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Found in Translation – Bridging Concepts from Traditional Gardens to Contemporary Urban Planning and Design

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Abstract

Facing new challenges, contemporary urban planning and design are in search of ways to reinvent the city. In the past, notably during the last century, cities have lost their human scale and at the same time, people have been losing contact with nature and the natural process in a progressively artificial and globalized world. Thus, addressing the city today, it might be interesting to look back on solutions that have been practiced in times when human uses were predominantly led by environmental determinism rather than by a technological one. With this purpose in mind, this paper aims to contribute to the discussion on how to improve urban planning and design through an integrated landscape approach by presenting a proposal for an urban area in the city of Lisbon that makes use of the ancestral knowledge of multifunctionality and water management, as is present in the *Quintas,* and adjusting it to fit present needs, to encompass new social realities and demands for public space and food security.

Keywords

Quintas, traditional gardens, *Hortas*, urban planning, water management

1. Introduction

Contemporary urban planning is struggling with development models that can best respond to present and future challenges. The outstanding ones include mitigation of and adaptation to climate change, the provision of spaces promoting the physical and psychological health of an

increasingly growing urban population, as well as dealing with scenarios arising from increasing fuel prices that will most probably affect the provision of food. Cities around the world are increasingly seeking to make urban neighbourhoods more sustainable in resource usage and to restore social connectivity within the community. To bring 'nature' into the city is a key issue when moving towards more sustainable urban development models that are also able to create more resilient cities (Newman et al., 2009).

Nature in cities has shown the ability to provide many environmental and psycho-social functions as already discussed in a wide array of literature (e.g., Hough, 1995; James et al., 2009).

In the light of new demands for nature in cities, the main challenge for urban planning is integration (Vigar, 2009; Healey, 2006): integration of sectoral policies, perspectives and responsibilities, and notably, the integration of multiple functions. This integration cannot only take place at the urban scale, but also at the neighbourhood level by promoting the involvement of community. Thus, cities need to be re-envisioned to create pedestrian-friendly spaces, to promote bicycle and pedestrian movement and encourage street life, thereby reducing congestion, pollution, and ultimately the consumption of resources.

Even though past urban models have already proposed the promotion of nature into cities – the Garden City Movement is one that stands out, the different functions were generally zoned at the city scale. The integration of functions provided by nature has not taken into consideration much at the on-site level. This trend was emphasized with the Modernist Movement, which proposed the segregation of functions in the city using green areas as the canvas. The extent of these green areas makes them at times difficult to manage and keep up, thus transforming them into abandoned and degraded urban voids. Despite the increasing concerns related to landscape in urban areas, these tend to become segregated in parks, greenways and street trees, rather than fully integrated in urban planning (e.g., Punter & Carmona, 1997).

Looking at the pathologies of contemporary cities, it may make sense to investigate the traditional city where shops and public spaces are typically mixed with or within walking distance of residential buildings, where traditional paving techniques allowed for rainwater to infiltrate, or where public squares and streets created opportunities for social interaction and promoted a sense of place (Carmona et al., 2003). Thus, to create innovative and more environmentally and socially sustainable urban areas, it might be worthwhile to invest in gaining a better understanding of traditional approaches and to look back on the solutions that have been practiced at times when human uses were predominantly led by environmental determinism rather than by a technological one.

Two aspects are further explored in this paper, since they are critical in facing the increasing uncertainty related to the future in urban areas: food provision and water management.

1.1 Potential of urban agriculture

In the ancient compact city, food was provided mostly by the surrounding rural areas. Nowadays, cities increasingly import food from more distant areas, thereby separating cities and the people from their food and natural environment and simultaneously putting pressure on energy consumption and emissions (Berry, 2002). The combined energy and food crises, similar to those

that emerged in 2008, demonstrated the fragility of food security also in Europe. Urban agriculture initiatives are not new to Europe. For instance, in the post-industrial revolution in the UK, or in Germany, where the well-known *Schrebergarten* managed by citizen associations links the production of food with recreational and community activities (Viljoen & Bohn, 2005). In Portugal, urban agriculture initiatives have occurred in a spontaneous non-organized way on suitable urban voids or adjacent to road infrastructures. This has mostly taken place after the large internal migration to the metropolitan areas of Lisbon and Porto in the 1960s. Coming from a rural background, this population was engaged in farming the vacant land surrounding their residential areas, combining a previous way of life with a leisure time activity and to supplement the family budget. Subsequently, this activity is also shared by other low-income populations and therefore the plots have been designated as 'social gardens' (*Hortas sociais*). In this sense, the urban *Hortas* are small spaces of agriculture activities that appear on vacant lots, left empty by urban plans and construction development, which could be framed as "squatter gardening". The evolution of this typology in Portugal has proven to be context dependent. Some developments have occurred either for ideological reasons, recreation, food safety or community support. These previously scattered and spontaneous activities are being regulated, and many local governments are supporting the creation of Agriculture Parks in a structured way as active part of green infrastructure.

Urban agriculture has shown great potential to contribute to food security in times of crises and, simultaneously, to provide a management strategy for the maintenance of green urban areas as a public-private partnership.

1.2 Water management issues in the Mediterranean

The other sensitive aspect in urban planning and design today is related to water management. Its balanced availability, distribution and management are required for almost all human activities. This management should be adapted to specific climatic conditions considering the amount and distribution of rainfall and other sources of water.

The Mediterranean climate regions are characterized by high spatial and temporal variations in rainfall with hot and dry summers and cool, wet seasons (Conacher & Sala, 1998; Mount, 1995). This variability is associated with extreme events, such as seasonal droughts as well as periods of torrential rains causing floods. Therefore, water scarcity is a common issue in the Mediterranean regions associated with problems in management and allocation, and increasing water demands (Conacher & Sala, 1998). Based thereon, the Mediterranean regions have developed a civilizational 'water scarcity culture' with the development of schemes and devices to cope with this variability, storing water in wet periods to use it in dry seasons for human activities, such as irrigation.

This adaptation to arid and semi-arid climates is an interesting learning process and is imprinted in the landscape. Ingenious systems and structures for water collection, storage and distribution have been created since early times aiming to compensate for the rainfall variability and water scarcity. Well-known landscapes across the Mediterranean basin are identified by their water irrigation schemes, such as the *qanats* in Persia, wells, cisterns, pools, the Roman aqueducts and dams and distribution canals, such as the *acequias* in the Iberian Peninsula (Raposo, 1994).

Mediterranean gardens can be seen as the summit of both, technology and aesthetics in dealing with water to create magnificent landscapes where beauty is associated with plant growth, to enhance human senses and recreation (Jellicoe & Jellicoe, 1987). The use of water in gardens goes beyond utilitarian purposes to combine cultural, aesthetic and spiritual values as well as environmental ones, such as cooling, increased infiltration, wildlife support and biodiversity. The examples of water use and management in gardens can provide inspiration for contemporary urban planning and design to help address sustainability objectives.

In fact, new approaches for water management in urban areas need to address issues such as climate change, flood risk prevention, stream restoration, stormwater management, improvement of water quality, reduction of waste (Petts et al., 2002; Burmil et al., 1999; Niemczynowicz, 1999). There is a need to integrate the requirements of sustainable water management that can cope with the current challenges in the urban planning and design processes.

In this context, the main objective of this paper is to contribute to the discussion on how to improve urban planning and design through an integrated landscape approach by presenting a proposal for an urban area in the city of Lisbon that makes use of the ancestral knowledge of multifunctionality and water management and adjusting it to fit present needs in order to encompass new social realities and demands for public space and food security.

2. Methodological approach

The methodological approach pursued in this paper is organized in two parts: in the first part, the structure of the Portuguese *Quinta* is presented as a way to provide a better understanding of how the functions of housing, recreation and production have been traditionally integrated using water as a guiding element; and in the second, a proposal is presented on how this traditional knowledge can be adapted today, not only in gardens but even on an urban scale to promote more integrated urban planning. These two parts are showcased using specific examples – the *Quinta of Bacalhôa* and the urban area of Chelas located in the city of Lisbon (Portugal). *Quinta* was chosen because it is very compact, almost rectangular and relatively small in size, making it easier to communicate (Chapter 3). The *Quinta* is located in the peninsula of Setúbal, 30 km south of Lisbon on the gentle northern slope of the Arrábida mountains (Figure 1 and 2) covering an area of 5.8 hectares. The area of Chelas, even though located in the very city of Lisbon has been quite troubled in terms of past utilisation and planning options, which have led to quite a degraded urban landscape that has been progressively fragmented by the construction of major road infrastructures that cross the city (Chapter 4). Due to the challenges presented, a subsection of the Chelas valley (Figures 1 and 2) was found suitable to demonstrate how the re-interpretation of traditional knowledge can produce interesting urban planning approaches. Finally, in Chapter 5, a proposal for an urban plan will be presented for that area with the aim to integrate functions and water management found in the Portuguese *Quintas*.

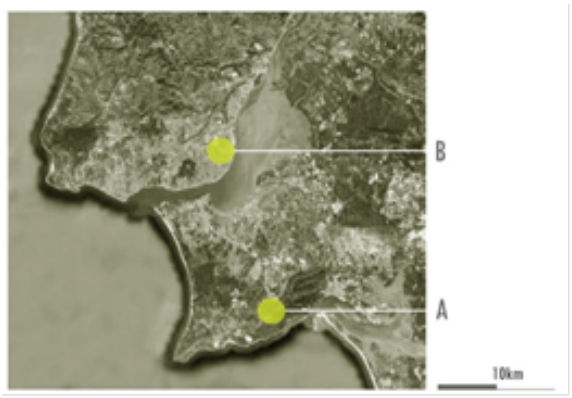

Figure 1. Location of Quinta da Bacalhôa near Setúbal (A) and Chelas urban area in Lisbon (B).

Figure 2. Location of Quinta da Bacalhôa next to Vila Fresca de Azeitão (A, left) and Chelas - north-eastern part of Lisbon (B, right).

3. Insights into the Quinta structure

The Portuguese *Quinta* can be interpreted as a mixture of a rural estate and a garden – a place where housing, agricultural production, leisure and recreation are brought together. There are various gradients to it, essentially depending on its history and that of its owners. There are *Quintas* throughout Portugal and they date back to the 15th century (Araújo, 1962). The aristocracy built most of the original *Quintas* as summerhouses and some are currently recognized as valuable cultural heritage. These *Quintas* were either isolated in the landscape to take advantage of the climatic amenities and breath-taking views or they covered vast areas of the rural hinterland of the cities. Even though the *Quintas* vary tremendously in shape and size, the three aforementioned functions are always present. During summer, all these functions depend greatly on the availability of water. Thus, the *Quintas,* like other traditional gardens in arid and

semi-arid regions, are structured by their internal climate regulation and water management strategies (Sullivan & Treib, 2002), which rely heavily on slopes for gravitational water distribution. The basic water features are related to water capture, storage and distribution. The capturing techniques may depend on the source of water, i.e., stream, well or mine (Ribeiro, 1992). In the *Quintas,* the main storage facility is usually a pool. Depending on the scarcity of water, the pool may be kept still to reduce losses by evaporation. In order to respond to each function, the water features tend to be multifunctional and since the uses and cultures need less water, they are located progressively away from the main water storage center – the pool.

Even though it is not within the scope of this paper to go in detail about the history and architecture of the *Quintas*, in order to showcase the integration of functions and structure, the example of the *Quinta da Bacalhôa* is used. According to Rasteiro (1895) it dates back to the 15th century, even though the first known registration dates from 1630. It was first owned by members of the royal family and later by Afonso de Albuquerque (governor of India and Viceroy of Goa) and his son Braz de Albuquerque. The latter is credited with bringing together the Renaissance and Moorish styles in the Quinta in an outstanding way. After being abandoned, it was rediscovered almost in ruins by the American ceramic specialist Orlena Scoville, who bought the property in the 1930s and started the famous restoration work. In this paper, that restoration is taken as a reference, as it still existed at the end of the 1990s when it was sold and transformed by its present owners – the Berardo Foundation.

On the map of the *Quinta da Bacalhôa* we can see how the three functions – housing, recreation and production – are structured around and by water (Figure 3). The use of water in this *Quinta,* as in others of this period, uses the existing knowledge from the Islamic garden, as well as irrigation techniques (Araújo, 1962; Ribeiro 1992). The main water feature – the pool – covers an area of 960 m² and is about 80 cm deep (Figure 4).

Figure 3. Plan of the Quinta da Bacalhôa.

In previous times, it received its water from the São Simão River and now from a well located next to the pavilions by the pool. This is the starting point for the irrigation system that covers the upper part of the Quinta, where the palace, formal garden, citrus orchard and kitchen garden are located on two different terraces. Since the house was built to be occupied mostly during the summertime, it is all about creating a fresh ambience. The pavilion and the pool were very likely designed to be the recreational area in historic times – low temperature in the pavilions bordering the water, sensorial attractiveness of the water and the view of the landscape downhill stretching as far as Lisbon, and the possibility to use it for water games, on small boats for instance. Nevertheless, the water had to create coolness without being wasted and unusable for other purposes. An example is the path that links the palace and the pavilion to the pool. It used to be flooded – some water evaporated diminishing the air temperature while the rest drained to the channel located near the terrace below that is linked to the pool for irrigating the orchard. From the pool, the water is channelled by gravity to all necessary locations. The lowest terrace was used for non-irrigated cultures – formerly occupied with olive groves and later by vineyards.

This outstanding way of integrating all the functions around water has been abandoned progressively in the gardens that are becoming more mono-functional and artificialized.

Figure 4. The pavilion by the pool.

4. Up-scaling the Quinta structure for Chelas

Many factors drove and shaped the urban development of Lisbon, such as political options, urban, social and economic needs and topographic characteristics. Based on these conditions, Chelas was not integrated into the city's urban structure until the 20th century (Figure 5).

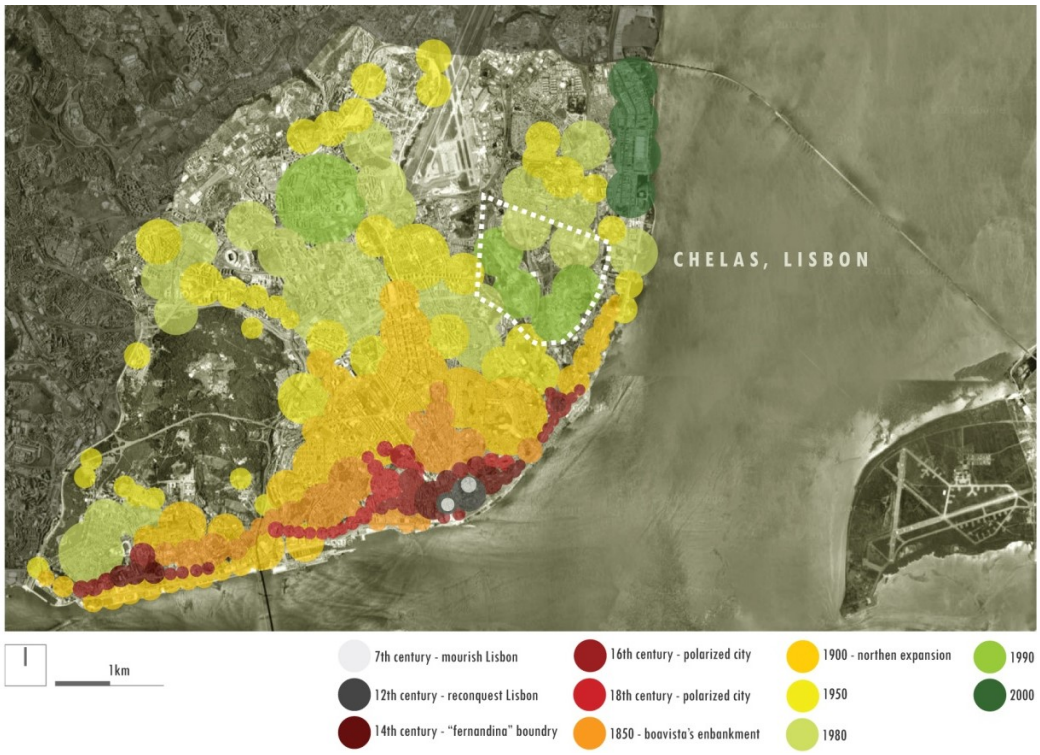

Figure 5. Chelas within the evolution of the City of Lisbon.

For many years, Chelas remained a landscape dominated by industry, mostly along the Chelas Creek, and by small *Quintas* where some of the city's agricultural production took place. This contributed much to the topographic structure of very steep slopes of the Chelas Valley located in

one of the three main watersheds of City of Lisbon, which caused difficulties for urban development, contributing to the delayed integration of this site into the urban context.

The first studies aiming at integrating Chelas into the urban area started in 1960. The objective was to create a multifunctional and integrated urban structure, and a rationalistic approach was adopted leading to the development of a proposal based on a cellular and hierarchic structure that included a nucleus with multiple high-density habitation with linear centres of function and mixed activities. These plans failed as they were only partially implemented in a scattered way, resulting in a highly fragmented and degraded urban landscape.

The cosmopolitan nature of Lisbon goes back to the Age of Discovery. Thus, Chelas is also an area where many different cultures mix, as many foreigners have settled there. From the economic point of view, the competitive potential of this population is one of the lowest in the Lisbon area. This is because of the high percentage of elderly people, a low percentage of youngsters that, together with poor qualifications, leads to low income levels and high unemployment rates. Thus, Chelas is one of the most problematic areas of Lisbon due to this misfit puzzle of human and material realities. The low quality of the public space and the island-shaped residential areas have definitively condemned Chelas to a poor quality of life.

As previous planning instruments have failed to provide Chelas with a unified and qualified structure, much is expected of the guidelines of the new Lisbon Municipal Master Plan. Due to the constraints of the terrain, the forthcoming plan calls for the valley in the Urban Ecological Structure to be occupied with public green spaces, connecting Chelas to the Tejo River and the rest of the city. For the first time in a Lisbon Master Plan, the value of urban agriculture of the *Hortas* is not only being recognized for its ecological, economic and social potential, but proposals are being put forward to transform the illegal occupation movement of land into well-organized areas as well. A regulation document, which addresses the conditions for the implementation of *Hortas* in the city of Lisbon, is currently under development.

Hortas in Chelas: the producers' expectations

Agriculture has been an ongoing activity in the valley of Chelas – previously in the Quintas located in a rural landscape, and from the 60s onward, in the form of Hortas in the midst of the urban voids (Figure 6). Today the production area covers a considerable portion of the subsection of the valley under study.

Aiming to gain a better understanding of the current practices and the expectations of the *Hortas* farmers, a survey was developed and conducted during spring 2011 among a group of 32 farmers from this specific Chelas site. The questionnaire was structured in three parts: personal information; information on present agricultural activity; and information on future expectations.

Figure 6. Overview of the Hortas on the slope.

The results show that the respondents are mainly people with rural backgrounds (nearly 90%). Of the reasons given by the farmers as their main motivation, we can highlight production as a hobby or as a supplement to their income (both mentioned by 40% of the respondents) and the high quality of the goods produced (13%). The main conclusions of this survey show that the main problems identified by the farmers are: access to water (referred as the main issue by 61% of the farmers inquired) and the availability of facilities to store the agriculture tools (56%). Despite these problems, 81% of the farmers surveyed showed no intention of moving to other *Hortas* location, even if better conditions are offered there, as for instance, those under construction by the municipality nearby, because they recognize the special value of the topographic characteristics of the slope, and especially the proximity of their current *Hortas* to their homes and the already existing social network.

5. The Chelas Urban Plan: The Concept

The location for the proposed design has been ignored by many planning and urban projects during the 20th century (as previously mentioned). A so-called “expectant ground” results from this fact. The intervention shall be focused on a location occupied by *Hortas*, on one of the slopes of the Chelas valley, in an area where the Chelas Monastery (currently used as an Army archive) is the main historical and constructed reference.

5.1 Structure and function – integration of agriculture

Our proposal aims to integrate a subsection of the Valley of Chelas in the City of Lisbon. In this regard, special attention was paid to working out different structures that contribute to the identity of the area: land use, public space and ecological structure. The developed macrostructure should provide solutions to the requirements that have been identified previously – such as continuity of the existing relations and the promotion of a progressive dialogue among the Chelas neighbourhoods, leading to a consolidated city. Therefore, the core idea of the proposal is to structure the area accommodating residential uses, agricultural production and recreational areas, and to integrate it into the urban context and into the broader urban ecological network (Figure

6). Also, an important aim is to preserve the current social and economic balance of the *Hortas* maintaining the positive impact of this activity in the community.

The design (Figure 7) intends to bring dynamics to a currently expectant place through the intersection of the different programmatic contents by actively reducing the boundaries between public and private realms.

Figure 7. Intents scheme (left) and overview of the design proposal (right).

5.2 Dealing with water

One central aspect of our proposal is water management: a collection or capture, storage and re-usage system. As one can describe the structure of the Quinta, we can also describe our proposal through the water features (Figure 8). As in the *Quintas,* our intervention takes advantage of the slope, using gravity to collect and distribute water downhill.

Beginning uphill, the primary water collection takes place on the impervious surfaces, such as the roofs of the proposed residential buildings. Here, articulated with the residential program, the design proposes a circular rainwater retention system. This will firstly serve the housing and commercial facilities. As in the *Quintas,* the water is stored in a pool. The purification of captured water is performed by a constructed wetland that provides the treatment based on the activity of the bacteria attached to the gravel, plant roots, soil and other particles. Afterwards, the purified water is stored in a service tank. This water can be used for domestic use and to irrigate the formal gardens. The grey water resulting from the domestic facilities may also be included in this purification/reuse cycle after being filtered by a specific filtering device. Then, this recycled water can be used for sanitary purposes, contributing to the reduction of one of the most important sources of water consumption.

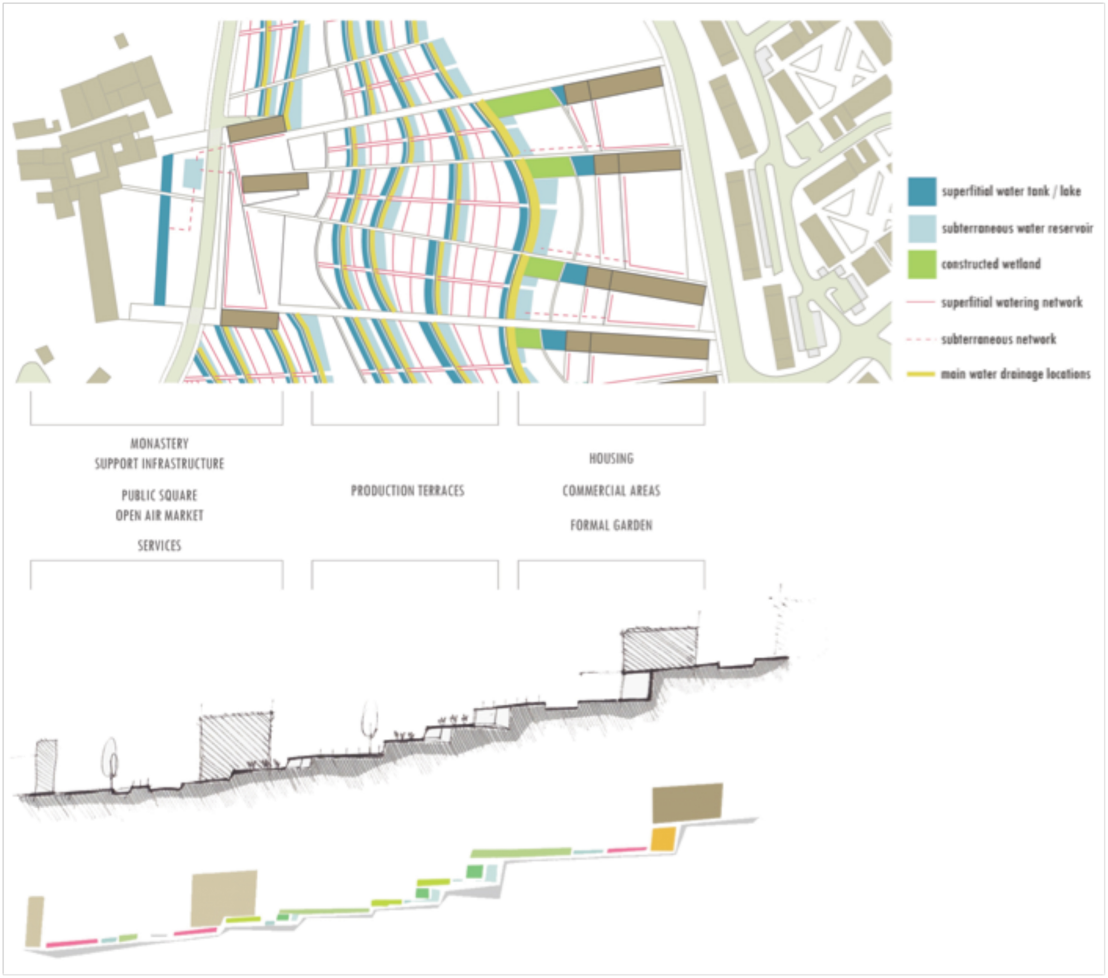

Figure 8. Water features - functional plan (above) and section (below).

In this proposal the slope is structured in terraces where the agricultural production takes place. The water used to irrigate the *Hortas* will be drained and collected in underground reservoirs located in every terrace. Each reservoir will serve the next (lower) terrace, through the superficial pools located between the tool storage facilities and the *Horta* plots (Figure 9). Transversal connections provide the access to and the links between the neighbourhoods (located on the top of the hill), Chelas Street and the monastery area at the bottom of the valley.

The services, commercial and street market activities where the *Hortas* farmers can sell their products are located on the lowest terrace and connected to the transportation system along Chelas Street. The inclined impervious surfaces drain the rainwater into a subterranean reservoir to be used for downstream irrigation.

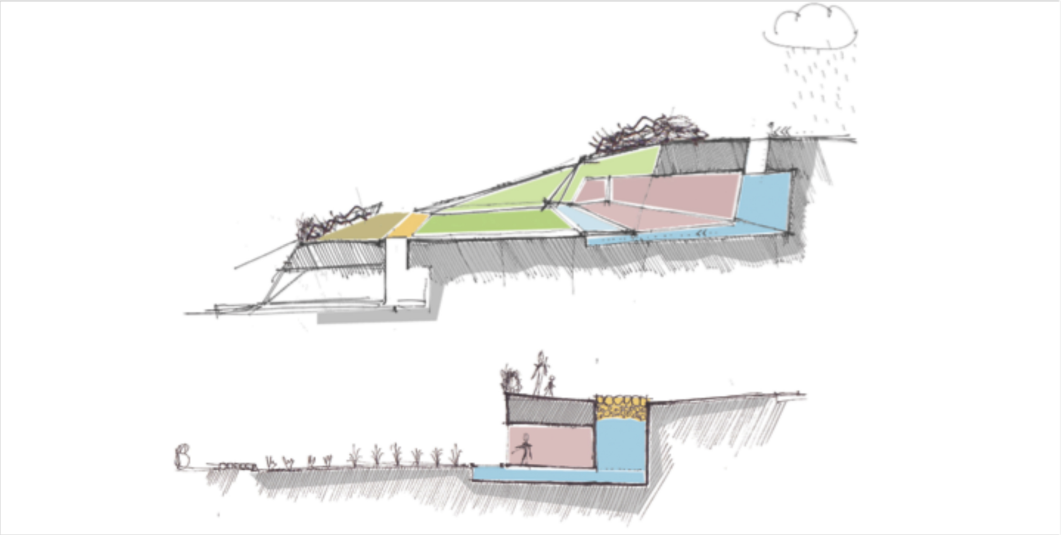

Figure 9. Sketch of a terrace unit.

Finally, the bottom of the valley, where the proposal meets the monastery, is adapted to serve as the supporting infrastructure for the agriculture activities. A public function is assigned to this last location aiming to promote the centrality of the proposed public space together with the service area. Here, the public spaces, namely the proposed square by the monastery, are also punctuated by water elements as a linear pool, symbolically reconnecting to the image of a previously exiting stream.

Thus, in this design proposal, the water features are displayed in a way that goes beyond the utilitarian purposes, also providing cultural, aesthetic and recreational uses. Due to this implementation, the proposed water elements end up not just having an active role in the economic and ecological sustainability of the design, but also contribute to the reconnection of the Chelas and its people to natural processes.

6. Conclusions

There is a need to innovate in urban planning and design by bringing together knowledge from the past to better face the challenges of the future. Water management is an issue that requires in-depth research of the physical and environmental context together with technological developments that can ensure a better and sustainable use.

Water management in traditional Mediterranean gardens and *Quintas* was based on sensitive systems and structures that took advantage of the climatic conditions, adopting knowledgeable techniques and processes that enabled the creation of beautiful landscapes, combining recreation, leisure and production purposes. Understanding these processes and adapting and integrating them in contemporary urban planning and design is desirable in terms of increasing sustainable planning and the quality of life.

The opportunity to elaborate a community development project inspired by these 'rural' remnants, such as the interest in urban agricultural production demonstrated by various groups of

population, together with a design scheme influenced by the concepts underlying the *Quinta* structure, produces an interesting challenge. It aims to incorporate traditional structures and community expectations into a contemporary urban design, intended to bridge the gap between rural and urban environments, between past and present, towards a sustainable urban living where identity and culture are desired values.

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