excluding the local population from the decision-making process (Ziai 2017).

Rooted in dissatisfaction with mainstream approaches and critiques of orthodox neo-classical economics in the 1960s and 1970s, “alternative” approaches began to question the dominant economic focus of development on firms (Geddes and Newman 1999). These new conceptions abandoned the short run view of growth as a simple increase in income and employment, by assuming a longer-term perspective through the identification of the tangible and intangible elements which distinguish the development of a local area and its competitiveness (Capello 2011). In addition to this, community-level and socially-oriented approaches emerged, as to meet the real needs of local people affected by international development programmes (Haughton 1999). Then, the Post Development school critique have further increased the range and diversity of approaches to local development, by radically criticising the post-war paradigm (Pike et al. 2007).

According to the new interpretations, development was conceived as context-dependent, so that its indicators and approaches had to consider the cultural, social and environmental background of the

place development projects were implemented in. This theoretical revolution, as a consequence, brought to the awareness that there is no singular meaning about local development, as there are different kinds of local development which are determined by different people and groups in different places at different times **(**Canzanelli 2001). The theoretical rearrangement, therefore, overturned the original universalist claim that there was a concept of development equally applicable in all situations. Despite this comeback of the particularistic principle over the universalistic one, it is possible to detect in the literature an attempt to trace a unifying definition of the concept of development, which is summarised by scholar Raymond Williams as «the establishment of conditions and institutions that foster the realization of the potential of the capacities and faculties of the human mind» to bring benefit to people, communities and places (Williams 1983).

Following this definition, it is possible to outline the major features of "local development". Before proceeding with a theoretical formulation, it is important to remember that the "local development" conception owes much of its framework to the former idea of economic development. According to economist Fabio Sforzi, «local development and economic development are both interpretations of economic change because they share its two essential features: the continuous increase in the per capita income of the population and the diversification of the economic goods that make up the income» (Sforzi 2005). Nonetheless, the two conceptions are radically separated by relevant conceptual discontinuities.

First, they «differ in the identification of the fundamental cause of economic change», as local development identifies it in «the growth and specialisation of human capabilities» (Sforzi 2005). This important theoretical foundation implies that local development abandons the exclusive focus on growth in quantitative terms, by giving a key emphasis on growth in qualitative terms. Second, local development adopts a place-based approach by analysing the relations between the economic, social, political, ecological and cultural dimensions of local context (Beer et al. 2003), notwithstanding the potential trade-offs and conflicts involved (Haughton and Counsell 2004). Furthermore, it «involves rejecting a compartmentalized view of the process of development» and «the search for a single all-purpose remedy» (Sen 1999). Third, this place-based approach can be implemented only by an integrated and multifaceted approach by involving different stakeholders and institutions (Sen 1999) through bottom-up actions based on participatory methods. These three relevant features - place-based approach, participation and focus on subjective-qualitative development - represent the backbone of local development and the key differences from the former paradigm of development.

3.1.2 Relevant principles in local development theory

Although local development has not an unequivocal definition, it possesses a series of principles which can be identified in the multiple theoretical conceptions as well as in the practical implementations. In this paragraph, the most relevant assumptions are considered, in order to clarify this fuzzy concept.

3.1.2.1 Place-based approach

The place-based approach, centred on the principle of heterogeneity, completely overturns the universal model of development that served as a paradigm until the 1980s. Indeed, the former concept tended to lump together under a single label a set of very different countries, without taking into account their different social, cultural, historical and geographical conditions. According to the renovated paradigm, instead, «what constitutes local and regional development varies both within and between countries and its differing articulations change over time» (Pike et al. 2007). Indeed, development is concerned with specific and particular places: each place has evolving histories, legacies, institutions and other distinctive characteristics that impart path dependencies and shape its economic assets and trajectories, social outlooks, environmental concerns, politics and culture (Agnew 2002). Such particularities can be materially and symbolically important to defining local development (Pike et al. 2007). As a matter of such, local development definitions are inevitably context-dependent (Storper 1997), as «the well-being target is not the same for people living in New York or in Maputo; only who is living in New York or Maputo could fix what they want to achieve in the medium and long term» (Canzanelli 2001).

The place-based approach is today widespread at the institutional level, as it is recognised that «place-based policies are the best way to tackle the persistent underutilization of potential» (Barca 2012), since they assume «that the interactions between institutions and geography are critical for development, and many of the clues for development policy lie in these interactions» (*Ibidem*). The recognition that space matters, as well as the local cultural, social and environmental features, is fundamental for the acknowledgement of the importance of the involvement of the local communities in the decision-making processes.

3.1.2.2 Participation and bottom-up approach

Participation is recognised to be a key actor for local development, as local people and stakeholders are fundamental actors since they live every day the territory, possess the local knowledge and above all are the ones who bear the impacts - both positive and negative - of local development. Indeed, participatory processes address a diversity of socio-economic, cultural and environmental

problems with the aim of producing adequate solutions and improve the quality of life of the population (Jover 2016).

The topic of participation in development programmes began to assume prominence from the 1980s onwards, when it emerged from the heterogeneous set of new proposals following the criticism of the classical development paradigm. It arose from civil society's protest against those top-down projects that were managed by experts, often foreign people who neither knew how to practise the local language nor had any knowledge of the indigenous culture and customs. Instead, the place-based approach proposed the involvement of the entire society in the management of the projects, through its active and inclusive participation in decision-making and discussion (Ziai 2017). This process implies a bottom-up approach, which is focused on satisfying the basic needs of local communities. Through the participatory approach, therefore, the priorities that constitute the development agenda are determined locally, and development is promoted «on a small scale and hinged on the valorisation of immovable resources (natural heritage, traditions, culture and local knowledge) » (Sforzi 2005). In this way, the participatory approach recognises the remarkable endogenous potential, within the territory, to promote local development and ensure the satisfaction of needs identified within a community.

Participation has different degrees of implementation, as it can range from an empty label for political persuasion to a real process which delegates the control of the actions to the citizens and the local communities. A successful representation of this varied scale of inclusion and involvement is the “ladder of citizen participation” proposed by Sherry Arnstein in 1969, an American urban planner which used this simple metaphor to describe participation - ranging from low levels to high ones - about citizen involvement in planning processes in the United States (Arnstein 1969). Although the symbol of the ladder is a simplification, it is a useful tool to orient the evaluation of participatory processes (Figure 2).

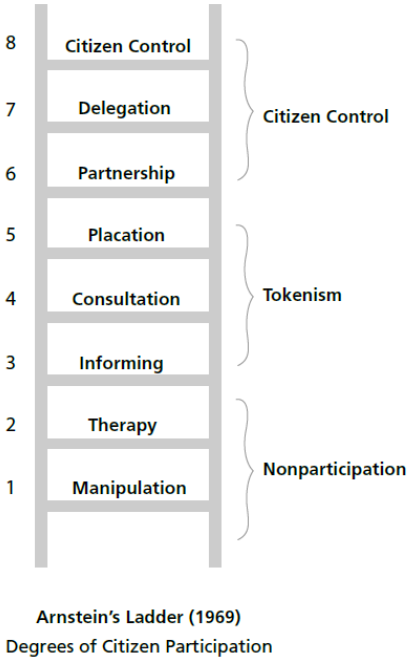

Figure 2: The Arnstein participation ladder indicating the degrees of citizen participation (Arnstein 1969).

On the lowest level, are present the "nonparticipation" actions: their «real objective is not to enable people to participate in planning or conducting programs, but to enable powerholders to "educate" or "cure" the participants». In the middle rungs of the ladder are present "Tokenism"[19] actions, which symbolically involve the community in the decision-making process, but eventually the decisions are made by powerholders: through consultations, workshops and public meetings, citizens are enabled to advise and plan, but the ultimate choice for the feasibility of the project is centralised (*Ibidem*). Then, on the top of the ladder are present the genuine participatory steps, consisting of "partnership" (which enables the citizens to negotiate and engage in trade-offs with traditional powerholders), "delegated power" (consisting in citizens holding a clear majority of seats on committees with delegated powers to make decision) and ultimately "citizen control" (where have-nots handle the entire job of planning, policy making and managing a programme).

The discussion on participation has been particularly lively and flourishing in South America, where a number of movements and authors have contributed to advancing alternative and sometimes radical proposals on the topic. Since participation will turn out to be a crucial element for the analysis of Ca' Roman's development scenarios, two Latin-American theoretical frameworks which elevate the participatory process to a key principle in decision-making are mentioned here. It

[19] Tokenism is the practice of making only a symbolic effort to do a particular thing, especially by recruiting a small number of people from under-represented groups in order to give the appearance of sexual or racial equality within a workforce (Merriam-Webster 2022).

is therefore useful to observe these proposals for "integral participation", in which citizens have full control over decisions concerning the territory in which they live, as to understand the dynamics that occur in a context that is radically different from the South American one, namely the Venice Lagoon territory. Indeed, in Italy (as well as in Venice), public administrations and local authorities do not sufficiently consider the issue of participation (Segre 2022), while most often dwelling on tokenism practices.

A fundamental author for participatory research and practice is the Brazilian pedagogist Paulo Freire (Orlowski 2019), especially for the proposals in his book “Pedagogy of the Oppressed” published in 1968, where he claimed that poor and exploited people can and should be enabled to conduct their own analysis of their own reality (Chambers 1994). According to Freire, researchers have to enable local communities to manage the decision-making process through dialogue and participatory actions, as to enhance people’s awareness and confidence, and empower them. Indeed, outsiders (like participatory experts or officers) should catalyse the actions made by the local communities, facilitating their research, project design and actions.

An alternative conception of local development that considers active participation as an absolutely central element is the Community Development framework, defined as «a process where members of a community come together to take collective action and generate solutions to common problems in order to create sustainable, cohesive and inclusive societies, governed by principles of equity and justice» (Gomez 2017). Community Development is a broad term which refers to a various set of practices led by civic leaders, activists, engaged citizens and consultants to improve local territories, with the aim of building stronger and more resilient communities. The author Aquiles Montoya highlights the differences between local development and community development, although he acknowledges the importance of the former. According to Montoya, local development considers local subjects as actors, so that «implicitly they should play a role that others have formulated for them. The participation of the people, like that of the actors, would be limited to the making of a careful interpretation, with which one may or may not agree, and which one may or may not feel, and so on. Therefore, participation, although active, is limited to being a simple representation» (Montoya 1998). In other words, within the Arnstein ladder framework, Montoya would define local development participatory practices as tokenism actions. For community development, however, «people are seen as the real subjects of the process, which does not come to them from anywhere, but is created by them through trial and error» (*Ibidem*). While recognising that this process is very time consuming, according to Montoya this ensures that development impacts are more effective and lasting.

3.1.2.3 Qualitative approach and the role of values

Another recurrent aspect of local development is the consideration of the qualitative aspects of growth, which goes beyond the simple consideration of quantitative indicators such as production, GDP or mortality rates (Raworth 2017). Indeed, the qualitative dimension relates to the nature of local development, such as «the economic, social, environmental sustainability, the type and quality of jobs, the embeddedness and sustainability of investments, the growth potential, the sectoral mix and social diversity of new firms» (Pike et al. 2007).

Qualitative approaches focus upon subjective concerns, informed by specific principles and values of local development socially determined in context within particular localities and regions at specific times. Depending upon the context, the sustainability of growth may be evaluated in terms of its ecological impact. Then, the "quality" of jobs might be assessed by their employment terms and conditions, relative wage levels, career progression opportunities, and trade union recognition and the extent to which each form of development contributes to the enhancement of citizens' capabilities (Sen 1999). Although efforts have been made recently to quantify such factors, the approach still remains fundamentally qualitative. Research has tended to concentrate, however, on the success stories of high productivity and high-cohesion forms of growth, neglecting other less desirable, but widespread, types of growth (Sunley 2000), testifying therefore how the "growth bias" is still present in the academic framework.

Quantitative and qualitative dimensions of local and regional development can be integrated but are not necessarily complementary. Localities and regions can experience development in quantitative terms but with a problematic qualitative dimension, for example inflationary and short-lived growth, increased low quality jobs and failing start-up firms. Similarly, localities and regions can witness qualitative development that is quantitatively problematic, for example low level, weak (but perhaps more sustainable) growth, insufficient (although potentially good quality) jobs or too few new investments (Pike at al. 2007)

Furthermore, values play a strategic role in defining what is development. Indeed, «what are considered "appropriate", "bad", "good", "failed" or "successful" forms of local and regional development are shaped by principles and values socially and politically determined in different places and time periods» (Pike et al. 2007). Rather than simple rational and technocratic calculations, principles and values frame value judgements about local development, and at the same time raise normative questions about the opinions of what *should be* rather than what is (Bagchi-Sen 2006).

As values vary within the cultural and social context, what is intended as development is different according to the location. Indeed, the principles and values that shape social aspirations may reflect perceived local economic, social and political problems. Furthermore, particular geographically rooted constructions of development condition the social use of resources with potentially different economic, social, ecological, political and cultural implications (Williams 1983). Such heterogeneity and contingency underpin the range and diversity of different approaches to development (Pike et al. 2007).

3.2 Territorial regeneration

Since the two Ca' Roman development scenarios examined in this thesis consider the requalification and restoration of existing heritage (both real estate and natural), they can also be analysed as cases of territorial regeneration. This paragraph attempts to explore in more detail the various meanings of the concept, in order to develop a univocal definition that is adopted to analyse the two scenarios examined.

3.2.1 Territorial regeneration in Italy

Territorial regeneration can be defined as a planning approach aimed at giving new vitality to disused or degraded areas through actions designed at recovering infrastructures, built sites and services, identifying new uses and limiting land consumption. This approach, conceptually similar to the idea of urban regeneration, is characterised by a greater sensitivity to «hydro-geological safety, ecosystem margins, and water-soil pollution resulting from previous uses» (PoliTo 2022).

In Italy, the idea of regeneration is mainly understood as an urban process and is based on the idea of recovering as much as possible existing spaces and areas that are compromised in various aspects, both environmental and structural. Urban regeneration in Italy is therefore configured as a reaction to the constant decrease in building surfaces and the increase in land consumption that has occurred since the second half of the 20th century. It is possible to summarise the recent national history of urban regeneration in three cycles: the redevelopment of historic city centres, the recovery of disused areas and the “scrapping” of residential neighbourhoods built in the second half of the 20th century, in particular between 1946 and 1971 (CGB 2018). The recovery of historic centres began in the phase of maximum development of the industrial city, the 1970s, with the physical, social and economic rediscovery of the historic city. Thanks to a renewed sensitivity to historical heritage and local identity as a value, urban centres underwent a process of regeneration, with a focus on the preservation of historical and monumental heritage. The second regeneration

cycle began in the late 1980s, when Italy's main industrial cities were faced with the economic and social emergency of delocalisation and the closure of industries. These divestments were joined, over the years, by the relocation of certain services (slaughterhouses, general markets, railway areas, etc.) and entire state-owned areas (military areas, the old part of port areas, etc.) in a process of overall reorganisation of the functions located in the central areas of the cities. These transformations have changed the urban landscape of Italian cities, due to the considerable increase in disused areas. The process of abandonment, on the other hand, presented a great opportunity, as the availability of large areas in the centre to make up for the lack of infrastructure (greenery, mobility, commerce, etc.) and services that too rapid growth had imposed. In this period, cities such as Turin, Florence, Naples, Venice, Padua and Sesto San Giovanni, pressed by the social and economic transformations underway, forcefully relaunched their image precisely by rethinking their structure and organisation starting from disused areas. The third cycle of urban regeneration is just beginning and refers to the "*città da rottamare*" (namely, the city to be scrapped), a term used to indicate the need to launch innovative policies and procedures to regenerate residential neighbourhoods built with low building, architectural and urban planning quality criteria. As happened to some extent in the historic centres renovation, the regeneration of these neighbourhoods impacts directly on the living complex of the residential city (and not in abandoned areas or buildings), but unlike that period it does not have to set itself objectives of preserving the historic and/or monumental heritage. Therefore, renovation, replacement by parts and even demolition and reconstruction of existing buildings can be used as useful tools (CGB 2018).

The concept of regeneration is widely used at a national level, as witnessed by the Italian Ministry of Infrastructure and Sustainable Mobility's "Urban Regeneration and Sustainable Land Requalification Programmes", for which regeneration is defined by two fundamental features. First, it has as its aim «the realisation, adaptation and completion of equipment, both networked and punctual, at territorial and urban level, capable of promoting and directing opportunities for sustainable development from an economic, environmental and social point of view, with regard to the values of environmental protection, the valorisation of the historical, artistic and architectural heritage, and guaranteeing an increase in the well-being of the community». Secondly, the regeneration of the territory must achieve «an integrated system of activities aimed at the expansion and realisation of industrial, commercial and craft settlements, the promotion of tourism and recreation, and the redevelopment of central and peripheral urban areas affected by degradation» (MIMS 2022). In addition, good practices of land recovery and requalification focus on the local community, in order to allow citizens to re-appropriate and re-experience the regenerated spaces,

with evident improvements in the quality of life and in the social, economic and environmental spheres (UNITEL 2021).

The predominant approach of land regeneration is urban-architectural, especially at the level of local government, although multi-sectoral approaches that adopt the principles of the 2030 Agenda for Sustainable Development (Iuvone 2019) are becoming increasingly popular and also consider social, economic and landscape aspects (Belotti 2019), whereby «the territory is no longer understood only as a topographical space susceptible to building occupation, but re-evaluated as a complex resource embodying multiple vocations (cultural, environmental, productive, historical)» (*Ibidem*).

The regenerative approach identifies soil consumption as one of the most serious variables in the problem of anthropogenic pressure on natural resources (Iuvone 2019), as the loss of permeable soil prevents the provision of those ecosystem services that are fundamental to the human socioeconomic and productive system (ISPRA 2022). In fact, a soil in natural conditions provides different types of ecosystem services: supply services (like food and biomass, raw materials, etc.); regulatory services (such as climate regulation, carbon capture and storage, erosion and nutrient control, water quality regulation, protection and mitigation of extreme hydrological phenomena, etc.); support services (physical support, decomposition and mineralisation of organic matter, species habitat, biodiversity conservation, etc.) and cultural services (recreational services, landscape, natural heritage, etc.). At the same time, it is also a fragile resource that is often considered with little awareness or attention when assessing the effects of the loss of its functions. In fact, incorrect agricultural, zootechnic and forestry practices, settlement operations, changes in land use and local effects of global environmental changes can give rise to serious degradation processes that limit soil functionality. These transformations often only become evident when they are irreversible, or in such an advanced state that restoration is extremely costly and economically unviable (ISPRA 2022). The consumption of new soil is therefore considered as a extrema ratio by public policies, to be implemented only after verifying the unavailability of existing public and private building stock to be restored and redeveloped (Iuvone 2019).

3.2.2 National and regional legislation about urban and territorial regeneration

At the national level, there is still no organic legislation on soil consumption and the promotion of territorial and urban regeneration despite numerous legislative initiatives on the subject. Some of these are summarised below:

- XVI Legislature: Bill "Regulations for the containment of soil consumption and urban regeneration" (Senato della Repubblica 2012);

- XVII Legislature: Bill A.S. 2383, "Containment of soil consumption and reuse of built-up land", which lists the fundamental principles for the valorisation and protection of soil. In particular, it is foreseen that the reuse and urban regeneration, as well as the limitation of soil consumption, are fundamental principles of the spatial government matter. However, soil consumption is only allowed in cases where there are no alternatives consisting in the reuse of already urbanised areas and their regeneration (Senato della Repubblica 2017).

- XVIII Legislature: Bill No. 1131 "Measures for urban regeneration". In the accompanying report (in *Atti parlamentari*, Senato della Repubblica No. 1131, March 2019), it is specified that the bill is intended to be an organic instrument to achieve urban regeneration in our country. «The proposal is aimed at defining the fundamental principles on urban regeneration and the related incentives for interventions to be carried out as a priority in already urbanised degraded areas to be redeveloped, within the limits of the concurrent State-region legislative competence on territorial governance» (Senato della Repubblica 2019).

Despite this legislative activity, there is no shared definition about "regeneration" in the Italian administrative apparatus. In spite of this, Article 2 of the above-mentioned bill defines urban regeneration as «a systematic complex of urban and building transformations in urban areas on areas and building complexes characterised by urban building, environmental or socio-economic degradation» (Iuvone 2019). The approach in Italy remains therefore strongly focused on the urban aspects of regenerative processes, neglecting to define the broader concept of territorial regeneration. It is possible to trace a reference to this new concept of land management - that also considers environmental and landscape aspects - in the administrative framework of some Italian regions, as in the case of the Veneto Region.

In Veneto, the Regional Law no. 14 of 4 April 2019, having as its object "Veneto 2050: policies for urban regeneration and re-naturalisation of the territory and amendments to the regional law 23 April 2004, no. 11 ‘Regulations for the government of the territory and in matters of landscape’" is published in the BUR no. 32 of 5 April 2019. According to the regional directives, «Veneto 2050 promotes measures aimed at improving the quality of life of people within the city and the reorganisation of urban spaces, urban regeneration in coherence with the principles of limiting land consumption» (Regione Veneto 2022). Among the relevant aspects envisaged by "Veneto 2050" are

premium mechanisms and incentives to encourage «the requalification of the existing building stock, with particular emphasis on the use of renewable energy sources and the circular economy» (Regione Veneto 2022). In addition, the law also provides for a territorial "cleaning" action through a system of building credits that rewards those companies that carry out soil renaturation processes. In this way, the regional law aims to encourage «the demolition and reconstruction of incongruous works or elements of degradation, with a view to reorganising the urban territory and replacing degraded or disused building heritage» (*Ibidem*).

3.2.3 Misuse of the concept and socio-environmental impacts

The term "regeneration" is often interchanged with terms such “requalification”, “redevelopment”, “reuse” and “recovery”, although each one has a different meaning. This has contributed to semantic confusion about the meaning of the word "regeneration", resulting in confusion at the level of public policy and implementation of regeneration programmes, which has led in some cases to an instrumental use of the concept. In addition, the terms “regeneration”, “redevelopment” and “reuse” have now become predominant in the policy discourse of public administrations, which share «the widely spread idea that the era of urban planning and expansion building is over and that the era of reuse and rehabilitation of the existing has begun» (Iuvone 2019). The "regeneration" label is very successful because it is «easy to translate into a few, simple, consequential actions: limiting the consumption of new "green" land, prioritising the recovery and redevelopment of vast peripheral areas that are compromised and degraded, reclaiming disused industrial land, and reconverting and recovering abandoned industrial warehouses» (*Ibidem*). This ease of use, together with a vague and often imprecise conception of the verb “to regenerate”[20], implies that this term is often adopted to justify the implementation of building plans or economic development programmes that have far-reaching impacts on social and environmental aspects on the local area and community (Zukin 1987).

From a social point of view, a widespread phenomenon that is due to regeneration interventions is gentrification, which is a process of socio-economic transformation of inhabited areas - such as city districts or small towns - whereby the original inhabitants, often belonging to middle- or low-income classes, abandon these spaces to be replaced by high-income citizens (Lees 2008). Thus, redevelopment and renovation interventions may cause rents and property prices to rise and thus encourage the migration of the original inhabitants to other urban areas (Treccani 2022).

[20] Regeneration comes from Latin “*regenerare*”, which means “to produce something new”. This new generation sub-intends a qualitative aspect of improvement that is grafted onto the Western line of thought based on progress: this conceptual connection with the terms progress and development has led to the term becoming popular in Western circles (see paragraph 3.1.1 “The multiple meanings of local development”).

Furthermore, regeneration interventions have the potential to turn into speculative real estate operations, whereby the benefits they are supposed to bring from a social point of view are overshadowed. In fact, these interventions often confuse housing and environmental quality with the architectural quality of the project realised, and are therefore insensitive to the fact that a building of high aesthetic and architectural value may be unsuitable for the social needs of the local community (EXEO 2022).

From an environmental point of view, regeneration interventions are defined as "sustainable" in that they aim to improve the environmental quality of the intervention area. Most of the literature on regeneration praises these aspects of reducing environmental and climate-altering impacts through more efficient management of resources (essentially water and energy) and improved landscaping (Roberts 2008). Nonetheless, in the case of speculative business-as-usual operations, awareness of the consequences on local ecosystems and environmental pollution are side-lined, so that regeneration projects become extremely impactful on the quality of the biological and geochemical systems in which they are embedded (Caputo 2020). Furthermore, green care interventions, if intended solely for their aesthetic value, do not bring any benefit from an environmental point of view, but rather may produce negative outcomes, as allochthonous ornamental species may be introduced into the ecosystem, which may propagate and go on to occupy the ecological niches of local species, with consequent knock-on effects for the entire ecosystem (Antinori et al. 2018).

4 Methodology

This research is based on a mixed approach, which involves the adoption of both qualitative and quantitative methods, although the qualitative part is predominant. A core part of the thesis consists in the use of semi-structured interviews with local stakeholders, as it has been assessed to be a suitable method to involve actors present in Ca' Roman to share their ideas and opinions about the local development scenarios studies. Furthermore, interviews were fundamental to reconstruct key historical happenings as the judicial proceedings concerning the development plan for the former colony or the political actions for the proposal of the Fort Ca' Roman Recovery Plan. Additional material was provided by the analysis of the local media, mostly press, as both to find evidence of the different historical events and to identify the public opinion about the development scenarios. On-site visits - supported by the collection of photographic material - were also important to study Ca' Roman from an ecological and geomorphological perspective: in addition, the conditions of the abandoned buildings of the former colony, the Barbarigo Fort and the Nazi bunkers were reported, as to investigate the relationships between abandonment and wilderness. Further, Geographical Information Systems analysis has been adopted to support the research with quantitative data about the modifications over time of Ca' Roman eastern shoreline and its forest.

4.1 Semi-structured interviews

A semi-structured interview is a research method frequently used in social sciences. It is based on an open approach, in the sense that it allows new ideas to be brought up during the interview as a result of what the interviewee says. Indeed, a semi-structured interview has not a rigorous set of questions (which does not allow one to divert) like a structured one, as the interviewer has only a framework of themes to be explored – which is not completely controlled. Because of its features, semi-structured interviews are widely used in qualitative research (Kallio et al. 2016).

This thesis is based on a set of semi-structured interviews with local stakeholders (Gruppo 25 Aprile, LIPU, Italia Nostra, Marine Village of Ca' Roman, Parish of Pellestrina) as to identify their opinion about the redevelopment scenarios, what they expect from them, their criticisms and their proposals for a better use of natural resources in Ca' Roman without damaging the local environment. The interviews were led by a framework of open questions that allowed the interviewees to express freely their thoughts and feelings about the topic. Due to the physical distance to reach Ca' Roman, only a part of the interviews has been implemented in presence: other interviews were led by videocall or phone call. The contribution of these interviews was

fundamental to develop the research, as it allowed to recognise the interests of local stakeholders and identify the lack of a participatory process within the context of the development scenarios analysed.

4.2 Analysis of local media

The research is based on a wide analysis of media from the Venice Lagoon area. Most of the media analysed are press articles from local newspapers like “Il Gazzettino” and “La Nuova Venezia”, along with other national information providers such as RAI (Radiotelevisione Italiana), “Domani”, “Il Corriere della Sera” and ANSA (Agenzia Nazionale Stampa Associata). Local stakeholders’ webpages were also an important source of information (Italia Nostra, LIPU, Gruppo 25 Aprile), especially for understanding the opinion of the public arena towards the development scenarios. Furthermore, official publications by public authorities were assessed, mostly from the Venice Municipality website. This crossed research allowed to reconstruct the development of the two scenarios over time and the reactions they fostered from the civil society.

4.3 On-site photography

Photography can be used as a tool for communication purposes through the impact of pictures. Indeed, images have the potential to express more directly events, feelings or even theories (van Dijck 2008). Furthermore, images have a key role in defining public and private memory, so that they can have an enormous impact not only one the personal sphere but also on the historical, political and social one. It is then important to acknowledge that with modern techniques it has become very easy to manipulate photographic pictures, as to control the symbolic meaning in order to conceive a specific message.

In this research, photography has been used as a tool to report the conditions of abandoned buildings in Ca’ Roman and identify where and how these neglected spaces interact with the wild forest as to produce new dynamics. The camera used to shoot the pictures is a Fujifilm X-T30. The pictures were not modified, as the scope of the research is to report the state of abandonment as it is at the present moment. Nevertheless, it is necessary to be aware that the act of shooting a photo consists in a selection of a part of the reality which falls within the frame of the camera: thus, objectivity of the fieldwork is not claimed, as its partial and subjective traits are evident.

4.4 Geographical Information System

A Geographical Information System (GIS) is a computerized database management system designed for the capture, storage, analysis, and display of spatial data. In this research, GIS has been used in order to provide a measurement about the modification of Ca' Roman coastline during the last century and about the expansion of Ca' Roman forest between 1978 and 2022. The analysis involved the use of satellite and aerial images, in order to identify the relevant geomorphological and anthropic elements within the island. The GIS software used for this research is the open-source program QGIS (Version Hannover 3.16.11). As in other GIS systems, objects are defined by cartographic data consisting of points (one geographic location), lines (a series of connected points), and polygons (an area enclosed by lines). Each object has a unique set of coordinates that places it at specific location. The coordinate system is site-specific, as it depends on the country or local area in which the cartography is produced: for this project, coordinate system Monte Mario (Rome) / Italy zone 1 - EPSG:26591 has been adopted.

The material of the geospatial analysis for the construction of the Historical GIS[21] in Ca' Roman consists in historical maps and aerial photos. The historical maps analysed are: "Von Zach 1798-1805", "Second military survey of the Habsburg Empire (1818–1829)", "Antonio de Bernardi 1843", "*Genio Civile* 1897", "*Mappa redatta dal Corpo Reale del Genio Civile di* Venezia" (1911), "*Carta Idrografica della Laguna redatta dall'Ufficio idrografico del Magistrato alle Acque di Venezia*" (1932) (Atlante della Laguna 2022; Banca Patavina 2016; DPRV 2012). Additionaly, more recent aerial photo provided by the Veneto Region Geoportal were analysed: "*1983 Regione Veneto*", "*1987 Regione Veneto*", "*1994 Comune di Venezia*", "*2004 Comune di Venezia*", "*2010 Regione Veneto – risoluzione 18 cm*" (Geoportale 2022).

[21] A historical geographic information system (also written as historical GIS or HGIS) is a geographic information system that may display, store and analyse data of past geographies and track changes in time. It can be regarded as a tool for historical geography (Knowles 2008).

5 The forest and the human in Ca' Roman

In this chapter, the Ca' Roman forest and pinewood is considered, as to identify its role on the ecological level, as well as its value for human-oriented activities. First, the history of the wood is traced back, and its ecological value identified. Then, the forest is the starting point of a reflection about the interactions between anthropic and natural elements, as the Ca' Roman wood is the centre of a dynamic system of physical, biological and symbolic relations. The wood is also the place of implementation of two development scenarios – the "*Piano di recupero dell'ex colonia di Ca' Roman*" and the "*Piano delle misure di compensazione delle opere MoSE*"[22] – which could turn upside down the delicate equilibrium of the island and favour a different social and economic use of its resources, exerting a considerable influence on its fragile ecosystem.

5.1 The Ca' Roman forest: history and ecological value

The Ca' Roman forest is a former artificial pinewood that is going through a process of diversification, with the inclusion of other species (both local and allochthonous). It is a recent wood, since its origin is traced back to the end of the 1950s[23] (Mamprin 2022). As the majority of pinewoods present in the North Adriatic shoreline, its implantation is due to a broader Italian program of reforestation. As Campagnolo states, «since the beginning of the twentieth century, at the same time as the realization of hydraulic reclamation works in the lagoon areas, extensive reforestation was carried out along the entire Veneto coastline. The aim was to create, in areas close to the coast, windbreaks to protect crops[24] and fishing valleys, while providing timber for new farms» (Campagnolo et al. 2010). Indeed, these strips of vegetation were able to catch the marine aerosol rich of salt brought by the winds, preventing therefore the salinisation of the soil (Boscaro 2016). The first attempts of reforestation were implemented along the east coast, where planting techniques were adjusted and then used extensively for subsequent operations. Normally, a strip of tamarisk trees was established seaward, behind which pines were planted. Any wetland present was reclaimed, resulting in a drastic decrease in these environments (Borghesi 2008). These «reforestation projects followed one another from the 1920s until the 1940s, affecting the entire

[22] The *Piano delle misure di compensazione, conservazione e riqualificazione ambientale dei SIC IT3250003, IT3250023, IT3250030 e IT3250031 e della ZPS IT3250046* is called in this research also *Piano Europa* or *Piano delle misure di compensazione delle opere MoSE*.

[23] According to LIPU officer Luca Mamprin, the Ca' Roman pinewood was planted during the summers between the 1958 and the 1961.

[24] Pinewoods are able to break sea wind and therefore protect the autumn and winter crops, such as barley or cereals.

coastline from the right side of the mouth of the Tagliamento River to the mouth of the Adige River. After an interruption from 1940 to 1946, due to the war, reforestation resumed» (Campagnolo et al. 2010).

Conversely, the Ca' Roman pinewood has no clear origin. Actually, the forestation occurred in Ca' Roman didn't have any productive purpose, since the island was unoccupied and no crop was grown there. Furthermore, the plantation occurred between the summer of 1958 and the end of 1961 (Mamprin 2022), way after the implementation of the vast forestation program mentioned above. Without any data, it is not feasible to achieve any real conclusion, but it is possible to hypothesize that the plantation, led by the Forestal Services of Veneto Region, was conceived to give aesthetic continuity to the shorelines of the Venice Lagoon (Mamprin 2022).

As the other pinewoods present in Veneto, the artificial forest is composed by three pine species: *Pinus pinea*, *Pinus halepensis*, and *Pinus pinaster*. Also, many specimens of *Pinus nigra* were planted, but they have recently been eliminated by the spread of processionary moth (Mamprin 2022). Nowadays, according to the LIPU chief, the forest is going through a period of conversion, with the elimination of the former pinewood towards the formation of a planation forest. Indeed, its original composition has been altered during the last 60 years, as several species were introduced, both deliberately and through propagation. The Forest Services of Veneto Region have been planting during the years several specimens of local plants such as holm oaks, downy oaks, field maple, ash tree and shrubs like barberry**,** *Viburnum opulus,* and *Crataegus azarolus*. Many other species, mostly invasive, colonized the wood, like robinia, poplar and ailanthus.

Ca' Roman forest is placed in continuity with the dune system, as it is placed on stabilized dunes originated from the interaction of weather-sea forcings, the coastal sediments and the dune vegetation (Figure 3). As such, there is a strong interconnection between the dunes, the *Ammophiletus*, the T*ortolum-Scabiosetum* and the forest systems which allow a consistent variety of fauna and flora (Caniglia 2007).

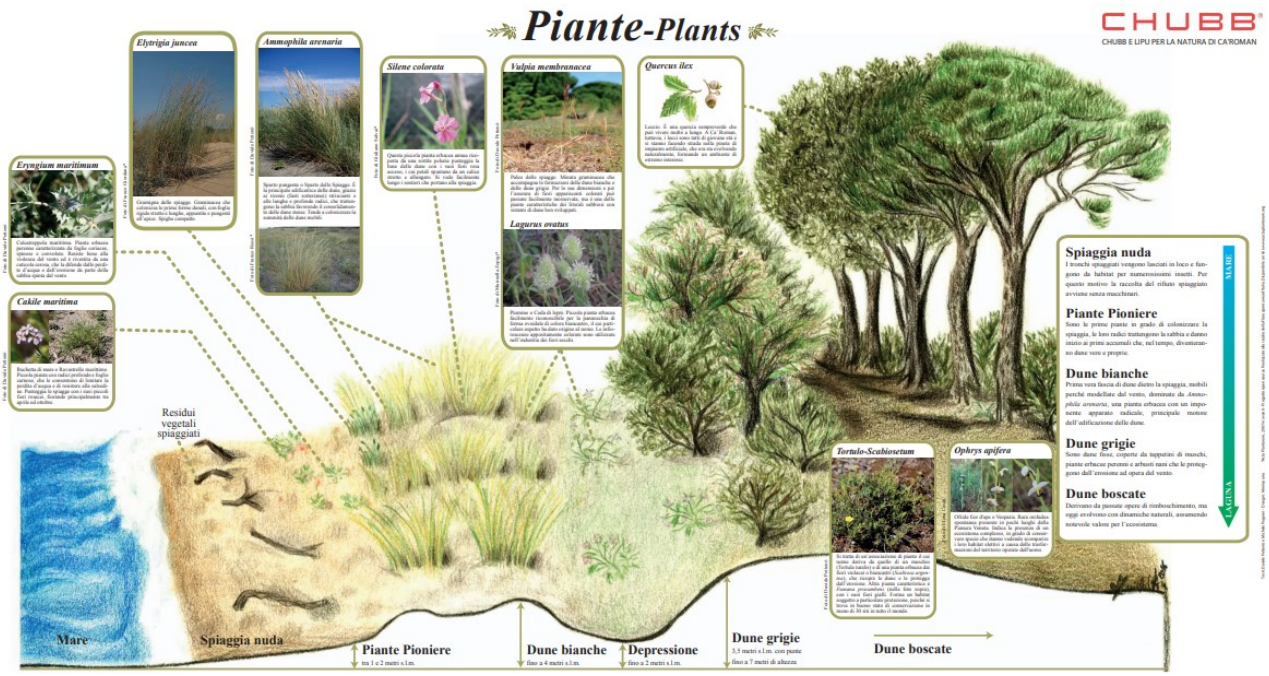

Figure 3: The succession of vegetation from the shoreline to the terrestrial systems in Ca' Roman. Picture provided by LIPU Ca' Roman section (Pettenò 2007b).

The ecosystem of Ca' Roman could benefit from this conversion, since the dominant presence of pine trees causes higher soil acidity, which reduces the activity of decomposers (such as fungi and bacteria) and therefore reduces the amount of organic matter produced. Thus, a greater variety of tree species would guarantee an improved organic activity and prompt the inclusion of new species in the forest, increasing its biodiversity. Furthermore, the presence of a thick layer of pine needles - which do not decompose because of the lack of decomposers - is the potential source of fires. Indeed, Ca' Roman is provided with a fire protection system to face this eventuality (Protezione Civile 2005). As the LIPU chief Luca Mamprin states, Ca' Roman is a fundamental site for the Venice Lagoon, since it has a variety of habitats that hosts a huge diversity of species: this richness combines with its strategic position, since Ca' Roman is one of the most important migratory routes in Italy, and many bird species (190 surveyed until 2012) use this spot to rest and feed during their journey in autumn and spring (UNESCO 2022).

Many of these species adopt the forest as their habitat, like the nightjar, the Sardinian warbler and the scops owl. The nightjar (*Caprimulgus europaeus*) is a nocturnal bird with a distinctive call echo which feeds on insects. It builds its nest among the grey dunes close to the pinewood. The Sardinian warbler (*Sylvia melanocephala*) is an insectivorous bird, about 13 cm long, common in the central and southern regions of Italy, while in Veneto region it is related to a few coastal sites. The scops

owl (*Otus scops*) is a small nocturnal bird. It reaches Ca' Roman during the warm season, migrating from the southern Sahara to nest. It places its nest in cavities in trees (Pettenò 2005).

5.1.1 Transformation in Ca' Roman morphology

During the last century, the morphology of Ca' Roman changed dramatically for the accumulation of sediments coming from the sea. This evolution of the eastern shoreline enabled the expansion of the former pinewood seaward, increasing therefore the habitat of local species and waterbirds. In 1911, with the construction of the breakwater (called *diga foranea*), the original morphology of the area (a long, narrow sandy hollow) underwent a profound change. The breakwater, in fact, intercepted the sandy sediments brought by the sea current, causing a very rapid advancement of the shoreline. This process continues to the present day, recording a constant advancement of the coastline (LIPU 2022). An analysis of the modification of Ca' Roman shore can therefore provide relevant information to understand how the forest has changed over time, as it is a major factor of its expansion.

The software QGIS (Version Hannover 3.16.11) has been used to analyse[25] the transformation of the island from the 1901 until 2010 through the comparison of historical maps[26] (the 1901 "*Mappa redatta dal Corpo Reale del Genio Civile di* Venezia" and the 1932 "*Carta Idrografica della Laguna redatta dall'Ufficio idrografico del Magistrato alle Acque di Venezia*") and more recent aerial photo[27] (the "*1983 Regione Veneto*", "*1987 Regione Veneto*", "*1994 Comune di Venezia*", "*2004 Comune di Venezia*", "*2010 Regione Veneto – risoluzione 18 cm*"). Older historical maps have been studied too, such as the "Von Zach 1798-1805" cartography, the "Second military survey of the Habsburg Empire (1818–1829)", the "Antonio de Bernardi 1843" map and the "*Genio Civile* 1897" cartography (Atlante della Laguna 2022; Banca Patavina 2016; DPRV 2012) - but, since the representation of Ca' Roman in those maps is nearly similar over the 18th and 19th centuries, they have not been considered for the GIS analysis.

Through a simple process of georeferentiation of the raster files and calculation of the areas, the modification of the shape of Ca' Roman and the progression of the coastline seawards are evident. Indeed, the island surface changed from an estimated 14.4 hectares from the 1901 map (Figure 4A)[28] to the 86.3 hectares of the 2010 aerial photo (Figure 7A) - for a total area difference of 71.9

[25] The methodology of the GIS analysis is described in Chapter 4 "Methodology".

[26] Source: Venice Lagoon Atlas (Atlante della Laguna 2022).

[27] Source: Veneto Region Geoportal (Geoportale 2022).

[28] As the area is calculated from an old cartography, the surface value of the 1901 map cannot be calculated with sufficient precision, so that the value reported is just an approximation of the real value.

hectares. The construction of the *diga foranea* in 2011 was a turning point for the geomorphological evolution of Ca' Roman, as it is showed by the comparison between the 1901 map (Figure 4A) and the 1932 cartography (Figure 4B), with an estimated surface of 34.1 hectares - 19.7 hectares differential, corresponding to a 136% increase. The coastline moved dramatically seaward during the last century (Figure 5A, Figure 5B, Figure 6A, Figure 6B, Figure 7A), as on the longest side (the one corresponding to the Ca' Roman Fort) it moved 698 metres eastward, while on the shortest side (the one corresponding to the northern end of the visible part of the *murazzo*) the change corresponds to 322 metres (see Figure 7B and Figure 8). The analysis shows a lack of available sources between 1932 and 1978[29], so nearly half a century of transformations is not documented. Nonetheless, it is possible to hypothesize a gradual increment of the Ca' Roman surface and a move eastward of the shoreline, as documented in different IGM (*Istituto Geografico Militare*) maps and aerial photos - which have been consulted, but, as no authorisation was given, cannot be used for this research. Furthermore, the 1950s pinewood implantation is showed by those non-publishable documents.

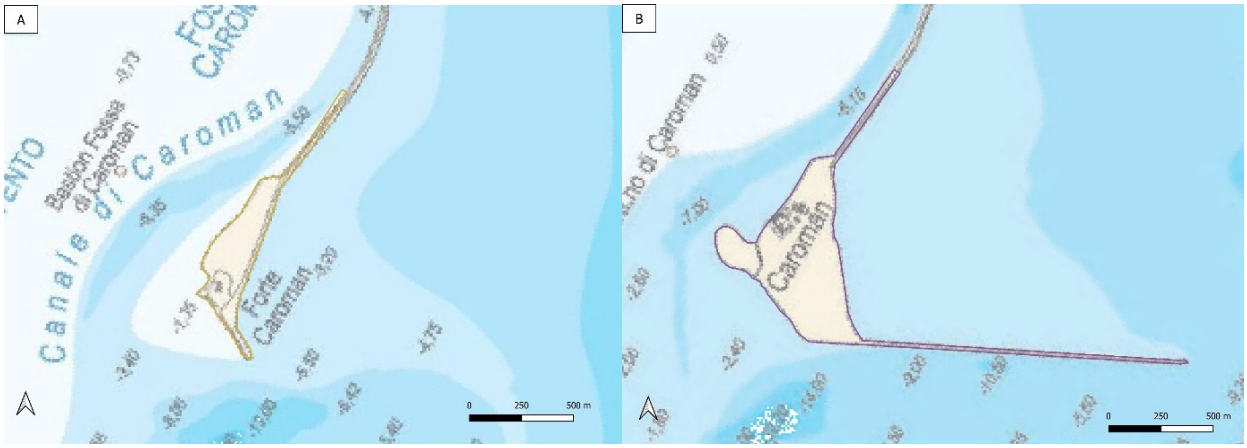

Figure 4: A) Ca' Roman 1901: Corpo Reale del Genio Civile di Venezia. B) Ca' Roman 1932: Carta idrografica della Laguna - Ufficio Idrografico del Magistrato alle Acque di Venezia.

[29] The author chose not to use the 1978 Regione Veneto aerial photo because of image resolution, and preferred to adopt the close-in-time 1983 Regione Veneto photo.

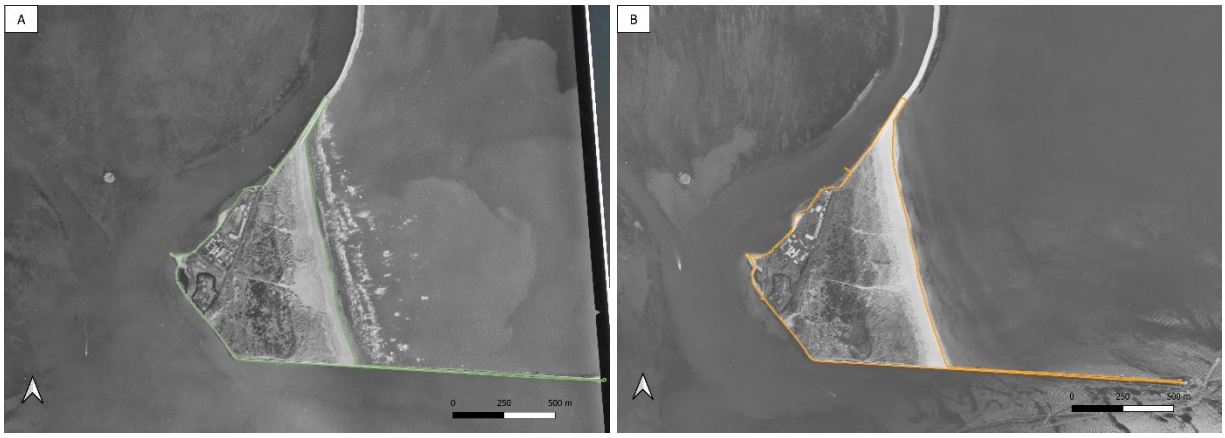

Figure 5: A) Ca' Roman 1983: Regione Veneto. B) Ca' Roman 1994: Comune di Venezia.

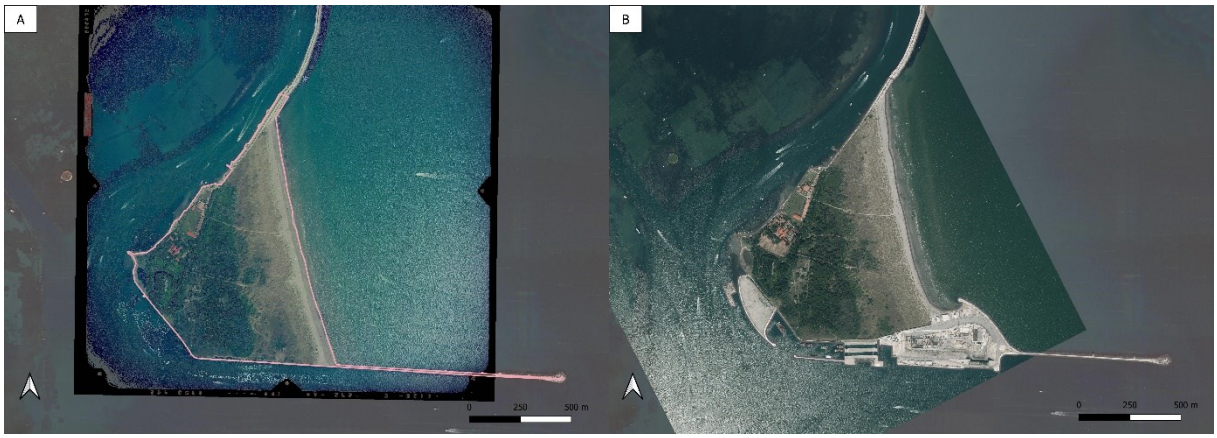

Figure 6: A) Ca' Roman 2004: Comune di Venezia. B) Ca' Roman 2010: Regione Veneto - 18cm resolution.

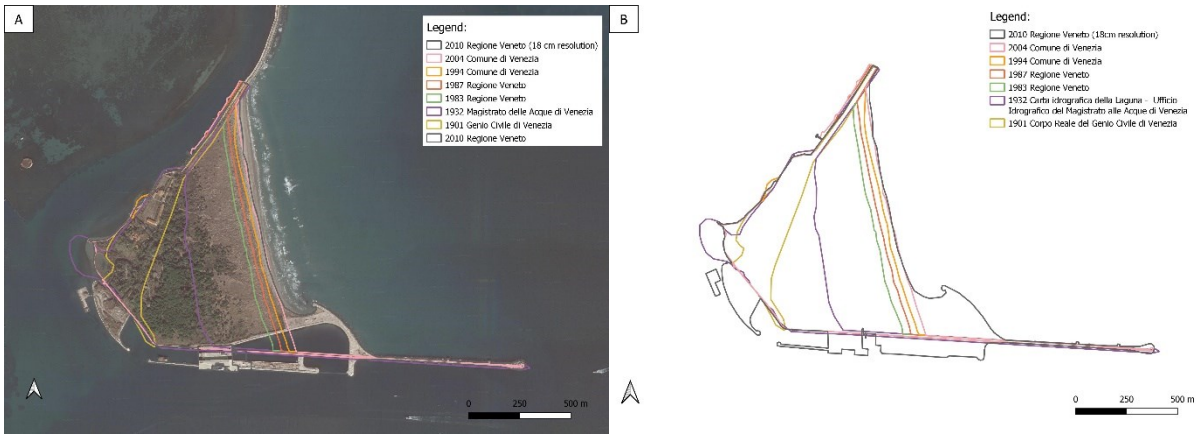

Figure 7: A) Transformation of Ca' Roman shoreline between 1901 and 2010). B) The progressive movement eastward (elaboration by the author).

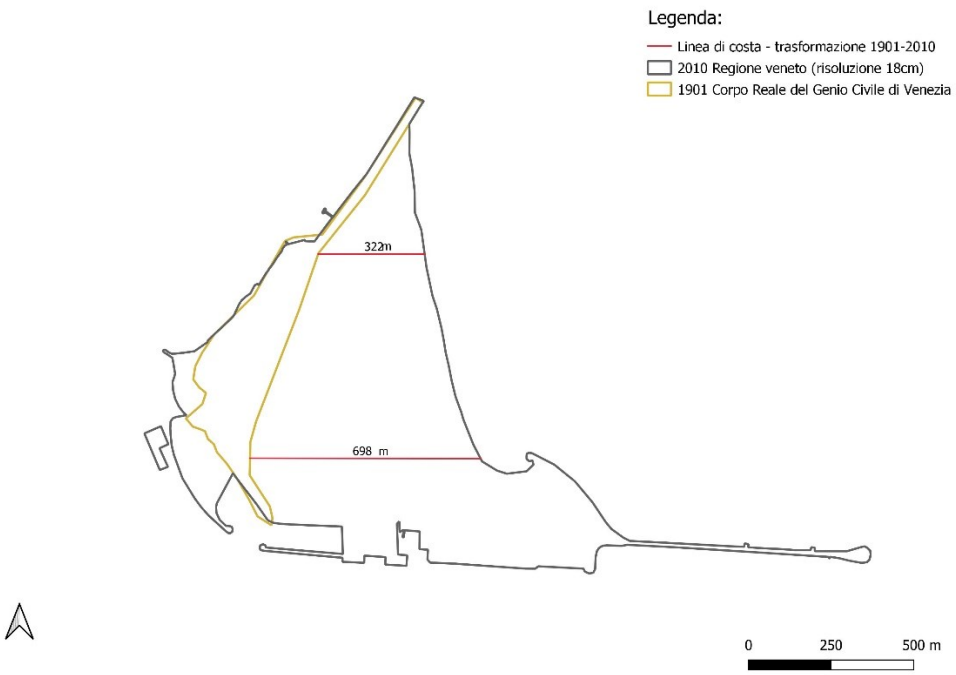

Figure 8: Eastward shift of Ca' Roman shoreline (1901-2010): on the longest side, the accumulation of sediment added nearly 700 metres to the former coastline (elaboration by the author).

5.1.2 The transformation of the forested area (1978-2022)

As the eastern border of Ca' Roman expanded seaward for the deposition of marine sediments, also the forest expanded through time. Indeed, as the terrestrial part of the island increased, available space for the forest area expansion was provided. Indeed, the marine sediments captured by shoreline vegetation turned into foredunes through a gradual process, stabilising into permanent terrestrial grounds the sediments and allowing therefore the colonisation by arboreal species.

Using QGIS software (Version 3.16.11), the Ca' Roman forest expansion is analysed and reported. Figure 9 and Figure 10 show the difference between the 1978 aerial photo from Veneto region Geoportal (Geoportale 2022) and the 2022 satellite image (Google Satellite 2022). From this analysis is possible to identify the progressive enlargement process of the wood seaward, consolidating the area which once hosted grey dunes. As a consequence, the grey dunes moved eastward, following the shoreline expansion. Furthermore, the forest moved also westward, occupying the area which once hosted the summer colony: indeed, that area faced a process of re-naturalisation after its abandonment after the 1990s. Thanks to these two different directions of expansion, the wood surface increased in the last 40 years of nearly 14 hectares[30] - nearly doubling

[30] As the calculation has been implemented on the basis of just two satellite images, the surface area of the forests in 1978 and 2022 is only an approximation: further analyses have to been done in order to achieve a high accuracy estimation.

its area, from the 20 hectares of 1978 to the 34 hectares of 2022. This expansion increased therefore the capability to host species, providing a positive shift in the availability of habitats for nesting waterbirds.

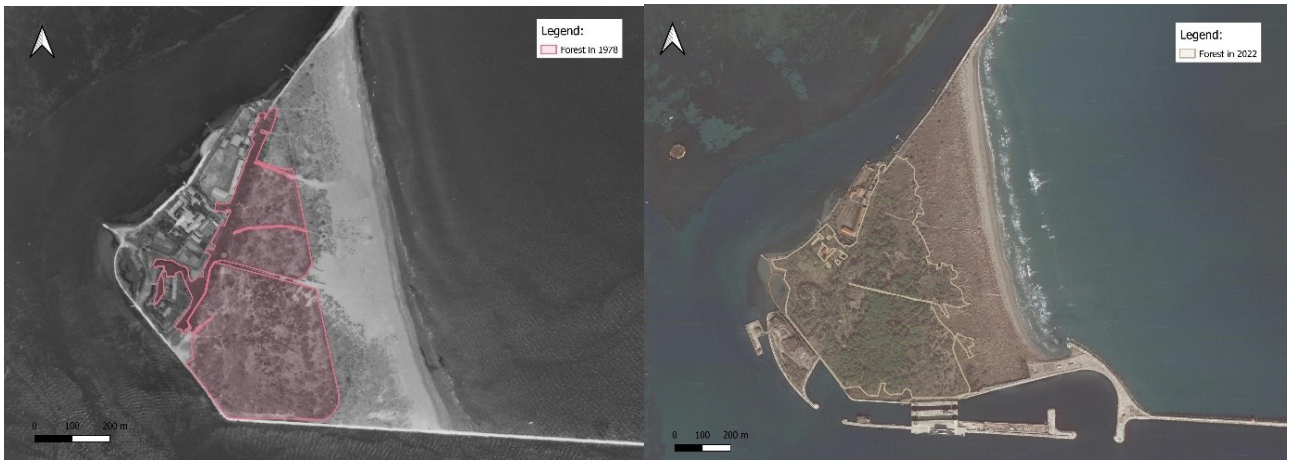

Figure 9: The expansion of Ca' Roman forest between 1978 and 2022 (elaboration by the author).

Figure 10: Compared analysis of 1978 and 2022 Ca' Roman forest's perimeter (elaboration by the author).

5.2 The forest and the abandonment: interactions between the anthropic and the “sylvan”

The Ca' Roman forest stands at the centre of a dynamic complex of interactions, as it plays the role of “mediator” between the island's elements. Indeed, its position within Ca' Roman makes it a pole of interchange between the lagoon, marine and dune ecosystems and the anthropic elements, whether abandoned or frequented. This mediating activity therefore makes it a centre of dynamics that can give rise to new forms of interaction «between the biological and the artefact, nature and society, wildness and humanity», which are the core of the PRIN Sylva Project of which this thesis research is a part (IUAV 2022). In this paragraph, only the abandoned anthropic elements consisting of the former summer colony and the military fortification system (in particular, Fort Ca' Roman and the system of German bunkers and artillery platforms) are considered, in order to reflect about the potentiality concerning the interactions between the forest and abandoned places.

5.2.1 The value of the abandonment

The forest relates to such abandoned artefacts both in a conflictual manner and in harmony with them. On the conflictual side, vegetal elements tend to extend their areal over time, incorporating the space previously occupied by buildings, pathways and other signs of human presence. This tendency towards natural invasion corresponds to the degradation of artificial elements - such as peeling walls, broken tiles, sagging pavement - which are defined as "abandoned", i.e. empty spaces that are no longer lived in or used by anyone. Or at least, by no being recognised to have a human dignity. In fact, these abandoned places are often a refuge for people on the margins of society and become ideal habitats for wild animals and plants. Abandoned places therefore constitute an apparent void, which instead conceal an extraordinary vitality, even if sometimes contradictory. In fact, these spaces - being socially perceived as empty, dirty and abandoned - become ideal places for illicit activities, such as the illegal dumping of waste, as it is commonly perceived that the lack of human presence corresponds to the absence of the social and normative rules.

On the other hand, as far as the relationship between the biological and the artificial is concerned, abandoned places constitute a key element in reversing the human approach to the natural, i.e. the *other-than-self* that constitutes the alterity par excellence to the human being. Indeed, it is in such places where the human presence is not predominant that the natural element can express itself more freely - respecting its own biological times and spatial needs, which are diachronically and spatially different from the productive ones of large anthropized centres such as cities or industrial districts - and thus establish new relationships with the surrounding anthropic space. In fact, it is no

coincidence that abandoned places often also become centres of artistic expression, where the “underground”, non-constant frequentation by people allows the temporal and spatial terms of vegetation and fauna to be respected (Figure 11).

Figure 11: Human-nature interactions in Ca' Roman, where the vegetations is invading one building of the former Canossian sister's colony (elaboration by the author).

This leads to some interesting results, which may suggest unprecedented itineraries of cooperation between the human and the natural. Firstly, an abandoned and re-naturalised space, if it is used by people, means that it is satisfying individual and social needs that human-made spaces have not been able to achieve. The re-naturalised space thus becomes an extension of the human social space. Secondly, a closer study of the places of abandonment could allow for a deeper understanding of the ecological dynamics of species and their interactions with an environment that is different from the natural one. Consequently, an understanding of the dynamics between biological organisms would ensure a more conscious management of habitats. Furthermore, the frequentation of such re-naturalised spaces may also have educational purposes, as these become meeting places between *Homo s.* and other species, where people learn to co-exist along with other creatures and thus increase their awareness about human impacts on the environment.

5.2.2 The human-forest relations in Ca' Roman

The aforementioned dynamics between the human and the natural can be found at Ca' Roman. Indeed, the colony's buildings, in a state of severe degradation - with the danger of collapse of the structures - have been encompassed by the forest in front of them, both in the external spaces between the blocks, and in the interiors, with the branches of various shrubs and trees extending into the buildings. Similar conditions can be found also at Fort Ca' Roman and in the various bunkers distributed along the island's NS axis. Furthermore, the buildings are marked by various elements of anthropic frequentation, such as abandoned rubbish and writing on the walls - consisting mainly of goliardic or affective manifestations. At the former marine colony, however, are present some artworks - mainly in the form of *graffiti* (Figure 13) - with a greater expressive and reflective intent. Moreover, in a wooden shack, an installation consisting of four sculptural elements was found, next to the associated exhibition sheet, which makes clear the artist's intention to explain her conception of the work - an invitation to reflect on the theme of change and growth - to the eventual visitor (Figure 14). This implies that the artist was aware that the place is a point of attraction for a certain typology of visitors, thus revealing how the abandoned colony is not really an empty space, but presents its own vitality of human interactions. Also inside the former colony, in a building facing the lagoon, there is another work, signed by another artist, consisting of mattresses retrieved from the abandoned site, inviting the visitor to momentarily detach herself/himself from reality in order to dedicate some time to self-reflection (Figure 12)[31].

[31] Both works are the work of young Venetian artists and IUAV (Istituto Universitario di Architettura di Venezia) students.

Figure 12: A *graffito* found in a colony's building (elaboration by the author).

Figure 13: A mural and corresponding poetry found on an external wall of a colony's building (elaboration by the author).

Figure 14: The installation *Alteration* (2022) by the artist Silvia Busnello, found in a shack of the former colony. A) Represents a distorted body left on top of old mattresses, which were used by the colony's guests. B) Another element of the installation. C) A massive head hanged on the rooftop: this disturbing presence makes the visitor reflect about growing up and changing interiorly (elaboration by the author).

Moreover, these artworks, although they are for the most part “urban” works (which could have been found in any other abandoned building of a metropolitan city), are set in the strongly natural context of Ca' Roman, so that for their fruition it is necessary to interact with the insular forest - as access to the colony requires to cross the wood through a short path obstructed by vegetation.

The condition of abandonment, therefore, allows for the establishment of different dynamics between the anthropic and the natural that may suggest a dialogue between the different elements, thus offering new insights into local development theory and practice. In fact, the area of the forest includes within it the former summer colony and the Ca' Roman Fort, which are the subject of lively debate about their management and use, due to the contrast between economic, conservation and socio-cultural interests. Therefore, the Ca' Roman forest is an interesting laboratory for analysing the contradictions that run through the Venice Lagoon, which can offer interesting proposals for the elaboration of alternative models of local development and regeneration, based on environmental sustainability and respect for the territory.

6 Local development scenarios in Ca’ Roman

Scenarios are storylines that describe possible futures relevant to the questions being addressed by local development proposals. They reflect «important choices that decision-makers are considering: What if we develop here? How might a particular policy affect the range of benefits that people count on and care about? What about climate change and its effect on those benefits?» (Nature Capital Project 2022). Indeed, scenarios are useful tools to find the best solution by comparing the alternatives and identifying the trade-offs.

In this chapter, two scenarios regarding the development of Ca’ Roman are considered: the “Recovery Plan of the former colony of Ca’ Roman” and the so-called “*Piano Europa*” which involves the Ca’ Roman Fort. They are both renovation plans of old structures, whose projects have been subjected to modifications due to normative regulation and the interaction, often in the form of critique and protest, with the local communities and stakeholders. Local and regional public authorities are involved in both cases as the promoters of these interventions. Furthermore, the analysis is based on the examination of local press articles and medias, as to identify the collective perception of the regeneration plans within the community of the Venice Lagoon.

6.1 Stakeholders in Ca’ Roman

Before considering in detail the two development scenarios, it is necessary to analyse the main stakeholders present in Ca’ Roman, as they have a fundamental influence on the evolution of the renovation plans. Indeed, although Ca’ Roman has no stable residents, its territory is cross-cut by a series of interests and local actors. In this paragraph, the main stakeholders are shortly presented and their core mission and activities in Ca’ Roman are identified. It is important to notice that not all the relevant actors listed below were available for a discussion about the scenarios, as mainly representatives from civil society were interviewed. Therefore, the opinions presented in Chapter 7 represent only a part of the complex socio-political dynamics and interests within Ca’ Roman and the Venice Lagoon.

6.1.1 LIPU

The LIPU - *Lega Italiana Protezione Uccelli* (Italian League for the Protection of Birds) - is an association founded in 1965 for the conservation of nature, the protection of biodiversity and the promotion of ecological culture in Italy. With 30,000 supporters, almost 100 local sections, over

600 active volunteers, dozens of operators, technicians, educators, LIPU is a reference point for nature conservation in Italy (LIPU 2022).

The Venice section manages the Ca' Roman LIPU Nature Reserve[32] since 1988 (Antinori et al. 2018), in agreement with the local authorities of the Municipality and the Province of Venice. In more than 30 years of LIPU's presence and management in the Ca' Roman area, the Association has been able to plan and carry out a series of management activities of nature conservation, environmental education and awareness-raising, and promotion and enhancement of the area and the biodiversity present (Antinori et al. 2018) - thanks also to special resources from the local authorities, the Venice City Council in the first place.

The association wants to preserve the Ca' Roman Reserve from any form of building investment or redevelopment that could alter the delicate balance of the oasis itself. Indeed, according to LIPU the concept of sustainability is essential in the management of the Ca' Roman area, which is based on the idea that human presence should have as little impact as possible on the natural environment. The duty to preserve the nature area is in fact be a priority over free frequentation of the Oasis itself: as local LIPU chief Luca Mamprin reported, frequentation of the reserve should only be allowed through the mediation of authorised naturalist guides, in order to minimise any negative impact due to an excessive human presence within the oasis. This “strong” view of the concept of sustainability clashes with several interests. First of all, the local inhabitants of Pellestrina and Chioggia would feel harmed by the prohibition of access to the beach. Moreover, this vision clashes with the development projects, currently underway or in the pipeline, envisaged by the public administration and private investors aimed at increasing the island's tourist attendance and the development of the local economy.

6.1.2 Marine Village

The Marine Village Ca’ Roman is the only current residential centre in the island – operating exclusively during the summer season. It is a reference point for local people of Pellestrina and Chioggia for its social engagement with the communities. Since its origin, the village posed itself in continuity with the natural environment around it, so that it tries to minimize its anthropic impact on the dune system and the forest. Indeed, the only frequent use made by the village’s costumers and hosts is a small area reserved for them on the seaside beach. In this context, the Ca’ Roman Marine

[32] The LIPU Oases and Reserves in Italy host and protect over 5,000 different animal and plant species, with more than 300 species of birds protected. Among these, many threatened. The Oases are also a breeding ground for some symbol species such as the White Stork, the Egyptian vulture, the Eleonora's falcon and various species of ducks (LIPU 2018).

Village is interested in pursuing the defence of the local ecosystem against any luxury or touristic residential plan which would prompt soil consumption in a protected area.

6.1.3 Public administration and local authorities

Public administration is the most controversial actor, since it is composed by contrasting interests and ideas of development of Ca' Roman, corresponding to parties and personal pursuits. Indeed, on one side, the Municipality and Province of Venice played a key role in the recognition of Ca' Roman as an Oasis for fauna protection and as a Regional Reserve of Local Interest, and they manage the protected area along with the LIPU. On the other side, public administration is involved in a series of investments - often attributable to private interests - which goes on the opposite direction of the one of conservation of the protected areas, as they allow soil consumption and ecological deterioration in Ca' Roman[33]. The contradiction within the public government shows a complex framework of contrasting ideas about local development, tourism and natural resources management. Nonetheless, it is important to notice that public administration is divided in a series of institutions and local authorities, so that it is not possible to identify a univocal common trend and political position for all these different public actors.

6.1.4 Ca' Roman s.r.l.

Ca' Roman S.r.l. (*Società a responsabilità limitata* - ltd.) is a building company born for the project of renovation of the former summer colony. Along with the administration of Venice, it is the major stakeholder for the local development scenario 1 that is further explored in this chapter. Its interests clashes with the other of the stakeholders interviewed, as the company fosters soil consumption and habitat deterioration in order to build a residential tourist village within the reserve of Ca' Roman.

6.1.5 Civil society

Civil society in the Venice Lagoon is a dynamic reality composed by a series of active groups who promote the safeguard of the lagoon environment and cultural heritage. In Ca' Roman many groups are actively participating in actions for its defence and promotion of an alternative way to conceive tourism and natural resources management. The most influential actors present there are Italia Nostra, Coordinamento Ambientalista Altro Lido (CAAL) and Gruppo 25 Aprile.

[33] The major investments occurred in Ca' Roman in the last 20 years can be traced in the MoSE project's works for the Chioggia inlet, the residential plan for the renovation of the former summer colony and the toruristic investment plan for the Ottagono island.

6.1.5.1 Italia Nostra

Italia Nostra is the oldest national association for the defence of the country's historical, cultural and environmental heritage. Established in 1955, it has its own policy on a wide set of issues, from cultural heritage and urban planning to landscape and territory protection. In more than 40 years of activity, Italia Nostra has greatly contributed to spreading among people the culture of conservation, based on respect for historical and human heritage. Since its foundation in 1959, the Venetian section of Italia Nostra has been committed to safeguarding and protecting Venice and its lagoon and the cultural and environmental heritage they represent (Italia Nostra Venezia 2022).

6.1.5.2 Coordinamento Associazioni Ambientaliste del Lido

The Coordinamento delle Associazioni Ambeintaliste del Lido (CAAL) is an association set up in 2008 with the aim of protecting the Lido and the Venice Lagoon from an environmental, historical, cultural and socio-economic perspective. It fights for the defence of common goods and the sustainable development of the territory. The association is the result of a collaboration between several Venetian associations, such as “Pax in Aqua Association”, “Estuario Nostro”, “Italia Nostra (Venice Section)” and “LIPU (Venice Section)”. The committee is managed through regular meetings for the common evaluation of the actions carried out and the coordination between the various associations (CAAL 2022).

6.1.5.3 Gruppo 25 Aprile

“Gruppo 25 Aprile” is an NGO standing and campaigning for residents’ rights in Venice. It is not a political party and its 3,000 members have decided to join forces irrespective of their political affiliations, social status or religious beliefs. During the last years the NGO organised flash mobs and campaigns in order to raise awareness about issues concerning Venice, such as the rental estate speculation, the *grandi navi* controversy and depopulation of the city. Although the group is not a political party, it formulated a set of proposal for the future of Venice (Gruppo 25 Aprile 2022).

6.1.5.4 Parish of Pellestrina

The Vicariate of Pellestrina is an important stakeholder to consider, as it is the representative of the Catholic community - and not only - of Pellestrina. Indeed, in the Venice Lagoon parishes have usually a mediating role, as they function as a interlocutor between people and political representatives. The Vicariate of Pellestrina consists of several parishes: Ognissanti, Sant'Antonio, Portosecco, San Pietro and the sanctuary of the Madonna dell'Apparizione.

6.2 Scenario 1: the "*Piano di Recupero dell'ex colonia di Ca' Roman*"

The first scenario analysed in this chapter concerns the area occupied by the former summer colony managed by the Canossian sisters, which in the last 15 years has been the epicentre of a dispute between the local authorities (Venice Municipality, Venice Province and Veneto Region), the private company Ca' Roman S.r.l. and the local environmentalist associations for the implementation of a Recovery plan which should turn the former colony into a touristic residence.

6.2.1 The Canossian sisters' colony

Before analysing the Recovery plan, it is necessary to go through the former colony's main events along the last 100 years. Indeed, the area underwent profound transformations during the 20th century, starting in 1920, when Professor Graziani established the "*Colonia Marina di Ca' Roman*" there, taking the military land in usufruct. According to Don Bellucco's book, the main source for reconstructing the events of the marine colony from the 1920s to the 1960s, the area was described as «rugged, covered with reeds» and its soil was rated as «brackish and sandy» (Bellucco 1965). Until 1941, the colony's dwellings consisted of wooden huts dating back to the First World War. With the acquisition of the plot by the Canossian Sisters in the same year, the area was gradually transformed as the wooden huts were replaced with masonry structures. The change was so noticeable that the Sisters applied for a building amnesty in 1985 (Consiglio Comunale di Venezia 2011). Since 1990, the colony has been unused, and its buildings currently lie in a state of serious neglect (Figure 15). In the late 1980s, the area on which the colony stands was sold to private parties, according to dynamics that have never been fully clarified (Il Gazzettino 2019), who did not pursue the philanthropic aims that were the *sine qua non* of Professor Graziani's transfer of the property to the Canossian Sisters (Antinori int 2022).

6.2.2 Protected areas and land use

The area is located within a site of relevant landscape and naturalistic importance. From a landscape point of view, the area is protected by the 1956 decree of the Ministry of Education (Gazzetta Ufficiale 2021). Furthermore, the area is protected by the 1995 PALAV (*Piano di Area della Laguna e dell'Area Veneziana* – Lagoon and Venetian Area Plan) [34], a planning tool of the Veneto

[34] The Lagoon and Venetian Area Plan (PALAV), approved by Regional Council Resolution no. 70 of 9 November 1995, constitutes an environmental and urbanistic instrument suited to the specific situation in the Veneto and Venice. The PALAV includes the 17 municipalities of Campagna Lupia, Camponogara, Cavallino Treporti, Chioggia,

Region that deals with, among other things, the lagoon environmental system (Giunta Regionale 1995). The PALAV identifies the Ca' Roman site as an «area affected by the presence of consolidated, wooded and fossil dunes», regulated by art. 14 a), according to which «the construction of buildings of any kind, including the opening of new roads, is forbidden». On the other hand, «interventions aimed at restoring and preserving the natural environment, as well as operations to improve the natural setting are permitted» (*Ibidem*). Furthermore, the area is close to the LIPU Oasis and the Regional Reserve of local interest "Ca' Roman", which is also a Natura 2000 site (LIPU 2022).

Figure 15: One of the buildings of the abandoned colony, in a state of advanced deterioration.

Codevigo, Dolo, Jesolo, Marcon, Martellago, Mira, Mirano, Mogliano Veneto, Musile di Piave, Quarto d'Altino, Salzano, Spinea, Venice (Regione Veneto 2019a).

The parcel of land on which the former colony stands changed its use - which involved agricultural land use, as indicated by the 1990 Corine Land Cover Map[35] – in 2009, with the approval of the "Variant of the General Regulatory Plan by the Regional Council No. 3886 of 15 December 2009" - published in B.u.r. No. 4 of Jan. 12, 2010 (Giunta Regionale 2009)[36]. The change in the type of land use therefore made lawful the private building intervention - limited to building renovation with demolition of the buildings and reconstruction, as described in the 2009 Master Plan Variant - conducted by the current owner, the Ca' Roman S.r.l (Il Gazzettino 2017).

6.2.3 The Recovery plan and judicial proceedings

6.2.3.1 Plan description

The intervention plan, called "*Piano di Recupero dell'ex colonia di Ca' Roman*" (Recovery plan of the former colony of Ca' Roman), is a private initiative sponsored by the Municipality of Venice. It consists of a touristic residential project that envisages the requalification of the former colony (Figure 16), with the construction of 84 residential units, distributed in 42 building elements (consisting of small villas), aggregated in five building bodies, for 24,990 cubic metres on an area of 29,195 square metres (Figure 17). The project was designed by the architectural firm Studio Mar (Tar Veneto 2017). According to sheet no. 19 of the recovery plan, «the existing buildings, constructed according to an old and outdated architectural concept with respect to the current parameters for the use of physical spaces, hardly can be object of a typological reuse. Therefore, their demolition and reconstruction can be envisaged» through a «building renovation with demolition of the former buildings and reconstruction, of equal volume, according to construction and typological criteria consistent with the intended uses envisaged in the areas now already built up» (Consiglio Comune di Venezia 2011).

[35] The Corine Land Cover (CLC) initiative was created at European level specifically to survey and monitor land cover and land use characteristics, with a focus on protection requirements (ISPRA 2022). According to the Corine Land Cover 1990 legend, the site had "243" code, which stands for «Land principally occupied by agriculture, with significant areas of natural vegetation» (Copernicus 2020). It is indeed classified as an agricultural area ("2", first digit), and a heterogeneous agricultural area ("4", second digit).

[36] Indeed, according to data from the 2012 Land Cover Map of the Veneto Region (Geoportale Regione Veneto 2022), the above-mentioned area is identified with code "1.2.1", which refers to «industrial, commercial and public and private service areas: areas with artificial cover (concrete, asphalt or stabilised: e.g., beaten earth) without vegetation that occupy most of the land (more than 50% of the surface). The area also includes buildings and/or areas with vegetation and associated spaces (boundary walls, car parks, storage areas, etc.)» (SPTSC 2012). More specifically, the area has the code "1.2.1.3", which refers to «areas intended for public, military and private services (not related to the transport system): this includes areas used for hotel and restaurant services, high school and university facilities of various orders and grades, libraries, scientific research areas, fairgrounds, courts, post and tax offices, prisons, barracks, places of worship alone or in association. Ancillary spaces (car parks, roads, green spaces for furnishing)» (SPTSC 2012).

Figure 16: A rendering of the project for the renovation of the colony (Consiglio Comune di Venezia 2011).

Figure 17: A model of the residential tourist village (Consiglio Comune di Venezia 2011).

The permitted intended uses - according to the land cover use legend offered by the Veneto Region (SPTSC 2012) - are residential, indicated by the code letters A1 (lodgings), A2 (collective residences), A3 (complementary functions to the residence, such as production activities, management, personal services) and accommodation, as designated by the codes E1 (hotels, guesthouses), E2 (motels), E3 (hotel-villages), E4 (tourist hotel residences), E6 (non-hotel accommodation facilities). The facilities would have been connected to Pellestrina thanks to the continuation along the lagoon shore of the pedestrian-cycling route from the Ca' Roman *murazzo* (Consiglio Comune di Venezia 2011).

The intervention plan, as it is located in an area adjacent to a Natura 2000 site, was subject to a screening study through the *Valutazione di Incidenza Ambientale* (Environmental Incidence Assessment - V.Inc.A.)[37], which produced a set of prescriptions to be applied to both the construction and operation phases. Further, beyond this reconstruction plan, it was added the «construction of new buildings - separated from the others - on a previously unbuilt surface, on which there were vegetable gardens, in the southern green area between the built-up area and the pinewood towards the fort»[38]» (Tar Veneto 2017).

6.2.3.2 Judicial proceedings

In 2012, the Venice City Council approved the Recovery Plan with Resolution No. 239 of 31st May 2012 (Lihard 2012). This resolution was followed by an application for its annulment - referring to the annulment request of the "Resolution of the Venice City Council no. 239 of 31 May 2012 approving the Plan for the Recovery of the former Colonia di Ca' Roman at Pellestrina (ex art. 30 of Regional Law No 11/2004)" - by the *Coordinamento delle Associazioni Ambientaliste del Lido* (CAAL - Lido Environmental Associations' Coordination Committee), which requested the «suspension of the works to implement the Plan», pursuant to «paragraph 3 of Article 30 of Regional Law No 11/2004, at least as regards the "*area ex orti"*» (Lihard 2012).

The same year, Italia Nostra lodged an appeal with the Tar (*Tribunale Amministrativo* Regionale – Regional Administrative Court) against the act of approval of the Ca' Roman allotment project. According to Italia Nostra, the plan «showed little attention in the verification of compatibility with respect to constraints (Natura 2000, PALAV, Special Law for Venice)». Italia Nostra's appeal, following the observations reported by other civil society institutions - such as LIPU and CAAL -

[37] Environmental Incidence Assessment (V.Inc.A) is an act required by European Union law to ascertain in advance whether certain projects are likely to have a significant effect on Sites of Community Importance, Special Areas of Conservation and Special Protection Areas (Regione Veneto 2019b).

[38] This area played a fundamental role in the judicial proceedings of the Recovery plan along the last ten years. Then, it is cited during the chapter as "*area ex orti*", how it is called in the several documents analysed.

which severely criticised the project, identified the risks of a project that would «destroy one of the very rare non-man-made and non-exploited environments of the Venetian coastline for bathing purposes», and reiterated the importance of «safeguarding this environment from speculation not only for obvious reasons of nature conservation, but also to protect the historical memory of a marine-lagoon environment that pre-exists the construction of the *murazzi*» (Italia Nostra 2012). Moreover, the area is close to the site of Community importance IT 3250030 "Medium-lower Lagoon of Venice" and the SPA IT 3250046 "Lagoon of Venice". Also, the whole lagoon area falls within the IBA (Important Bird Area) of the Venice Lagoon. The document recalled how «towards the sea stretches the LIPU Oasis of Ca' Roman (a SCI and SPA site IT 3250023 "Lido di Venezia: Coastal biotopes"), one of the few surviving examples of a littoral environment endowed with the vegetation succession typical of the original upper Adriatic coastal ecosystem» (*Ibidem*). Moreover, the project «would entail not only the partial redevelopment of the disused area, but also new constructions (almost 25,000 cubic metres of cottages and other structures) planned in an area of high naturalistic and landscape value, which has, moreover, been declared unbuildable (the "*area ex orti*"), constituting one of the very few ecosystem-functional transects of the Venetian coastline not interrupted by human infrastructures» (*Ibidem*).

In addition, the Recovery plan did not have a *Valutazione Ambientale* Strategica (VAS - Strategic Environmental Assessment), an essential assessment tool to verify whether a plan of action can negatively impact the environment[39]. Indeed, the project made use of art. 40, paragraph 1, of Regional Law No. 13 of 6 April 2012, which justified the exemption from the Strategic Environmental Assessment procedure for minor areas. This article was then suspended in March 2013, when the Constitutional Court, with sentence no. 58 of 29 March 2013, declared its constitutional illegitimacy (Tar Veneto 2017).

In March 2013, the Council of State granted the suspension request of Italia Nostra and the CAAL, forcing the company Ca' Roman S.r.l. to freeze the works. The judgement, pronounced by the fourth section of the Council of State, overturned the previous judgement of the Veneto Regional Administrative Court which, in the first instance, had rejected the environmentalists' petitions. However, the association had appealed to the Council of State, which considered their request as valid (Italia Nostra 2013).

[39] The Strategic Environmental Assessment (VAS) of plans and programmes that may have a significant impact on the environment aims to ensure a high level of environmental protection and contribute to the integration of environmental considerations into the preparation, adoption and approval of plans and programmes, ensuring that they are coherent and contribute to the conditions for sustainable development (ISPRA 2021).

Moreover, also in March 2013, on a separate occasion, the Constitutional Court, with sentence no. 58 of 29 March 2013, declared the constitutional illegitimacy of the above-mentioned article 40, paragraph 1 of the Regional law (which allowed the exemption to VAS for minor areas). As a consequence, the company Cà Roman S.r.l. submitted to the Veneto Region an application for VAS requirement («*istanza di assoggettabilità a VAS*»), activating a new procedure. Following the new procedure's activation, the Regional Commission responsible for the VAS, with opinion No. 56 of 4 June, ruled that the plan did not require a Strategic Environmental Assessment. Then, the Extraordinary Commissioner of the Municipality of Venice, with resolution no. 445 of 2 October 2014, after the verification for the requirement of an environmental assessment, re-approved the implementation plan of private initiative without changes compared to the previous approval (Tar 2017).

In 2015, following a new appeal by Italia Nostra, the Veneto Regional Administrative Court ruled that the case of the Recovery plan of the former colony would be followed by the Court of Justice of the European Union, suspending its judgement pending the European indication. In fact, it was recognised that the intervention of the company Ca' Roman S.r.l. involved demolition, building renovation and new construction (84 residential units distributed in 42 small villas) on a surface substantially different from the one previously occupied. According to the judge, that was a matter of «new building interventions» and not restructuring interventions, which were the only ones envisaged by the Master Plan (La Nuova Venezia 2015).

On 21 December 2016, the Court of Justice of the European Union confirmed the provisions of Directive 2001/42/EC and, consequently, the correctness of the VAS screening procedure adopted in this case (Consiglio Comunale di Venezia 2018). Following the Court of Justice's sentence, in 2017 the Veneto Regional Administrative Court accepted 2 out of the 7 points presented in the Italia Nostra appeal (Tar Veneto 2017), blocking the Ca' Roman Recovery plan because «11 of the 84 planned housing units were to be built on the *area ex orti*, a green area that, according to urban planning regulations, can only be the subject of green maintenance activities, not building ones» (Pederiva 2015).

Notwithstanding the judgment, the Municipality of Venice appealed to the Council of State with appeal RG No. 4012/2018, recorded on 21/05/2018 (Consiglio Comunale di Venezia 2018). Moreover, on 6th November 2018 followed the "Proposal of Resolution" by the City Council to make a further "Variation to the General Regulatory Plan of the island of Pellestrina", in order to remove the legislative obstacle for the approval of the Recovery plan. In fact, the resolution intended to «acknowledge the proposed Agreement pursuant to art. 6 of L.R. 11/04 submitted by

Ca' Roman S.r.l. with PG 2017/0304108 of 27.06.2017» (*Ibidem*). This implied, as a consequence, to «adopt the Variation no. 34 to the Plan of Interventions, Sheet no. 19 "*Ex Colonia di Ca' Roman*" of the N.T.A. of the V.P.R.G. for the Island of Pellestrina (Consiglio Comunale di Venezia 2011), as per the relevant elaboration forming part of the proposed agreement» (Consiglio Comunale di Venezia 2018), keeping valid «all the opinions already acquired during the approval procedure of the Recovery Plan, since no project modification has been introduced» (*Ibidem*), so that the opinion expressed by the Regional VAS Commission in 2013, which denied the requirement of a Strategic Environmental Assessment, was kept valid (*Ibidem*).

In addition to this, a project rearrangement was carried out that did not envisage building in the disputed area ("*area ex ortii"*), to reduce the likelihood of further impediments to the execution of the Recovery plan. In fact, following the stop imposed in 2017 by the Tar, in 2019 the Venice City Council promoted a modification of the recovery project, which consists in the «building renovation with demolition of the existing structures and reconstruction with the same volume» of 7 new building bodies made up of several residential units connected by porticoes and galleries for access to the first floor - while the southernmost building body built on stilts (Corriere del Veneto 2019). The new buildings would be covered in copper, with a modular window system. The parapets of the terraces would be glazed, in order to allow the widest visibility to the outside and the least visual impact. Added to this, it is foreseen «the construction of a public park area in correspondence with the telemetry tower, where a small worship structure will also be built; the construction of a bicycle and pedestrian path connecting Pellestrina and Fort Ca' Roman to the south through the *murazzi* path, with small rest areas; and the creation of a nature trail in the area of the *area ex orti*, where protected plant species and the comb ditches that allowed them to grow will be preserved» (Venezia Today 2019). To this day, none of these measures have been implemented: one of the reason suggested by some stakeholders interviewed is that the investment in that area is not profitable anymore, both for the continuous opposition by local civil associations and for the recent economic regression due to Covid-19 pandemic (Mamprin 2022).

6.3 Scenario 2: The "*Piano delle misure di compensazione delle opere MoSE*" and the LIPU project for the Ca' Roman Fort Renovation

The second scenario considers the project initiatives inherent in the "Plan of measures to compensate for the impacts due to the construction of the MoSE system works" and their modification following the interactions between the interests of the *Consorzio Venezia Nuova*, the Interregional Superintendency of Public Works for Triveneto, the *Demanio* (State Property) and civil society associations, first and foremost LIPU. In fact, LIPU, as an institution that has been managing since 1988 - in collaboration with and on behalf of the Municipality of Venice and the then Province of Venice - the Ca' Roman Oasis of Protection, which then became a Nature Reserve of Local Interest in 2012 (LIPU 2020), is an essential local player for a land management plan.

6.3.1 The "*Piano Europa*"

The "Plan of compensation, conservation and environmental rehabilitation measures of the SCIs IT3250003; IT3250023; IT3250031; IT3250030 and of the SPA IT3250046", named "*Piano Europa*", is an intervention plan consisting in the evaluation of the impacts on the "IBA (Important Bird Area) - Lagoon of Venice" consequent to the realisation of the MoSE mobile dam system project and in the implementation of suitable measures to prevent pollution or deterioration of habitats, as well as disturbances harmful to birds with significant consequences in the light of the objectives of art. 4 of Directive 79/409/EC – the Birds Directive (Bidinotto and Cerasuolo 2018).

6.3.1.1 "*Piano Europa*" - Judicial proceedings and purposes

The document was produced by the *Magistrato alle Acque di Venezia* after the infringement procedure 2003/4762 initiated by the European Commission's Directorate General for the Environment (Bur Veneto 2022), due to the lack of an adequate impact assessment of the project on Sites of Community Importance (SCI), Special Protection Areas (SPAs) and the Important Bird Area (IBA) of the Venice Lagoon (Bur Veneto 2010). In fact, the MoSE project had «neither identified nor adopted appropriate measures to prevent pollution and habitat deterioration» of the area "IBA 064-Laguna di Venezia" due to the impacts related to the MoSE construction. Moreover, the construction works have caused a «harmful disturbance of birds with significant consequences in the light of the objectives of Article 4 of EEC Directive 79/409» (MIMS 2010). According to the European Commission, therefore, «the Italian Republic has failed to fulfil its obligations under Article 4(4) of Council Directive 79/409 EEC of 2 April 1979 on the conservation of wild birds»

(MIMS 2010). Although the European Commission for the Environment stated that the initiative was not intended to prevent the implementation of MoSE, the body called on the Italian government to produce new information on site impacts and environmental mitigation structures (*Ibidem*). The *Magistrato alle Acque* and the *Consorzio Venezia Nuova* both confirmed that the sites were temporary, and would be fully restored at the end of the works, according to the *Piano Europa*, a restoration plan published in 2007 at the indication and suggestion of the Ministry of the Environment and Protection of Land and Sea. The filing of the infringement procedure by the European Commission was closed on 14/04/2009 (MoSE Venice 2022c).

The Plan consists in a wide set of actions to restore the lagoon environment and mitigate the impact of MoSE construction sites. They encompass the reconstitution of salt marshes and mudflats, the creation of new littoral habitats, the redevelopment of construction sites, the extension and restoration of SCI sites and designation of SPAs, phyto-purification systems, the recovery of historical-military elements and environmental redevelopment (MoSE Venezia 2022f). For the design of the interventions, the *Consorzio Venezia Nuova* hired specialists and experts from different fields.

6.3.1.2 "*Piano Europa*": Ca' Roman section

At Ca' Roman, according to the Plan updated in 2011, «the proposed interventions have the precise goal of giving rise to a process of environmental redefinition that goes beyond limiting the inconveniences linked to the presence of a technological intervention of the scale of the MoSE as much as possible» (Magistrato alle Acque 2011). In particular, the Plan envisages the «requalification of the natural environment of the area temporarily occupied by the work site, both through the creation of pedological conditions that allow the spontaneous recolonisation by the herbaceous cenosis pre-existing to the work site operations, so as to reconstitute the habitat of priority interest "Grey Dunes", and through the planting of shrub and tree species typical of coastal environments» (MoSE Venezia 2022f). The reconstruction of habitats also aims to provide areas partially suitable for nesting for species such as the Kentish plover and the little tern. Both of these species used to nest regularly at Ca' Roman, but for some years now they no longer nest there or do so only occasionally (Mamprin 2022). In addition to the focus on the ecological aspect of the intervention, the Mitigation Measures Plan states «an approach aimed at improving the perception of the landscape» (MoSE Venezia 2022f). The planned intervention area consists of an area of approximately 3,000 square metres, distributed over a strip in an east-west direction. For the entire length of the new work under construction the site has a width of approximately 13 metres, while at the two ends there are two wider areas (*Ibidem*).

In addition to this strip, there are areas dedicated to the creation of littoral habitats, known as areas D and E (Figure 18). In area D, close to the northern pier of the Chioggia inlet, for about 2.7 hectares, compensatory measures aimed at the development of backshore habitats are planned. In area E, close to the northern pier of the dam of the new Bocca di Chioggia navigation lock, of about 2.1 hectares , «a new stretch of beach and dunes will be created» (MoSE Venezia 2022f).

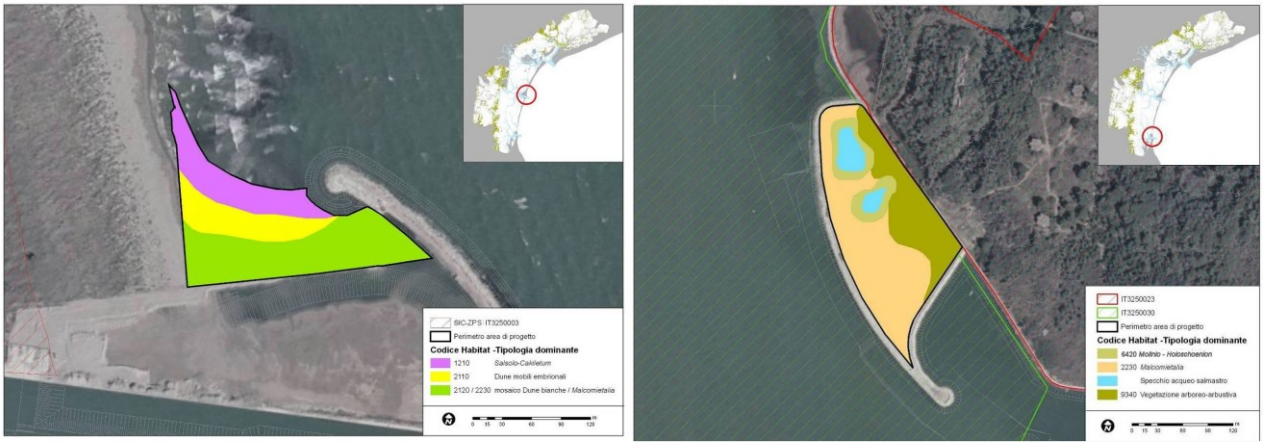

Figure 18: Area D and E of the *Piano Europa* (MoSE Venezia 2022f)

Area D, corresponding to the excavated material accumulation area, is located far from the beach behind the forested area, in contact with the lagoon area but with a clear boundary from it. From these characteristics follows the type of interventions proposed below. According to the Plan's analysis, the habitats would be favourable «for the settlement of some species such as the red-backed shrike and the nightjar, as well as being important for other species that frequent these areas with different phenology, such as the bee-eater, the Sardinian warbler and the black bunting» (*Ibidem*). The purpose of the intervention is the «complete reconstitution of the natural environment in the area» through the planting of local shrub and tree species, «with the aim of achieving the greatest possible balance between the various plant components present, through a correct choice of species and aggregation of specimens».

The project also envisages leaving part of the area to the herbaceous-covered backdune belt, inserting within it only a few single shrubby plants typical of coastal areas, such as juniper (*Juniperus communis*), sea buckthorn (*Hippophae rhamnoides*), strawberry tree (*Arbutus unedo*), phyllirea (*Phillirea angustifolia*), buckthorn (*Rhamnus catharticus*), wild privet (*Ligustrum*

vulgare), hawthorn (*Crataegus monogyna*), dog rose (*Rosa canina*), viburnum (*Viburnum lantana*), blackthorn (*Prunus spinosa*), barberry (*Berberis vulgaris*) and dogwood (*Cornus mas*). The aim is to «reconstitute the ecotone environmental conditions that are most favourable to the bird species that we intend to encourage with these interventions» (Mose Venezia 2022f). Furthermore, since the area is located on the border with the Ca' Roman Oasis, «within this new natural area a pedestrian pathway will also be created, which will have the characteristics of a level pathway in stabilised beaten earth and surrounded by wooden margins for most of its route, while near the new wetlands a raised wooden walkway equipped with handrails will be created» (*Ibidem*).

The intervention plan concerning the *piarda* also includes an architectural-landscape intervention designed by IUAV professor Aldo Aymonino, which envisaged the creation of an urban park intended for public use with decorative elements and ornamental plants (Magistrato alle Acque 2010), connected to a pedestrian path crossing the southern side of Ca' Roman (Aymonino 2010). The intervention is characterised by its aesthetic value, and is aimed at increasing the island's frequentation.

Instead, on area E is planned to create on a surface of about 2 hectares, located next to beach and dune habitats, a beach about 100 metres long where it will be possible to reconstitute three types of habitats of Community interest: the annual vegetation of the marine deposit lines, the embryonic dunes and the mobile dunes with the presence of *Ammophila arenaria*. The project therefore envisages a subdivision of the area into successive intervention belts, each with its own vegetation types (Brotto 2011). Towards the upper part of the foreshore line, the spontaneous establishment of the typical vegetation of this habitat along the marine deposit lines is planned. Then, to the rear of this strip of free beach «the first strip of low mobile dunes will begin, which will be spontaneously occupied by sparse vegetation of a more stable presence». Within this area, «it is planned to intervene by setting up a system of low dunes in the first strip of about a few tens of metres in depth and generally varying in height from 40 to 80 cm» The small alternating dunes «will be protected on the sea side by a barrier of bundles, half-buried in the sand, to ensure sufficient protection even if the force of the waves were to reach the southernmost dunes» (MoSE Venezia 2022f). Only in the innermost part of these first low dunes would the piling be set up, which would help the sand deposit within its structure. In a strip behind, oriented parallel to the shoreline like the previous one, a higher dune cordon will be created, up to a maximum of 3 metres, in order to create the habitat of community importance of the mobile dunes of the coastal cordon with the presence of *Ammophila arenaria*. In addition, «conditions will be created to allow the spontaneous development of phytocoenoses that can be traced back to habitat 2230 "Dunes with *Malcomietalia* meadows"»

(MoSE Venezia 2022f). Within this dune, typical dune species will be planted, first and most abundant among all the *Ammophila*, and «other species typical of the North Adriatic coasts will be sown or planted, with seed previously obtained on site, such as *Kakile maritima*, *Eryngium maritimum*, *Calystegia soldanella*, *Medicago maritima*» (Brotto 2011).

6.3.1.3 Observations by LIPU

The interventions proposed by the *Piano Europa* were analysed by LIPU, which drew up in 2018 a series of observations and proposals in order to prioritise the need for the projects not to conflict, or even contradict, the provisions of the programme of compensatory interventions and, more generally, that «the projects do not cause further damage or pressure on the ecosystems of the portions of SCIs/SPAs affected by the works and, in particular, on the species and habitats protected therein». Moreover, with reference to the "Technical-illustrative report" (Magistrato alle Acque 2011), LIPU officer Luca Mamprin observes that the project also includes, among its intentions, «the desire to favour the frequentation of the areas affected by the MoSE and to limit their separateness and impediment to what is strictly necessary» (Mamprin 2022). The desire to significantly increase the arrival of visitors to the island is seen as a negative factor by the managing body of the Oasis, since the increase in tourist attractions within the Reserve would cause further disturbance of local species and a greater anthropic impact.

A further element of observation is the *piarda*'s landscape-architectural intervention planned by IUAV professor Aldo Aymonino. With reference to the documents "*Inserimento paesaggistico – Bocca di Chioggia, Spalla Nord*" (Magistrato alle Acque 2010) and "*Bocca di Chioggia – Spalla Nord*" (Aymonino 2010), LIPU points out that «the project seems to be aimed at creating a "public garden" that can be used by visitors to the island of Ca' Roman. An example of what is claimed lies in the fact that the botanical species planned are largely allochthonous and ornamental» (Antinori et al. 2018). Such species, if placed in the natural context of Ca' Roman, could cause serious damage to local ecosystems due to the spread of invasive species that may alter the original environment. In addition, «the perimeter path around the island that would bring visitors right next to the nesting grounds of the oystercatcher (*Haematopus ostralegus*), in the area of the lagoon between the Madonnina and the fort, is also considered unfeasible» (*Ibidem*).

6.3.2 The LIPU project for the restoration of Ca' Roman Fort

The observations reported by LIPU were followed in 2019 by a proposal for intervention by the *Provveditorato Interregionale delle Opere Pubbliche del Triveneto* (Interregional Superintendency of Public Works for the Triveneto) within the "Compensation, conservation and environmental redevelopment measures of the MoSE system", aimed at the regeneration of Fort Ca' Roman, currently in a state of abandonment. In fact, in those years, the fort was matter of interest of various proposals involving the *Agenzia del Demanio* (State Property Office), the Superintendency, the Municipality and local associations. Initially, in 2017 the Fort (Figure 19) could have been acquired free of charge by the Municipality of Venice, but due to an error in the acquisition request procedure, this operation did not succeed. That acquisition would have been relevant for the restoration of the fort as, if the public good would have become a Municipality property, it would have been managed by an association in the area, most probably LIPU, in order to give a physical headquarter to the Reserve's managing body (Antinori 2022), therefore assuring a better implementation of the conservation practices and a relevant presence on the territory.

As the acquisition operation failed, the State Property Office, faced with the associations' proposal, asked for an annual fee of at least 13,000 euro as a contribution, a figure that was impossible to pay by local entities. However, the Superintendency, favourable to the bottom-up management proposal, had opposed to the State Property Office's inclination to hand over the property to a private party: indeed, the body stated that, if the property had been auctioned, it would not have invested money in restoring it (La Nuova Venezia 2019). As a prove of the Superintendency willingness, the Italian Castles Institute's national councillor Andrea Grigoletto (in favour of the possible management by LIPU) in September 2019 stated that, according to the words of the spokesperson of the *Provveditore alle Acque*, «if the *Demanio* did not put it up for auction, the *Provveditorato* would give 500 thousand euros for the restoration of the Fort» (La Nuova Venezia 2019). In spite of these objections, the fort's 1,218 square metres were included in the *Demanio*'s call for alienations (Corriere del Veneto 2019). Nevertheless, at the end of 2019, the fort was presented for auction with a base of 690,000 euro (Agenzia del Demanio 2019), which, however, had no interested buyer (La Nuova Venezia 2019). Furthermore, since the asset had been put up for auction, the *Provveditorato* had refused to finance the fort's restoration.

Figure 19: The Fort Ca' Roman and the Barbarigo battery (elaboration by the author).

Subsequently, following the comments made during 2018 by local environmental associations - including LIPU and WWF - regarding the plan for the MoSE compensation works (Antinori et al. 2018; Ercolin 2018), which had delayed the continuation of the design phase of the *Piano Europa* at Ca' Roman, the possibility of bottom-up management of the Fort by LIPU came up again. In fact, the *Provveditorato* planned to transfer the funds for the compensation of the MoSE works to Ca' Roman for the regeneration of the fort, in order to make it the operational centre for the management of the Reserve (Antinori int 2022). According to LIPU, in fact, «the present buildings, suitably restored, can be used by the Reserve. At present, in fact, there are no properties belonging to the Reserve and this leads to management difficulties of the area aimed at the conservation of habitats and species of conservation interest present» (Antinori et al. 2018). As the funds related to the "Plan of compensation, conservation and environmental requalification measures for MoSE works" are tied to actions aimed at improving the conditions of the habitats involved (Antinori 2022), the realisation of the LIPU project for the restoration of the Fort, according to Federico Antinori, spokesperson for Italia Nostra and former officer of the Oasis, would be justifiable only as an «indirect action to improve the habitats of species, through redevelopment works of the fort that would allow a stable and permanent presence of the Reserve's managing body in the territory, so as to improve the monitoring and protection actions of the Oasis and the species present in it» (*Ibidem*).

At present, the design of a first intervention for the renovation of the Fort has been financed. It consists of the restoration of the two warehouses located at the entrance to the fortress and a square building, which will become the headquarters of the park's managing body. In addition, part of the Barbarigo battery will be restored (Figure 19: The Fort Ca' Roman and the Barbarigo battery (elaboration by the author)., so that its terrace will be made available for birdwatching sessions and part of the warehouses will be used as offices for the managing body. The project has been submitted to the opinion of the Venice Safeguard Commission: if it is approved, the Lipu will be able to have a physical headquarters and thus implement a series of activities aimed at the conservation of local biodiversity - as it will be possible to host volunteers, researchers and students who will contribute to monitoring the ecosystem - and at the dissemination of nature - such as the organisation of excursions or birdwatching activities (Mamprin 2022). A second part of the restoration is planned, but has not yet been financed: this project, currently at the draft stage, envisages recovering areas of the battery to be used as kitchens, dormitories and refectories to host visitors and school camps, as well as exhibition rooms for conferences and scientific meetings.

These interventions have the potential to favour the conservation of the local ecosystem, as they would allow for those fundamental safeguarding, monitoring, control and dissemination activities that are necessary to maintain in their current state and possibly restore the unique habitats of Ca' Roman.

7 The opinion of the stakeholders

Participation is a relevant principle for local development conceptual framework, as it is assessed that working with stakeholders to develop scenarios allows people to voice their desires for the future, identifying both areas of conflict and areas of consensus. Indeed, participation also provides a process for collective learning and iteration as scenarios are developed in a way that everyone supports. For these reasons, each of the scenarios presented is discussed along with some of the local stakeholders through semi-structured interviews in order to identify, in a dialogical way, the opportunities and risks of local development projects targeting the forest of the Oasis. Due to the qualitative approach adopted, the discussion does not claim to produce any objective guideline or plan, but to depict a draft of what local stakeholders intend about Ca' Roman local development. Furthermore, as not all actors participated in or were interested in the study, its partial nature is also underlined.

7.1 The opinion of the stakeholders: Scenario 1

In this paragraph the main considerations of the stakeholders interviewed are reported, in order to identify what type of development they are in favour of and how they judge the possible transformation of the former colony into a tourist residential complex.

The Recovery Plan is generally opposed by all the stakeholders interviewed, as it is perceived as a project that puts economic interests before environmental and local community interests (Antinori 2022). This position is shared by Italia Nostra and Gruppo 25 Aprile. According to LIPU director Mamprin, the park's managing body «recognises the legal status of the various rulings that allow partial construction on the site dedicated to the tourist village», but at the same time points out that, if it had the choice between different options, it would have «preferred a type of intervention that can provide an open use to the public» (Mamprin 2022). According to Don Vittorio, parish priest *in solidum* of the Vicariate of Pellestrina, the Pellestrina community reacted negatively to the implementation of the Recovery Plan, as an important place for the local Catholic community (the church of the former colony) was taken away from public use to become the object of private investment, without any public consultation. Furthermore, environmental concerns were expressed by him. The same sensation of being cut off from a symbolically important place is reported by the Ca' Roman Marine Village (Brusamolin 2022), which, among other things, is located next to the intervention site, and therefore potentially disturbed by the constriction works, especially during the summer season when the village hosts various users.

All stakeholders interviewed expressed concern about the environmental impacts of the project. In fact, a construction project at Ca' Roman would seriously jeopardise one of the last stretches of "wild" beach of the Veneto coastline (Gasparinetti 2022), compromising a priority habitat for the conservation of migratory bird species (Mamprin 2022). The construction works would in fact disturb the local fauna, as well as damage local habitats with the necessary works to build infrastructures such as electricity and water networks. Furthermore, the tourist village, being a permanent structure, would ensure the potential uninterrupted presence of humans throughout the year, causing serious disturbance to the bird fauna during both the wintering and nesting periods. It must be remembered that Ca' Roman is a preferential site for migratory birds for the fact that during the winter the island is essentially uninhabited: the reduced human presence in the winter months is a necessary condition for their stationing on the island. Thus, «a repeated human presence throughout the year would potentially change the birds' migratory preferences, so Ca' Roman would lose an important part of its biodiversity» (*Ibidem*) and therefore its naturalistic and touristic value. Moreover, the continuous anthropic presence favours synanthropic species (species which benefit from human presence, such as pythons and rats) and disadvantages many others: this would increase the possibility that many species would no longer nest at Ca' Roman. According to Antinori, an «eco-village at Ca' Roman is only conceivable through the mediation of park rangers who carry out constant surveillance and mediation between users and the natural environment» (Antinori 2022).

With the village construction, transport services would also have to increase: since the public service offered by the local public company ACTV is insufficient, as it only runs once an hour, it would be necessary to increase the number of ferries to the island or devise a private transport service dedicated exclusively to the village. This would imply a greater impact both on the land level - with the potential construction of a private pier - and on the water level - whereby the increased frequency of waterbuses and a consequent rise in wave motion may disturb the lagoon ecosystem. Finally, a permanent anthropic settlement may favour the spread of allochthonous ornamental species - as happened in the case of the Canossian nuns' colony, who imported species such as *Yucca gloriosa* and *Elaeagnus angustifolia* to the island - which would take away space from local species.

According to the stakeholders, the company Ca' Roman S.r.l. and the public bodies promoting the Recovery Plan did not devise any participatory process to include the local population in the decisions about the plan's design. According to parish priest Don Vittorio, «the community was not taken into consideration at all»: in his opinion, this implies a serious shortcoming, as «the

population of Pellestrina could have offered interesting ideas» about the development of the project (Don Vittorio 2022). The lack of interest in involving local stakeholders is highlighted by the fact that not even the reserve's managing body, LIPU, was ever asked for its opinion on the project. Italia Nostra claims it was not taken into consideration until it opposed the project through a series of lawsuits that saw it in the forefront of defending the Ca' Roman ecosystem (Antinori 2022). Stakeholders have expressed distrust towards the local administration, as it is perceived as an actor that favours private speculation over the public good. Mistrust is generally directed at the Venetian political class, as both centre-left and right-wing administrations have proven to be inclined to favour - or at least be neutral about - the interests of Ca' Roman S.r.l. (*Ibidem*). According to LIPU, the administrators who approved the Plan demonstrated a preference for political and economic interests over those of conserving the biodiversity of the Venetian lagoon (Mamprin 2022). This tendency to favour business interests has also been attributed to the Canossian Sisters themselves, as they are credited with the «decision to sell the plot of land - when it was still intended to be used as a public good, as per the wishes of the founder Dr. Graziani - exclusively to a private individual» (Don Vittorio 2022). Furthermore, the motivations for the sale are still unclear, as the sisters are reported to have kept a «non-transparent attitude» (*Ibidem*).

Despite these multiple complaints of lack of listening by the local administration, the Venice City Council advises that it has considered participatory practices, since, according to the City Council Resolution PD 478 of 06.11. 2018, «the Recovery Plan has been the subject of an extensive process of sharing and participation», such as, among others, the «pre-illustration of the project in a joint session at the 5th Council Commission and the Municipality of Lido and Pellestrina, the presentation by the planners to the Coordination of Environmental Associations of the Lido and the public presentation in Pellestrina in July 2011» (CCV 2018). According to this document, therefore, it is possible to trace an attempt to sketch a participatory process, even if, upon a more detailed analysis of the actions included in the process, it is evident how they are more an informative tool of the decisions already ratified than a forum where the different voices and opinions can dialogue in order to reach an agreement. It would also be necessary to analyse the communicative approach in order to understand whether there was an intent to involve as many citizens as possible for each action of the participatory process: since such documentation has not been traced, this thesis does not deal with the individual actions undertaken by the Municipality of Venice to involve local stakeholders.

7.2 The opinion of the stakeholders: Scenario 2

This paragraph considers the opinions of interviewed stakeholders regarding the redevelopment scenario of the Ca' Roman Fort. The project is generally seen by the stakeholders interviewed as a positive intervention, as it is considered a plus point for the conservation of local biodiversity, especially as it has prevented a potential speculative operation that would have led to projects similar to the one analysed in scenario 1.

According to LIPU manager Luca Mamprin, the regeneration of the fortress allows a step forward for the administration of the Oasis, as the managing body is able to guarantee a more constant presence in the field and consequently improve the quality of services offered. At the same time, however, he points out that the financing of the project comes from a fund that is supposed to provide compensation works for the damage caused by the construction of the MoSE (as foreseen by the Europe Plan), which consist mainly in «restoring the areas that have been subtracted by the construction works[40]» through a restoration of the natural habitat by «reforesting the *piarda* with thorny bushes, delimiting an area that cannot be frequented by the public of the beach for kentish plover and little tern, and implementing a management plan for the herring gull colony» (Mamprin 2022).

The Fort restoration, therefore, is less relevant from a conservation point of view, as it does not directly contribute to preserving the habitats of Ca' Roman. Moreover, great concern is expressed over an "improper" use of the fund, in that it would be used to finance a work that has more of a historical-cultural value than a conservation value, thus «setting a precedent that could justify inappropriate uses for an allocation of public money that has a very specific purpose» (Antinori 2022). In fact, if the intervention at Ca' Roman can still be considered as an action aimed at the preservation of local flora and fauna, in other cases «an even broader interpretation of what is meant by "compensation works" could finance measures which should be subsidised with other types of funds, such as the implementation of urban greenery or the creation of car parks» (Antinori 2022). In other words, money intended to restore habitats damaged by the MoSE could be used by local governments in the future to finance a series of interventions that should be financed by their own funds.

[40] At Ca' Roman, the construction of the MoSE's complementary works - consisting of the navigation lock, the refuge port and the embankment - led to the destruction of over three hectares of habitat protected by the European Community. An environmental damage that the LIPU defined at the time as «serious and unnecessary, as the same works could be carried out in other sites and, moreover, at a lower cost» (LIPU 2020).

Another relevant aspect is the position regarding the impacts that the regeneration of the Fort might have on the frequentation of Ca' Roman. According to Mamprin, access to the Fort will be mediated through LIPU staff, so «there will be no radical upset of the flows toward the island» (Mamprin 2022). The challenge is in fact to enhance the strong naturalistic value of the location, leaving the Oasis as much as possible as it is in its current state. The aim, according to the managing body, is to make Ca' Roman as appreciated as possible by local citizens so that they can develop a sense of belonging to the reserve and feel it as a place of their own. There is in fact a «lack of a consolidated link between the inhabitants of Pellestrina and the Ca' Roman Oasis» (Don Vittorio 2022), as the island's inhabitants prefer to frequent the newly artificial beach adjacent to the town (Antinori 2022). On the other hand, a more deep-rooted bond between the inhabitants of Chioggia and the Oasis can be traced, as they are the main frequenters of the local beach. The restoration of the Fort, thus, will not imply decisive alterations in anthropic flows to and from Ca' Roman, so it should not have a significant impact on the local environment.

With regard to the participatory aspect, there is mixed feedback depending on the actor interviewed. LIPU reports that «it was heard 100 percent», as the project consists of a proposal by the organisation itself (Mamprin 2022). In addition, LIPU was asked for a survey to identify valuable trees on the island. Oasis manager Luca Mamprin says he was «pleasantly surprised by the willingness to enter into dialogue with LIPU», although he emphasises that this openness on the part of the institutions - in particular, the Interregional Superintendency for Public Works - is «due to the need to regain credibility after the financial scandals linked to the MoSE» (*Ibidem*). At the same time, however, the participatory approach was one-sided, as only LIPU was consulted, excluding other stakeholders, primarily the local community. According to Don Vittorio, in fact, the «local population, while tending to look benevolently upon projects that promote environmental conservation, was excluded from the decision-making process» (Don Vittorio 2022). Furthermore, he recalls the unfortunate outcomes of the case of the Recovery Plan for the former colony, which did not consider local interests, and warns for the negative outcomes of development projects without any participatory basis (Don Vittorio 2022). This exclusion in the first instance does not deny the possibility of being able to make suggestions and proposals for an improvement of the project at a later stage, so as to realise a work that is shaped by the wishes of the resident population. A different position is that of Italia Nostra, for whom «there is a tacit agreement between local associations pursuing similar objectives of defence and preservation of the lagoon, for which they do not interfere too much in the actions of their allies» (Antinori 2022). Moreover, LIPU’s speed in accepting the invitation to formulate a project can also be explained in «the rarity of occasions in which the public administration offers spaces for consultation and co-designing to

local organisations» (Mamprin 2022). The atmosphere of mistrust towards local institutions can therefore be seen as a cause of the lack of integration between the different social networks in the demands for greater involvement at the decision-making level.

Furthermore, a certain detachment between the associations and the population of Pellestrina was perceived during the interviews. An example is given here of the statements made by Federico Antinori, head of the LIPU Oasis from 2006 to 2012. «During my time as chief, an attempt was made to involve the population of Pellestrina in order to make them aware of environmental issues: for example, we organised an exhibition on Ca' Roman in the town of Pellestrina, which however failed to arouse much interest» (Antinori 2022). Antinori then reports on the desire to organise initiatives in local schools, which however were never implemented in a systematic way due to a lack of funds and personnel. In fact, the limited budget dedicated to the management of the reserve cannot cover the entire salary of the manager himself, who is the only employee of the Oasis. Moreover, the manager is forced to find a second job, with the result that he cannot devote all his time to organising the Oasis' activities. Similarly, «the reduced funds do not allow access to the material needed to carry out dissemination and communication campaigns» (*Ibidem*). This combination of lack of funding and distrust in institutions has produced a separation between the community of Pellestrina and Ca' Roman that has contributed to the exclusion of the local population from decision-making processes concerning the Oasis.

7.3 The opinion of the stakeholders: the future of the forest

Regarding the future of the forest, most stakeholders agree that the Oasis must be preserved and the forest itself must not be disturbed by invasive construction works. Similarly, however, there was resignation about its preservation, as Scenario 1 could potentially upset its balance. In fact, according to the amendments made to the Recovery Plan in 2018, the construction of the resort is legally implementable, despite no construction work having been carried out to date. This has produced a widespread feeling to perceive the forest as "lost" or at least severely changed in the immediate future. Despite this, the Ca' Roman Fort Recovery project represents an alternative to this scenario of habitat subtraction, as the construction of the physical headquarters of the Oasis management body consists in an action of partial re-appropriation of the forest: a repeated presence of the LIPU within the park would in fact allow for more frequent monitoring of any developments regarding scenario 1, and consequently exert pressure on the implementation of the same and its perception in the media and public arena.

Against this backdrop of insecurity regarding the future of the forest, stakeholders differed on the possible uses of the forest. According to Natale Brusamolin, head of the *Villaggio Marino*, «the forest area could partially host socialising spaces for village users such as benches and games» (Brusamolin 2022). Of a different opinion is the manager Luca Mamprin, who is «against any work that could increase the human presence in the area, as it would increase the disturbance caused to the local fauna» (Mamprin 2022). In fact, according to LIPU, «tourist use of Ca' Roman should be limited to the paths already present and mediated by naturalist operators, so as not to cause any damage to the delicate local ecosystem» (*Ibidem*). The implementation of the Fort restoration project, therefore, could represent a turning point for the preservation of the forest and Ca' Roman itself, as the assignment of a physical location to the managing body could guarantee greater control of compliance with the rules in force in the Oasis and therefore a reduction in the anthropic impact on the habitats.

8 Discussion

In this chapter are discussed the results obtained from the analysis of the two development scenarios and the opinions collected from the semi-structured interviews with key local stakeholders. The discussion takes into consideration the theoretical framework of local development and territorial regeneration described in Chapter 3. First, a Ca' Roman-based definition of local development and territorial regeneration is proposed, in order to provide a coherent theoretical basis which can serve as a guideline for the discussion. Further, the discussion focuses on two conceptual pillars of local development studies, namely the participation of local stakeholders in decision-making processes and the space-conscious approach, with a key focus on their contribute for projects' efficiency and effectiveness.

8.1 A definition of local development for Ca' Roman

After examining the historical course of the concepts of "development" and "local development" in Chapter 3, it is possible here to identify an unambiguous definition in order to analyse development scenarios considering Ca' Roman.

First of all, an idea of development for Ca' Roman cannot disregard the importance of spatial characteristics, hence a truly space-conscious approach must take into consideration an in-depth contextual analysis, which is not limited to a mere consultation of texts, but is based on a relationship of assiduous presence on the territory and constant confrontation with the people who live it on a daily basis and are the repositories of priceless local knowledge. Nevertheless, it is important to acknowledge that local actors are often referred to as knowledge providers, as they can provide useful information to elaborate development projects. This approach, which can be described as "extractivist", is condemned here, as it involves local communities only for instrumental use and then excludes them from decision-making activities. A true participatory approach considers the communities in the area and works with them - and their knowledge - to collectively draw up development projects.

Only such an approach can lead to an awareness of the environmental factors, central to this thesis research, and the dynamics occurring in the territory - consisting above all in the interactions between environment and humans and in the social dynamics that produce unique spatial forms such as those present in Ca' Roman. Indeed, the type of natural resources management, socio-

economic structure and *Lebensformen*[41] present in a territory are the result of a historically traceable relationship of mutual influence between humans as well as between humans and the environment. A local development approach in Ca' Roman, therefore, cannot focus merely on the economic and quantitative aspects of growth, as neglecting the social, geographical and cultural elements would have a disastrous impact on the fragile balance of the island, while also undermining the success of development and regeneration projects.

For the second point, is necessary to make another theoretical consideration. The localist approach, in fact, despite being based on the principle of heterogeneity, is often framed on a reference framework of universally shared principles and practices, such as the SDGs (Sustainable Development Goals promoted by the United Nations). Indeed, a «progressive local and regional development is based upon a set of foundational, even universal, principles and values such as justice, fairness, equality, equity, democracy, unity, cohesion, solidarity and internationalism» (Harvey 1996). Such ideals can «connect local and particular struggles in a more general, geographically encompassing common and shared interest» (Harvey 2000). This general framework of values and practices, despite its international diffusion, refers to a specific cultural framework, which is the Western one. It is therefore necessary to acknowledge that the universal model, since it is a culturally and historically situated model, is not universal at all, but it is the product of a specific society in a specific time (Ziai 2017), to be able to adapt it in other non-Western contexts. It is evident how this model is easily usable (without deep theoretical rearrangements) in countries culturally close to the West, whereas it needs major reworking in the case of historical-cultural contexts that admit values and principles different from those supposed universally given. In the case of Ca' Roman, being embedded in the Italian cultural and institutional context, it is therefore possible to approximate that the reference values between the local and universal framework are almost identical. This consideration, however, do not exempt from an approach open to dialogue and able to listen to other point of views, mainly the local communities' ones.

Third, in establishing the principles and values that define what is meant by local development, public discussion and social participation within a democratic framework are essential. Indeed, a proper understanding of economic demands requires discussion and exchange through debate, criticism, and dissent, which are central to the processes of generating informed and reflected choices. However, the effectiveness of open dialogue is often underestimated in assessing social and political problems. Democracy, then, suggests opportunities for the definition of social and

[41] *Lebensformen*, or form-of-life, is a concept proposed by the Austrian philosopher Ludwig Wittgenstein which can be defined as the horizon within which our language games stand out, that background that gives meaning to our relating in the world. It can be interpreted more simply as a concept close of what we intend as "culture" (Wittgenstein 1921).

economic problems, although there are clearly substantial geographical variations in its practice (Sen 1999). This approach is possible only by involving local communities through real participatory processes - which assume the proposals represented by the genuine participatory rungs of “partnership”, “delegation” and “citizen control” of Arnstein’s ladder (Arnstein 1969) – which enable the citizens to decide about what can be done in their territory and discuss about feasible solutions for the great set of problematics occurring in the Venice Lagoon and in Ca’ Roman. As such, since the island is not permanently inhabited, local associations present in the site should be consulted and considered as relevant stakeholders, as they interact everyday with the local environment and have a precise idea of the island’s problematics and resources.

To conclude, local development programmes in Ca’ Roman have to adopt a space-conscious approach which encompasses a deep geographical, social, cultural, environmental analysis to understand the complex dynamic occurring in the Venice Lagoon. Furthermore, local actors, even if without any political nor economic influence, must be consulted through a participatory approach which enables to identify the potentialities and threats of Ca’ Roman and design collectively adequate solutions.

8.2 A theory of territorial regeneration for Ca’ Roman

The concept of regeneration, although being a widely used term, takes on a set of different and sometimes even antithetical nuances. In fact, the practices of territorial regeneration and recovery of existing built-up areas can lead to serious social and environmental damage if they are unable to understand the cultural, social, geographic and ecological factors of the context in which they are to operate. Therefore, even territorial regeneration must be locally declined, and implemented only after an accurate multidisciplinary analysis of all the elements and dynamics that make up a territory.

Ca' Roman, having unique characteristics from an ecological and landscape point of view, is a territory that presents a particular fragility, so recovery and regeneration plans that do not adapt to the island's specificities cannot be compatible with the conservation of natural habitats in their current state. Indeed, construction-type interventions would cause major disturbances to the local fauna, with the risk of causing some species to abandon their original range. Moreover, the subsequent increased anthropic occupation of the regenerated spaces would lead to further impacts, as it would discourage the nesting of protected species (Mamprin 2022). Another potential negative impact is the potential spreading of allochthonous species, brought by the humans as ornamental elements. Finally, with regard to the implementation part of the regeneration projects, it must be

remembered that Ca' Roman presents several significant limitations for building activities, as the area is protected by an apparatus of national and European laws aimed at the conservation of local habitats.

The complexity of the factors present in Ca' Roman therefore indicates how any intervention plans must strictly implement the principles of environmental sustainability, and can only take place on a small scale, both in terms of the area of intervention and in terms of the number of people encouraged to frequent the area.

8.3 The lack of a participatory approach

The participatory approach is essential in local development scenarios, as it makes it possible to identify what the community really wants in the area it feels physically, symbolically and culturally as its own. This approach is decisive for the very success of development projects, as it makes it possible to identify the territory's critical factors and potentialities that are decisive in influencing their implementation. It is therefore in the interest of those in charge of projects to devise a participatory process, as it reduces implementation costs. In fact, in the first place, the involvement of the local population in the decision-making process allows the projects themselves to be legitimised at the local level, thus decreasing the likelihood of oppositional attitudes towards them and therefore avoiding unforeseen expenses due to the consequent delays in the operational schedule. Furthermore, including participation in the design of projects allows to take into account local knowledge for the design of context-optimal solutions, enabling more efficient materials and tools to be chosen at a lower cost. Additionally, the residents' participation in the decision-making process permits the accomplishment of mutually agreed-upon goals that boost the socioeconomic and environmental advantages for the neighbourhood.

From the analysis of the interviews, it resulted evident that the lack of a participatory process open to all possible actors in Ca' Roman has caused significant obstacles to project implementation. Firstly, this absence generated a climate of distrust towards institutions, as the Recovery and Regeneration projects were perceived as imposed from above and without any consideration of the specificities of the territory. This has generated openly oppositional attitudes towards the projects themselves - namely the appeals to the Tar brought by Italia Nostra or the attempts by local associations to prevent the sale of the Fort to a private party - which have considerably slowed their implementation. It is therefore in the interest of the investors themselves to ensure a process that is at least transparent in the management of the territory, as civil society can play an active part in devising solutions and make significant contributions to the implementation of development plans.

This is even more evident in the case of scenario 1, as the huge investments for the realisation of the project did not result in any material output, since the buildings of the former colony were not demolished and no construction work was carried out.

In addition, the lack of a participatory approach corresponds to an economic loss consisting of the potential contribution of the opinions, ideas, and knowledge that the local community and stakeholders would have brought to the project. The decision to ignore listening to the realities of the area therefore consists in the loss of all those benefits that could have been gained through dialogue between investors and stakeholders.

In short, a properly managed participatory approach can bring win-win solutions for both the investor and the local community. Analysing the context of Ca' Roman, one can identify how the failure to involve local realities in the management of the territory by institutions and private investors has led to negative consequences both economically, socially and environmentally.

8.4 Space-conscious approach in Ca’ Roman

The place-based approach is a fundamental pillar of recent theoretical elaborations of the local development concept, since a definition of development itself is relative to the socio-cultural context in which it is embedded. Once again, the adoption of this approach, although supported by a substantial set of ethical and political arguments (see Chapter 3), also brings benefits from the point of view of project implementation efficiency, and thus from an economic point of view. Taking into account all the environmental, social and geographical factors of an area provides a body of knowledge that can be used to devise solutions suited to the context in which they are implemented and thus guarantee the success of development projects and produce positive results for both those who designed the project and its beneficiaries.

In the context of Ca' Roman, it can be affirmed that an insufficient analysis of the uniqueness of the local habitat and the complicated socio-cultural context of the lagoon was carried out. This led to a notable detachment between the project ideas - the Recovery Plan of the former colony and t the Regeneration Plan of the *piarda* envisaged by the Europa Plan - and the territorial reality, in fact producing friction that negatively influenced the realisation of the projects themselves. In particular, public institutions and investors showed little interest in preserving the island's delicate ecosystem: this lack of environmental sensitivity partly contributed to fuelling the climate of mistrust between civil society and the administration that had already been established due to the population's insufficient involvement in decision-making processes.

The institutions were accused of favouring the business-as-usual model and of not considering the damage to the Oasis - real and potential - caused by construction projects such as the MoSE and the tourist village. In both cases of development, moreover, the actions promoted by the Venetian public bodies have been condemned by the European Union as not being in line with the respect of Community priority habitats and the relevant environmental jurisdiction. This implies that the position of local realities was supported and legitimised by the actions of a transnational body, making the lack of dialogue with local institutions even more serious. The little interest in nature conservation issues is also highlighted by the lack of funds allocated to LIPU, which has been the managing body of the Oasis for more than 15 years and is neither able to have an adequately paid employee nor a physical location to carry out the basic operations of research, monitoring and dissemination.

On the other hand, it is necessary not to attribute this behaviour to the entire institutional sector. With regard to scenario 2, in fact, it is possible to identify a positive disposition with respect to the delicate habitat of Ca' Roman on the part of the *Provveditorato alle Opere Pubbliche*, which played a fundamental role in preventing the sale of the Fort of Ca' Roman to a private investor and assigning its management to LIPU, enabling the park's managing body to implement monitoring and safeguarding the island's protected habitats. Thus, the arena of public institutions in the Venice Lagoon consists in a complex set of social, economic and political interests which interacts with the local territory in both contrasting and cooperative way, underling the controversial behaviour kept by public bodies in the Veneto Region.

8.5 Abandonment

The abandoned condition of man-made elements on the island represents a challenge and at the same time a potential for local development projects. On the one hand, in fact, these buildings may represent a problem in terms of safety, but on the other hand they represent a source of spaces that can take on a new value through a different use of them. Ca' Roman has several abandoned places, which interface with the natural element of the forest. This relationship can suggest new uses for the spaces themselves, which can become places of value for the territory.

The abandoned buildings of the former colony and the Fort, as well as the other military structures on the island, were described by the stakeholders interviewed more as degraded and unsafe places than as elements containing their own potential. The most recurrent proposals - when proposing the possibility of their use in the future - essentially consisted of two different suggestions. On the one hand, it was proposed that places of high historical and cultural value - such as the World War II

bunkers or the Fort itself - be restored for their value in themselves, and thus become a site of guided tours or small cultural events. On the other hand, it was proposed to leave the buildings as they are, so that nature can continue the process of re-appropriation of the anthropic spaces, which are thus configured as voids - something negative, to be erased - that are filled by vegetation and reassume a positive value, as they become places for the conservation of biodiversity.

None of the interviewees mentioned the art installations found within the lagoon: this may be due to the fact that the colony is difficult to reach, and the buildings are in a state of disrepair; it may also be explained by the fact that the works can be traced back to a youth movement of artists who have little connection with the local association nor with the population of Pellestrina. Nevertheless, the Fort Restoration project is an interesting territorial regeneration proposal for a local development perspective, as it aims to reuse an abandoned space of high historical value to promote nature conservation and dissemination activities.

8.6 Final considerations

In this chapter, the current development scenarios in Ca' Roman have been analysed through the concepts provided by territorial regeneration and local development studies. Moreover, a dialogue with stakeholders was necessary to understand the complexity of the dynamics at work on the island. A summary of the results obtained is thus necessary to grasp the salient points of the research.

Scenario 1 envisages an intervention plan that does not take into account the local specificities of the area and the community that would benefit from it. It is in fact the result of a private investment that promotes unidirectional economic development, which has little positive impact on the local economy, since it sets out to increase the island's tourist attendance without having considered the broader effects of the transformations it triggers from a social and environmental point of view. In fact, scenario 1 targets a particular type of client - i.e. tourists who are willing to pay several thousands of euros for a week-long stay - and does not seek continuity with the local players already present in the area - especially the Marine Village, LIPU and the community of Pellestrina. This approach prevents from conceiving alternative proposals with a low impact on the Oasis' ecosystem and which is including the segments of the population that already frequent Ca' Roman, such as the users of the Marine Village, LIPU volunteers and nature enthusiasts, as well as the inhabitants of Pellestrina and Chioggia.

Scenario 2, on the other hand, can be split into two different phases: the elaboration of the Europa Plan and the Ca' Roman Fort Restoration Project. As far as the first phase is concerned, while acknowledging that the plan had included measures to reconstitute habitats damaged by the MoSE construction works, it should be noted that in the case of the *piarda* reclamation project the lack of a place-based approach was extremely evident, as it envisaged the placement of ornamental plants within an extremely delicate ecosystem that could be adversely affected by the introduction of further allochthonous species. Moreover, the Europa Plan did not envisage any participatory process for Ca' Roman to include local realities in the decision-making process.

Conversely, the second phase is the result of a markedly different approach by public institutions, with greater openness to consultations with the local community and a greater awareness of Ca' Roman's needs. In fact, the opening of the *Provveditorato* to grant the management of the Fortress to LIPU is the result of an awareness of the island's problems and of the fact that the best way to administer the Oasis is to give the managing body the tools to handle it properly. Despite the recognition of the place-based approach, on the participatory side the project remains lacking. In fact, the only local organisation that was invited to collaborate was LIPU, while all the other associations and the populations of Pellestrina and Chioggia were not consulted. This approach therefore remains a serious shortcoming, as it effectively excludes an important part of the people that have a physical, cultural, symbolic and social proximity to Ca' Roman from the decision-making process. This could potentially create a gap between the project and civil society, with the danger that civil society will not recognise the regeneration of the Fort as a benefit for itself nor as a common good of the local community, denying it spaces. In spite of the lack of a real participatory approach, the relationship of trust established between LIPU and local stakeholders - due to the positive thirty years long management of the Oasis - may lead to suppose that the Fort Regeneration Project will have positive implications for the island, as LIPU stands as a guarantor of the desire to create a space to defend community habitats and promote scientific dissemination.

In conclusion, according to research into development scenarios occurring in Ca' Roman and consideration of the interests and desires of stakeholders interviewed, an approach aimed at capturing the specificities of the territory and paying attention to the local population is a necessary condition for successfully promoting local development and regeneration projects that aim to bring economic, environmental, and social benefits.

9 Conclusion

Ca’ Roman is a unique site within the Venice Lagoon for the variety of habitat and biological life it presents. The ecological significance is recognised at international level, as the island is a site of Communitarian relevance, mostly for its importance for migratory birds. The thesis focused on an element of extreme value of this location, the forest of Ca’ Roman. Indeed, for its geographical position at the centre of the island, it acts as a mediator between the lagoon and the sea, hosting species coming from different ecological niches. Furthermore, it presents within its perimeter many abandoned buildings with high cultural and symbolic value. Although these structures have lost their former function, they arise new interactions that have been explored in this research.

Indeed, the peculiar condition of abandonment allows for the establishment of unique dynamics between the anthropic and the natural that may suggest a dialogue between the different components. As such, these interactions overcome the generally recognised contrast between the human and the “sylvan”, as they are able to foster a cooperative behaviour between two voids - the abandoned places and the “wilderness” - which represents the *other-than-self* from the “civil” human. Positive outputs are produced by this cooperation, as the fulfilment of unsatisfied social needs, a more conscious management of habitats through deeper understanding of the ecological dynamics and the promotion of co-existence behaviour between humans and the other species.

Local development and territorial regeneration are two disciplines that have the potential to grasp these opportunities and provide them a consolidated status. In this thesis, these new insights into development theory and practices have been explored by analysing two territorial regeneration scenarios occurring in Ca’ Roman. In fact, the abandoned structures present in the forest of the former summer colony and the Ca' Roman Fort are the object of recovery programmes which raised lively debate because of the contrast between economic, ecological and socio-cultural interests. The programmes were perceived by local communities and civil associations as investment plans which did not take into account the peculiarities of the territory. On account of this, their implementation experienced several slowdowns due to the opposition of local stakeholders through judicial proceedings which eventually led to important rearrangement of the projects themselves.

The analysis of the substantial failure of these plans is an opportunity to identify which factors has not been considered by the investors, and recognise the potentiality of the Ca’ Roman forest in terms of local development and territorial regeneration practices which are able to provide benefits to the community and the environment. Indeed, the absence of a participatory process and a place-

based approach led to negative socioeconomic and environmental consequences, as it raised oppositions from local stakeholders and prevented planners to devise solutions suited to the delicate context of Ca’ Roman ecosystems.

The Ca' Roman forest is therefore an interesting laboratory for analysing the contradictions that run through the Venice Lagoon, which can offer innovative proposals for the elaboration of alternative models of investments based on environmental sustainability and regard for the territory. In conclusion, local development and regeneration practices in Ca’ Roman have to consider the specificities of the island and involve local population in the decision-making process. This approach, supported by the insights provided from a new perspective into the relationship between the human and the “sylvan”, can offer positive solutions for the community which are respectful of the unique features of a forest sitting between the lagoon and the sea.

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12 Riassunto

La località di Ca' Roman, situata all'estremità meridionale dei Lidi di Venezia, possiede un notevole valore dal punto di vista naturalistico per la varietà di habitat e specie che ospita, oltre che per le peculiarità geomorfologiche e la posizione di terra di confine tra laguna e mare. In particolare, l'isola presenta una foresta di origine antropica che sta subendo un processo di progressiva rinaturalizzazione: questo processo coinvolge edifici abbandonati di varia natura e destinazione d'uso che incontrano la vegetazione e la fauna locale, innescando dinamiche insolite tra ciò che definiamo umano e ciò che non lo è.

Questa tesi prende in considerazione l'uso del territorio e delle sue risorse dai primi del Novecento a oggi, attraverso un'analisi geo-storica volta a individuare i cambiamenti nel tempo e l'impatto che i modelli di sviluppo adottati hanno avuto sul territorio. In particolare, si concentra su un elemento centrale di Ca' Roman, il suo bosco, esplorando le relazioni tra uomo e selva attraverso l'analisi di due scenari di sviluppo in atto nella località della Laguna di Venezia: il Piano di Recupero dell'Ex Colonia di Ca' Roman e il Piano di Compensazione delle opere del MoSE (il cosiddetto "Piano Europa") - oggi aggiornato al Piano di Recupero del Forte di Ca' Roman.

Lo scopo di questa ricerca è quello di individuare delle linee guida per l'attuazione di programmi di sviluppo locale in grado di tenere conto dell'unicità del territorio della Laguna Veneta dal punto di vista ecologico, politico e socio-culturale, attraverso un'analisi partecipata degli scenari di sviluppo attualmente in corso nel bosco di Ca' Roman. La ricerca, basata sul confronto con i principali stakeholder locali e sull'esame di articoli di stampa locale, consente di individuare i fattori di criticità dei programmi di sviluppo, nella misura in cui si configurano principalmente come operazioni di riqualificazione del patrimonio edilizio dell'isola attraverso piani di intervento volti ad accrescerne il valore economico e immobiliare a scapito delle sue unicità ambientali e delle comunità locali, escluse dal processo decisionale. Attraverso tale analisi, quindi, è possibile individuare le potenzialità della foresta e capire se queste sono compatibili con futuri progetti di sviluppo locale in grado di rivitalizzare un'area storicamente sottoutilizzata nel rispetto del delicato ecosistema e della cultura lagunare.

L'analisi dei due scenari si basa sui contributi più rilevanti della letteratura sullo sviluppo locale e la rigenerazione del territorio. Essa consiste in un approccio partecipativo volto a coinvolgere i principali stakeholder e i membri della comunità locale attraverso una serie di interviste semi-strutturate, affinché esprimessero liberamente le loro opinioni sugli scenari. Inoltre, sono stati analizzati i principali media locali per individuare la percezione collettiva dei piani di rigenerazione

e ricostruirne il decorso giudiziario. Sopralluoghi supportati dalla raccolta di materiale fotografico sono stati effettuati al fine di studiare Ca' Roman dal punto di vista ecologico e geomorfologico: inoltre, tali visite hanno permesso di verificare le condizioni degli edifici abbandonati dell'ex colonia, il Forte Barbarigo e i bunker nazisti, per indagare le relazioni tra abbandono e wilderness. Infine, un'analisi geospaziale supportata da Geographic Information System è stata implementata per supportare la ricerca con dati quantitativi inerenti le trasformazioni nel tempo del litorale orientale di Ca' Roman e del suo bosco.

La tesi è strutturata in due parti distinte ma concettualmente collegate. Nella prima parte, il contesto storico e geografico di Ca' Roman sono considerati separatamente nei capitoli 2 e 3, al fine di individuare quali processi storici e naturali hanno contribuito all'attuale conformazione dell'isola e alla sua posizione di confine tra i comuni di Pellestrina e Chioggia. L'analisi si concentra sugli eventi dell'ultimo secolo, in quanto determinanti per la formazione dei principali elementi geomorfologici - come la pineta retrodunale e il sistema dunale - e per la costruzione delle strutture antropiche dell'isola. Inoltre, si sottolinea il valore dal punto di vista ecologico del sito di Ca' Roman all'interno del sistema lagunare, in quanto presenta habitat di rilevanza comunitaria per la nidificazione degli uccelli migratori. Infine, il capitolo 4 considera i principi chiave dello sviluppo locale, in particolare gli aspetti partecipativi e l'approccio non quantitativo e place-based. Ad essa si aggiunge una riflessione sul concetto di rigenerazione territoriale e sulle possibili interpretazioni dello stesso.

La seconda parte considera la foresta di Ca' Roman dal punto di vista dello sviluppo locale e della rigenerazione del territorio. Dopo aver esaminato le principali caratteristiche del bosco lagunare, il capitolo 6 esplora il rapporto tra l'umano e la selva studiando le dinamiche che si instaurano tra gli edifici abbandonati di Ca' Roman e il bosco stesso, suggerendo nuovi spunti di riflessione nella prospettiva dello sviluppo locale e della rigenerazione del territorio. Il capitolo 7 analizza gli scenari di riqualificazione del Piano di recupero dell'ex Colonia di Ca' Roman e del Piano Europa. Questi scenari consistono nel recupero di edifici abbandonati all'interno del perimetro del bosco, con un potenziale impatto significativo sulle dinamiche ecologiche di Ca' Roman, sito di fondamentale importanza per l'intero ecosistema lagunare. Inoltre, la mancanza di un processo partecipativo volto a coinvolgere la popolazione locale nel processo decisionale ha comportato a un significativo rallentamento dei programmi di intervento. Nel Capitolo 8 vengono riportate le opinioni degli stakeholder locali sugli scenari stessi, al fine di esplorare con loro il potenziale contributo che avrebbero potuto dare ai progetti se ci fosse stato un processo partecipativo. Infine, il capitolo 9 discute i risultati ottenuti dalla ricerca, in particolare confrontando le dichiarazioni degli attori intervistati con le ricostruzioni dei programmi di riqualificazione attraverso gli articoli di stampa,

alla luce di due principi teorici chiave dello sviluppo locale: la partecipazione e l'approccio place-based. In questa discussione viene elaborata una proposta di teoria dello sviluppo locale e della rigenerazione territoriale adattata al contesto di Ca' Roman, alla luce delle nuove prospettive individuate nell'indagine di una rinnovata relazione fra essere umano e selva. Inoltre, vengono identificati i principali aspetti critici degli scenari analizzati e il potenziale della foresta di Ca' Roman in una prospettiva di sviluppo locale.

Per concludere, il bosco di Ca' Roman è un interessante laboratorio per analizzare le contraddizioni che attraversano la Laguna di Venezia, il quale può offrire proposte innovative per l'elaborazione di modelli alternativi di investimento basati su sostenibilità ambientale e rispetto del territorio. Pratiche di sviluppo e rigenerazione locale a Ca' Roman devono perciò considerare le specificità dell'isola e coinvolgere la popolazione locale nel processo decisionale: tale approccio, supportato dagli approfondimenti forniti da una nuova prospettiva sul rapporto tra uomo e selva, può offrire soluzioni positive per la comunità che siano rispettose delle caratteristiche uniche di una foresta situata tra la laguna e il mare.

13 Declaration of originality

Il candidato dichiara che il presente lavoro è originale e non è già stato sottoposto, in tutto o in parte, per il conseguimento di un titolo accademico in altre Università italiane o straniere.

Il candidato dichiara altresì che tutti i materiali utilizzati durante la preparazione dell'elaborato sono stati indicati nel testo e nella sezione "Riferimenti bibliografici" e che le eventuali citazioni testuali sono individuabili attraverso l'esplicito richiamo alla pubblicazione originale.

The candidate declares that the present work is original and has not already been submitted, totally or in part, for the purposes of attaining an academic degree in other Italian or foreign universities.

The candidate also declares that all the materials used during the preparation of the thesis have been explicitly indicated in the text and in the section "Bibliographical references" and that any textual citations can be identified through an explicit reference to the original publication.

Student's signature

Federico Tonegatti

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