Metabolic Approaches to Regeneration of the Historic Mondeggi Villa Estate

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Abstract. The social and economic crisis that accompanied the Covid-19 pandemic has emphasized the need to rethink consumption, production and collective life in the peri-urban areas surrounding large cities. With this in mind it seems important that studies of urban spaces should include an interpretation of the different needs and sensitivities of the local communities involved. New behaviour models, both individual and collective, in line with the principles of environmental and social responsibility, have been used as the basis for developing new design approaches.

The Metropolitan City of Florence (CMF) seized the opportunity to adopt Integrated Urban Plans as a tool for sustainable urban regeneration and used funds provided by the National Recovery and Resilience Plan (PNRR) to develop a project for the Monteggi Villa Estate, a vast tract of land in a state of semi-abandonment, owned by the CMF, and located on the south-eastern outskirts of Florence.

This paper outlines the regeneration project for the Monteggi estate, developed by the CMF with the support of the Department of Architecture of Florence University, highlighting its ethical and cultural premises; it also describes the steps taken for obtaining the approval of the Technical Economic Feasibility Project.

Keywords: Integrated Urban Plans · Urban planning · PNRR · Metabolism

1 Introduction

The Metropolitan City of Florence (CMF) seized the opportunity to adopt Integrated Urban Plans as a tool for sustainable urban regeneration. Using funds provided by the National Recovery and Resilience Plan (PNRR) the CMF developed a project for Mondeggi Villa Estate, a valuable 170 hectares historical-agricultural heritage, unique in Tuscany for the breadth and richness of its territorial, architectural and rural assets, and promoted it as a metropolitan project par excellence. To date, very few historic Tuscan estates can boast such large tracts of land with architectural assets and artifacts as valuable as those belonging to Mondeggi.

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The 52 million euro loan offered to the CMF for the «Integrated Plans-M5C2-Investment 2.2» project was a precious opportunity for ensuring a unified, integrated approach to both programmatic and spatial solutions, through which to create the conditions for implementing environmental quality and social cohesion at the metropolitan level and for ensuring the Estate's long-term economic self-sustainability. It is essential to grasp the metropolitan value of the Mondeggi project, given its spatial dimensions and its strong relationship with other projects envisaged in the Florentine area, all of which are linked to issues promoted by the National Recovery and Resilience Plan (PNRR) [1].

Mondeggi can be seen as the principal island in a newly created archipelago of regenerated spaces which has the potential to enhance large portions of the peri-urban metropolitan area; the projects and goals developed by the CMF will play a vital role in ensuring transformability and resilience throughout the metropolitan area and will tackle the main critical issues of our era: the fight against poverty, food security, health, education and training, gender equality, management of water resources, clean energy, work, industry and innovation, equality, sustainable cities, circular economy, climate change, environmental protection, peace and institutions [2, 3]. Modeggi also has the peculiar characteristic of having only one owner, of a public nature, the CMF. Unfractionated property of wide extension, barycentric position within the metropolitan territory, combination of environmental, historical-cultural and landscape emergencies make this asset of great interest to be able to configure itself as a flywheel of regeneration of a large quadrant of metropolitan territory.

On the basis of these premises an institutional agreement was drawn up between the CMF and the Department of Architecture of Florence University and a working group from the Department of Architecture was set up (De Luca G., Pisano C., Battisti F., Collotti F., Carta M., Matteini T.) to carry out research with the goal of establishing a preliminary cognitive framework for defining a project for redeveloping and enhancing the Mondeggi Villa Estate; a project that would be aligned with the principles of sustainable development, as laid down in the 2030 Metropolitan Agenda as well as being inclusive, fair, sustainable and metabolic.

The experience of redeveloping and re-purposing the Mondeggi Villa Estate estate is configured as a case study in which the term "redevelopment" is given a broader meaning than that traditionally adopted in the urban-building sphere; here it involves redeveloping and re-purposing a historic asset with valuable environmental and landscape qualities, in order to enable profound, long-lasting actions and processes of renewal of places and spaces whose use and fruition make them critically important, and these actions and processes will increase citizen well-being in an entire metropolitan peri-urban quadrant.

2 Context Analysis: Intervening in Peri-Urban Areas

In recent decades, concepts such as regeneration and redevelopment have gradually expanded, and now include measures in different parts of cities (historic centres, industrial areas, established urban fabrics) as well as involving partially urbanised areas (peri-urban or sprawl).

Peri-urban space is a border space that can be defined as a buffer area between urban and rural contexts; in recent decades it has been characterised by fringe areas increasingly subject to transformation and change brought about by the exchange and mutual contamination between physical dimensions and living practices [4]. In recent times, it has been recognized that this spatial typology offers an alternative interpretation of contemporary territories as autonomous spaces [5]: a new form of city, whose built environment, landscape, lifestyles, social relationships and economy have all been studied [6].

These spaces thus lend themselves to being studied as places of practices, flows, economies and ways of inhabiting unprecedented, and as yet not fully explored, contemporary territories. These places can strongly influence the quality of the territory [7], where, albeit indirectly, public operators have used the paradigm of dividing and separating [8], using the parametric and quantitative zoning introduced by DM 1444/68 to establish clear borders between functions, materials and people, without however attributing and recognizing a public role at the fringes of urbanisation. Present-day interventions in peri-urban spaces should avoid redefining or identifying new perimeters of separation between city and countryside, and should recognize the role of peri-urban fringes as spaces for engagement or conflict where new rules for contemporary living and new metropolitan landscapes are defined [9].

The highly fragmented morphology and the composition of a territorial mosaic made up of numerous different land-use categories configure areas with a strong, but often uncontrolled and poorly planned, evolutionary dynamism which results in the progressive dispersion of the urban system within the rural one. This gives rise to numerous problems of an agronomic nature, defined as urban sprawl, in addition to the ongoing phenomenon of sealed soul, the result of urban development that is unsustainable relative to the resources available in that land area.

These two phenomena cause most of the risks to which the inhabitants of peri-urban areas are subject [4].

Peri-urban spaces are created to satisfy primary needs, such as the need to have a place to live, work, spend free time and socialize. However, it is within these spaces that loss of neighbourhood relationships is experienced, with families who live outside the classic boundaries of the urbanised city often being confined by autonomous, closed and restricted lives with unvaried, self-limiting outlooks which become real impediments to experiencing the diversity that the city offers.

Despite this, peri-urban metropolitan spaces are configured as areas with high potential, fabrics where innovative models can be experimented against the background of the 2030 Agenda: a strategic vision for improving urban quality and livability in complex peri-urban territories, by tackling productive, landscape, environmental and sociocultural issues. It is also important to consider that the progressive urban expansion of cities, even beyond their administrative boundaries, cannot fail to refer to the theme of urban regeneration, as seen at an international and national level, inspired by the goals and targets of the 2030 Agenda for sustainable development.

In this context, the importance of redeveloping a significant historical asset such as the Mondeggi Villa Estate does not primarily lie in the conservation of an asset of historical architectural value, but in the role this asset can play in enhancing a large

metropolitan peri-urban area. Redeveloping and repurposing the Mondeggi Villa Estate can be configured as grafting functions and activities capable of re-activating production chains, recreational activities, inclusion and energy conservation onto a metropolitan peri-urban area.

3 Mondeggi Villa Estate

3.1 General Description

The Estate consists of about 170 hectares mostly situated within the Municipality of Bagno a Ripoli but with some land in the Municipalities of Figline and Incisa Valdarno. It is a complex area in which architectural and land assets sometimes overlap. The values, textures and conservation of the architectural assets vary greatly; the land assets are mainly composed of wooded areas, cultivated land, olive groves and vineyards, connected by a network of paths. The original relationship of spatial and functional continuity between the villa - of over 4,000 square metres - the system of outbuildings, rural houses and the agricultural areas has remained intact.

The original nucleus of the villa dates to the late Middle Ages. The most important additions and modifications were carried out by the della Gherardesca family who owned the estate for four centuries. They acquired further land, both woods and farms, expanding the estate beyond its present size, built new service artifacts for agricultural activities and expanded the system of gardens, paths and roads. In 1964 the entire property was purchased by the Province of Florence, (the Province has since been replaced by the CMF), with the intention of using it as an extension of the San Salvi psychiatric hospital in Florence but this never happened. Between 1988 and 1989, the Province carried out works of modernization and partial functional adaptation of portions of the villa building with the intention of using the upper floors as managerial offices. The land and the ground floor of the villa were leased to the Mondeggi Lappeggi company, which provided agricultural machinery and equipment for the production and sale of wine and oil. In the same period some plots of land were entrusted to the Faculty of Agriculture. Productive activity ceased in 2009: the villa was closed and most of the land and crops were abandoned. In 2012, some of the farmhouses were illegally occupied: the occupants, however, did recuperate and clean up some of the olive groves and vineyards [10]. In 2013 an association, “Towards the Common Good of Mondeggi - A Farm without Masters” was set up with the goal of reutilizing the land for farming. The following year those living on the Mondeggi Estate and farming the land made a commitment to not abandon the land or the farmhouses and to not sell the estate thereby realising the goal set the previous year. In 2019, the “Friends of Mondeggi - A Common Good” committee was set up as a supervisory entity, with the goal of preserving the Mondeggi area as a common good [11]: eight local associations and individual citizens are members.

3.2 The Project

The exploratory approach used in the definition of the general project is inserted in phase 1 of the Technical-Economic Feasibility Plan - the technical “container” which

provided a framework for the scientific assignment given to the University of Florence - and coherent with the goal of developing a unitary project, it considered the separate, fragmented or autonomous management of the land assets and architectural heritage to be unfeasible. This approach has led to the creation of a general proposal, characterized by some insights and design alternatives, inserted into a structure made up of invariants which are identified as a system of choices structuring the estate and around which the various alternatives are organized and articulated.

The general project therefore took the form of a masterplan (Fig. 1) whose goal is to coordinate the spatial and programmatic structuring choices set out below; these choices constitute the basis for creating a common governance system capable of managing the Mondeggi Villa Estate in a uniform manner.

The first objective of the master plan was to establish those characteristics that define the genius loci [12] of the estate, which in Mondeggi have been maintained despite land acquisitions, transformation of architectural heritage, modification of production systems and access networks and changes of ownership and use. This attribute, characteristic of many historical and patrimonial assets [13], cannot be taken for granted: the risk lies in proposing a generic project which robs the assets of their exceptionality and identity. The general project is therefore based on the relationship between the topography of the area, which defines the typical Florentine hilly agricultural landscape dominated by olive groves, vineyards and arable land with the presence of rows of trees and wooded areas, and the settlement system, made up of of the villa, with its gardens and outbuildings, and six farmhouses: the dialectic between productive land and architectural assets, framed in an open landscape without fences except those required for protecting the crops, represents the genius loci of Mondeggi and the starting point of the design proposal.

The social component, understood as an engine for experimenting with new ways of vivre ensemble [14] and for seeking the coexistence of different rhythms of life within collective configurations of space, plays a decisive role in the proposal. Indeed, in this specific historical period, the search for the relationship between individuals and community, between autonomy and sharing [15] and for the right distance [16] for social relations, appears to be an absolutely relevant theme, especially in an area like that of the Mondeggi Estate which exists outside the interpretative schemes of the well-established city.

In the project this research is expressed through some specific programmatic choices that have characterized the detailed designs. For example, the six farmhouses have been designed as “association houses”. Each farmhouse will be managed by one or more associations and will be characterized by a specific social and cultural focus. On the basis of their individual typological, constructive and heritage restraint characteristics, each farmhouse has specificities related to the activities to be established, but all of them have areas dedicated to producing and transforming agricultural products, spaces for associative activities and rooms for housing, both permanent and temporary.

The program for the villa is different, but complementary. Functions of a metropolitan and institutional nature will be housed in the villa: these will include, managerial and didactic spaces associated with agri-tech, a guesthouse and ethical restaurant, and the cellar, with its wine shop and wine making area. All this will lead to the co-presence of

workers, visitors and citizens, and will generate innovative spaces for cohabiting which will be further explored once a management and governance system has been defined in the subsequent co-planning phase.

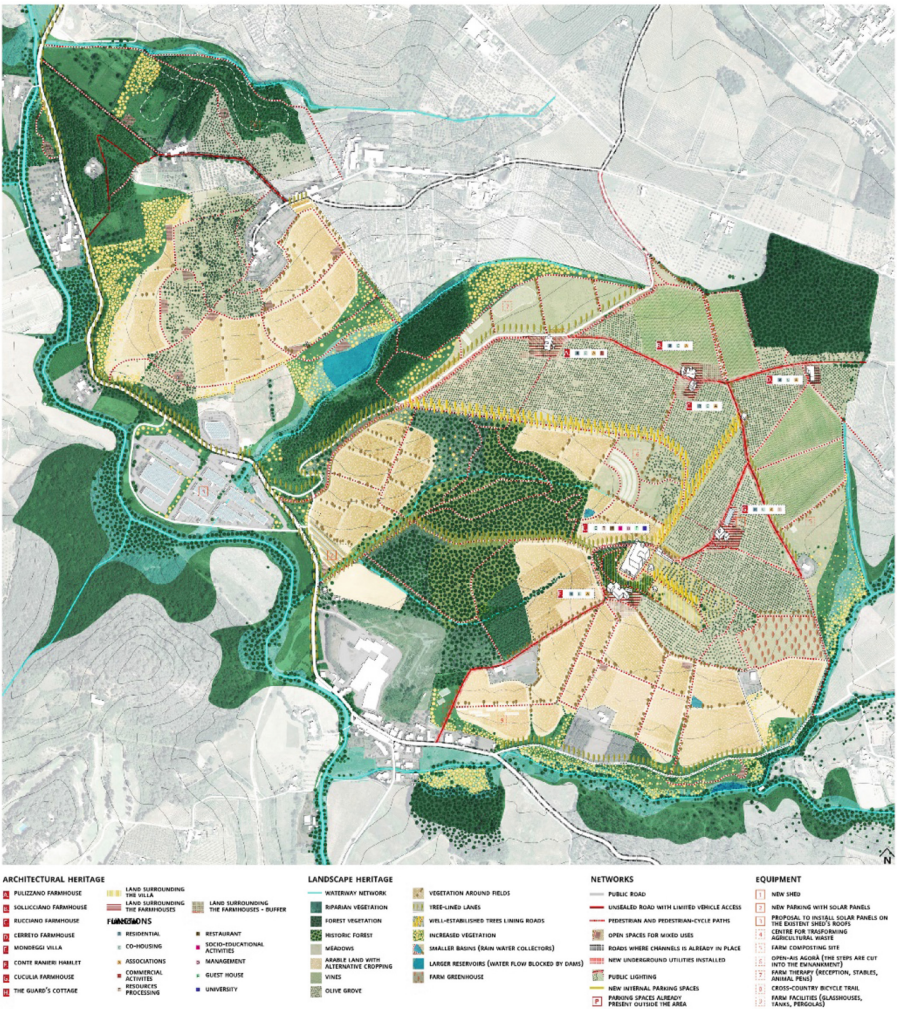

Fig. 1. Masterplan for the Mondeggi Villa Estate

The current proposal intends to maintain a high degree of flexibility so it will be remain relevant to the requirements of the estate for another century and will be able to adapt to any social, economic and cultural changes that may occur. The layout of the buildings will be in line with the various existing levels of protection, but will seek maximum adaptability; plant engineering will be designed so it can be easily modified and adapted; the creation of new reservoirs is aimed at facilitating crop diversification. In

general, every choice has the goal of generating opportunities for future developments, program, uses and users.

The project is implemented with a strong emphasis on environmental and economic sustainability, using a metabolic approach [17–19] (Fig. 2). The transition from linear production consumption approaches towards circular systems now seems imperative in order to reduce the impacts of urban and peri-urban environments and to comply with both the general environmental goals laid down in the European agenda and the specific goals indicated in the «Integrated PlansM5C2- Investment 2.2″ Project. This project, therefore, considers the Estate and its immediate context as a metabolic ecosystem within which it is possible to carefully analyse water, energy and production cycles, and the use and recycling of raw materials. This type of approach requires the preparation of an energy community, the creation of a system of reservoirs, the design of constructed wetlands and the valorisation of agricultural waste and forest cuttings.

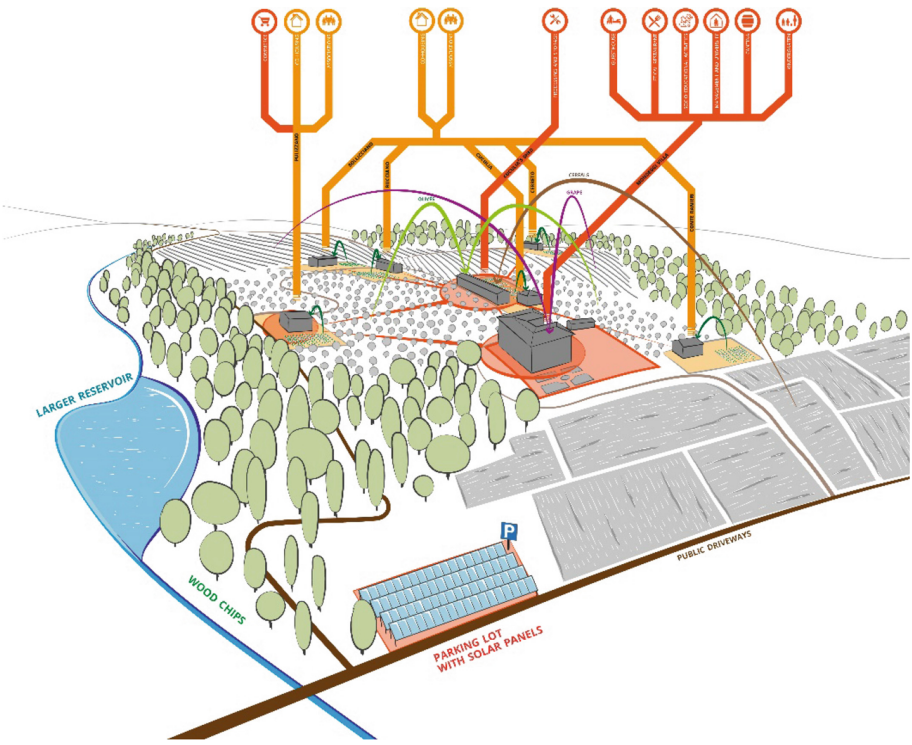

Fig. 2. Diagram showing Mondeggi's metabolic processes

3.3 Project Sustainability and Metabolism

In developing the project for eco-sustainably restructuring and rendering operational the Villa Mondeggi Estate, the goal was to define the conditions required for achieving

complete sustainability - environmental, social and economic - of the complex systems envisaged for the estate and their implementation. Sustainability is, therefore, simultaneously characterised by different dimensions that pursue heterogeneous and often conflicting goals; in order to adequately respond to all the complex, heterogeneous and potentially energy-intensive project requirements, it is essential to identify which elements should be transformed into design strategies.

In this case, the objective of the project was to combine economic sustainability, often the only parameter used for evaluating complex projects, with social sustainability and environmental sustainability, which in this project depends on energy efficiency, use of water resources and waste generation.

Economic sustainability depends entirely on the ability to generate income consistently over time in order to maintain the efficiency of the complex system of assets that make up the Mondeggi Villa Estate.

Environmental sustainability depends on the ability to safeguard and maintain natural and ecosystemic resources over time, without producing irreversible alterations; in other words, it is a question of verifying the project's "metabolism", understood as the relationship between the resource flows (energy, water resources) absorbed and produced by the "Mondeggi system".

Once the eco-sustainable restructuring has been completed and the Villa Mondeggi Estate is fully functioning, it will be a complex organism, whose activities will require the absorption of energy, water and raw materials which, once they have "metabolized", will allow the Estate to operate until they become slag and waste. This applies especially to the estate's agricultural activities and its restored and re-purposed buildings.

This methodology was first devised by Abel Wolman in 1965 [20] to analyse the directions of energy, water, nutrient, material and waste flow in urban systems, in order to quantify the inputs, outputs and parts stored in the system. This methodology is used to assess the stability and impact of a production system. Nowadays the concept of urban and territorial metabolism has been fully embraced by contemporary urban planning [17–19, 21]. Many European administrations have promoted research that adopts a metabolic and ecosystem perspective when preparing urban plans and projects both at national (Foresight Future of Cities Project, UK) [22] and local levels (eg. Genoa, Antwerp). The transition from linear production-consumption approaches towards circular systems now seems imperative in order to reduce the impacts of urban and periurban environments and to respect the environmental objectives set by the European agenda.

Finally, the social sustainability of this project can be defined as the capacity to guarantee fair access and use of the Mondeggi Villa Estate so that the conditions of human well-being that the Estate generates are fairly distributed and create employment.

3.4 Preliminary Evaluations on Sustainability

On the basis of this brief premise, the assessments that follow are intend to provide some initial elements for verifying the sustainability of the eco-sustainable redevelopment and re-purposing project for the Mondeggi Villa Estate.

The three components of sustainability were studied separately as follows:

- assessment of economic sustainability, identifying sustainable lease/concession fees for the various real estate assets, with appropriate deductions in the light of the exclusively public function envisaged in the project;
- assess environmental sustainability, deducing the project's metabolism with reference to its energy, water and waste components;
- assess social sustainability, here defined as access to the assets/public amenities and other amenities available to the public which generate benefits as envisaged in the project.

The range of sustainability assessment methods currently available ranges from highly technical tools to very simplistic methods [23, 24]. Most of the methods adopted for assessing sustainability are based on a qualitative rather than a quantitative approach. According to Brown et al. [25], this is because the analysis required to address the wide range of issues surrounding these assessments is extremely complex. This raises another critical question, namely how to integrate qualitative and quantitative information into a single assessment.

In the present case, since these assessments are associated with a project, a quantitative approach is proposed for evaluating economic and environmental sustainability, with the goal of the latter being to evaluate the complex cycles (water, energy and waste) associated with the Estate's architectural assets and the land to define the metabolism of the project. A quantitative approach is proposed for assessing the project's social sustainability. The evaluations are conducted using available data where possible; where there is none then data inferable from similar case studies will be used.

Although this study is general and characterised by the three components of sustainability, the initial results suggest that the conditions exist for integrated sustainability; subsequent design phases will therefore have to develop the topics set out below in greater detail.

Economic Sustainability: Guarantee the Operation and Maintenance of the Estate
The economic sustainability of the eco-sustainable restructuring and repurposing project of the real estate compendium that makes up the for the Mondeggi Villa Estate was determined by assessing whether or not the activities envisaged in the project would be capable of generating sufficient income.

Once the Villa Mondeggi Estate has been repurposed, there will be some areas completely or partially given over to public use which will not generate any income, and other areas that will generate an income. All agricultural land intended for production will generate income.

All assets capable of generating income have been identified.

The following architectural assets will generate income:

1. residential assets: residences and co-housing;
2. commercial assets: trade, restaurant, cellar and warehouse;
3. tertiary assets: associations, multi-purpose, managerial/start-up and social/educational;

4. hospitality assets: guesthouse.

The following land assets will generate income:

5. agricultural assets: i) vineyards; ii) olive groves; iii) arable land; iv) orchards; v) greenhouses for growing vegetables

Studies of the potential real estate income to be generated from the assets, which will take the form of sustainable rental fees/concessions, have revealed that: i) category 1 assets can be leased at controlled rental fees; this means that management and ordinary maintenance can be delegated to the tenants, thereby reducing CMF management-maintenance costs; ii) assets in categories 2, 3 and 4 will generate "corporate" income, i.e. cash flows for each activity established; in other words, the conditions exist for establishing productive activities whose profitability will be in line with market trends. These productive activities once established on the Estate will not only generate a lease/concession fee, but will also reduce the management maintenance burden for the CMF. The capability of the category 5 land assets to generate a net yield from wine and oil production has already been verified; this production generates income which makes it possible to delegate the task of maintaining the lands destined for agriculture - a substantial part of the 170 hectare estate - to the producers rather than the CMF assuming this burden.

Although the project cannot provide precise estimates, most of the functions to be established on the Estate will be able to generate income. The prerequisites required for the successful implementation of these functions exist right from the design phase, to be more fully researched in future design phases, and this creates favourable conditions for ensuring the project is economically sustainable. It follows that project development should privilege functions and intended uses that generate income while safeguarding the project's social and environmental values. In any case, even considering that the PNRR provides loan, albeit without interest, to be repaid, the individual activities that can be implemented in the estate capable of generating income will have to be subjected to a concession or lease fee with income in favor of CMF; based on this, a management scenario can be outlined where CMF retains the management of the estate in its entirety and identifies, for the various inse-diable activities, suitable entities to which to concession or lease certain spaces.

Environmental Sustainability: The Project's Metabolism

The metabolic processes at work on the Villa Mondeggi Estate were studied in order to evaluate the complex cycles (water, energy and waste) associated with the estate's land and architectural assets.

The architectural assets, as defined in the project, are listed in the previous paragraph.

Land assets are divided into:

– agricultural assets: i) vineyards; ii) olive groves; iii) arable land; iv) orchards; v) greenhouses for growing vegetables
– forestry assets: i) forest; ii) historical forest; iii) deforestation areas.

The research focused on studying the metabolic processes related to the architectural and agricultural component of the estate, comparing the volume of water required for

performing the functions to be established using project assets and the areas destined for agriculture with the rainwater collection capacity of the new collection and conservation reservoir envisaged in the project.

Using synthetic evaluation methods to research data relating to the specific water requirements for each type of agricultural activity envisaged for the estate, it was possible to estimate an annual water requirement of approximately 60,000 m^3 for agriculture on the estate. The estimated annual requirement of the other activities envisaged for the estate (those in categories 2, 3, 4) is approximately 30,000 cubic meters (of which approximately 50% can be considered "clean" water which would be supplied via the aqueduct). So there is a hydro-requirement for approximately 75,000 m^3 of recyclable water (which would have to undergo a purification process). As these are rough assessments carried out without any precise information regarding the business activities to be established on the estate, a precautionary 10% incremental coefficient was added to the estimated parameters, and the maximum annual overall recyclable water requirements on the Villa Mondeggi Estate is considered to be approximately 82,500 m^3. These water requirements would seem to be met by the collection and reservoir system envisaged in the project which has a capacity of about 40,000 m^3: this would guarantee the supply of as much as 50% of the Estate's annual hydro-need.

The self-regulatory capacity of wooded areas is such that it was considered that rainwater alone was sufficient for the forestry assets.

As regards energy needs, the in-depth study carried out for the CMF revealed the possibility of creating an "energy community" within the Estate which would make it practically autonomous, and capable of generating a positive Current Net Value and a positive Internal Rate of Return.

With regard to the production of waste associated with agricultural activities, the agricultural waste generated each year on the estate amounts to about 200 tons. It can be used as fuel to generate about 500 mWh/year of energy (or transformed into bio-pellets or chips that can be sold on the market: this production could be increased if the wood waste deriving from forest maintenance were also utilised).

An estimation of the amount of urban solid waste generated by the activities involving the estate's architectural assets, used the European person equivalent (PE) figures to ascertain that the waste generated was equivalent to that of 544 people. This certainly represents a significant increase in urban solid waste production but it can be absorbed by the separate collection system that has been established in the Municipality of Bagno a Ripoli for some time.

The above summarizes a series of studies and evaluations which, although only approximate, suggest that careful circular planning, to be developed in the future phases of definitive and executive planning, can guarantee robust environmental sustainability for the Estate.

Social Sustainability: Collective and Inclusive Use of the Mondeggi Villa Estate

Social sustainability can be defined as the ability to guarantee conditions of well-being (i.e. health, safety, education) to every individual in an equitable measure, without distinction of class or gender. It was Khan [26] who defined the principles of the social dimension of "sustainability", recognizing that equity, legitimacy, accessibility, participation, cultural identity and institutional stability were the indispensable foundations

for a socially-just distribution of the benefits (and costs) deriving from way in which humans manage the natural and man-made environment.

In the case of the Villa Mondeggi Estate, social sustainability very much depends on the benefits that the property can generate, i.e. job creation and social and cultural growth.

The planning set-up hypothesized for the Mondeggi Villa Estate guarantees direct employment for about 35–40 people mostly in primary and tertiary production activities (staff hired to carry out the various functions of the Estate) as well as some indirect employment (collateral activities required to ensure the continued efficiency of these activities, for example building maintenance).

Although the land assets that remain in public use (woods, open appurtenant areas with or without equipment/facilities) are not considered to have production cycles they do still generate employment, closely associated with their use and maintenance. From a social point of view, these assets are extremely important because, despite not having a "real" market that would allow them to generate an income, they have a high non-monetary value, for which specific estimates need to be implemented [27, 28].

The social sustainability associated with the use of the public (land) assets of the Estate is also associated with social sustainability as a byproduct of social and cultural growth. It is closely linked to the activities that will be carried out in the context of tertiary assets such as multi-purpose and social/educational associations as well as management/start-up activities.

It is thought that the planned sustainable re-purposing of the Mondeggi Villa Estate, which will greatly increases its accessibility and usefulness, will bring about widespread social benefits. A Cost-Benefit Analysis can be added to the subsequent design phases to assess the social outcome of the project for eco-sustainably redeveloping and re-purposing the Estate.

4 Conclusions

The strong point of the Mondeggi project, given its complexity and long-term strategy, lies in the preparation of a complex, open system that defines a stable framework within which activities, functions and programs can change over time. The project responds to the stimuli and possibilities of different forms of living together [29], it embodies the principles of territorial porosity and it constitutes a democratic space [30] where new paradigms of citizenship can emerge. Mondeggi provides an opportunity to activate a process of enhancing metropolitan peri-urban spaces through redeveloping and increasing the accessibility of an important public and historical asset.

Given this framework, when the project is implemented, it is essential that a governance path be put into place to ensure that the management and transformation of the individual buildings and plots are harmoniously articulated with the needs of the place, the activities and agricultural production as well as with the community that these attract: changing and sometimes unexpected communities.

Further research developments will be oriented to the in-depth study of the sustainability-related component of the project, in its environmental, social and economic aspects. When the project is at an advanced stage Mondeggi will be included in a

social and metabolic circuit, designed so it absorbs and internalizes future dynamics of transformation - social, environmental, economic - thereby guaranteeing a continuous dialogue between the history that has passed through the estate and the events that are destined to pass through it in the future.

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