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Article

# Towards Regenerated and Productive Vacant Areas through Urban Horticulture: Lessons from Bologna, Italy

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**Abstract:** In recent years, urban agriculture has been asserting its relevance as part of a vibrant and diverse food system due to its small scale, its focus on nutrition, its contribution to food security, its employment opportunities, and its role in community building and social mobility. Urban agriculture may also be a tool to re-appropriate a range of abandoned or unused irregular spaces within the city, including flowerbeds, roundabouts, terraces, balconies and rooftops. Consistently, all spaces that present a lack of identity may be converted to urban agriculture areas and, more specifically, to urban horticulture as a way to strengthen resilience and sustainability. The goal of this paper is to analyse current practices in the requalification of vacant areas as urban gardens with the aim of building communities and improving landscapes and life quality. To do so, the city of Bologna (Italy) was used as a case study. Four types of vacant areas were identified as places for implementing urban gardens: flowerbeds along streets and squares, balconies and rooftops, abandoned buildings and abandoned neighbourhoods. Six case studies representing this variety of vacant areas were identified and evaluated by collecting primary data (i.e., field work, participant observations and interviews) and performing a SWOT analysis. For most cases, urban horticulture improved the image and quality of the areas as well as bringing numerous social benefits in terms of life quality, food access and social interaction among participants. Strong differences in some aspects were found between top-down and bottom-up initiatives, being the later preferable for the engagement of citizens. Policy-making might focus on participatory and transparent planning, long-term actions, food safety and economic development.

**Keywords:** urban horticulture; city planning; green infrastructures; participatory processes; social ecology

## 1. Introduction

Due to an increased global population, particularly in urban areas which hold 54% of the world's inhabitants [1], cities are growing and changing rapidly and without concerted planning. Consequences of this growth can be observed in the so-called urban sprawl, one of the main forms of urban development, characterized by a dispersed, disordered and low-density growth of peri-urban city areas [2]. Scarcely planned urban development generally leads to the relocation of formerly rural areas into residential allotments, where unused or underused empty lots are usually found. Furthermore, mismanaged urban development may result in the abandonment of entire city districts (e.g., industrial areas) producing a network of paved and unpaved spaces within the city borders, which are commonly referred to as "vacant lands" [3].

The economic and financial crisis starting in 2007 has accelerated this generally irreversible trend [4]. Abandoned buildings create voids in that urban fabric that are perceived by the populace as degraded and dangerous places [5], which ultimately result in increased expenditure for the public administration [6]. Beyond industrial districts, there are also many abandoned public buildings in inner cities [7], including dismissed military bases, offices and departments that fit with common definitions of vacant land. Recently, while the economic situation has improved, a number of actions were taken by local administrations to find public uses for newly generated vacant lands [8–10] (e.g., housing development, multicultural centres, playgrounds), although the costs for regeneration may often be too high for the municipality. However, urban agriculture initiatives require a diversity of material and non-material resources for their development [11], and sufficient funding for this requalification is required for long-term viability. Some guidance could come from food aid programs and agricultural projects developed in other countries (e.g., Africa and United States) [12,13]. A good economic and administrative framework provided by programs of the local administration could be useful for the final decision maker [14,15]. In New York, local programs are provided with access to land, other resources and technical assistance [11]. Under these circumstances, the public requalification of the urban spaces may constitute the most feasible and rewarding option [16,17].

### 1.1. Defining Vacant Lands in the Urban Environment

In the last 20 years, several conflicting definitions of vacant lands were coined and it is, therefore, difficult to provide a unified one here. Usually, this term includes categories such as bare soil, agriculture at the edge of an urbanized area or uncultivated land, recently razed land, derelict land, land with abandoned buildings and structures, and brownfields [3,18]. In the late nineties, "terrain vague", the French version of this concept, was used to describe empty and abandoned urban spaces [19]. Putting an emphasis on the double Latin origin of the term, *vacuus* and *vagus*, underlined the fact that these spaces were not only empty or unoccupied but also free and available. In 2000, Pagano and Bowman [18] focused more on land use, and they affirmed that vacant lands included not only privately owned or public unused or abandoned land as well as land that once had structures on it, but also the land with existing abandoned, derelict, boarded up, partially destroyed, or razed structures. Accordingly, many suburban districts that were once utilized for industrial activities are vacant lands.

Small or large lots of neglected land that are found within the urban space constituting the "public urban green" may also be considered vacant lands according to Aruninta [20]. This category encompasses both private and public marginal land which are often abandoned due to their low economic value (i.e., including flowerbeds along the streets and squares or small and little gardens). The *public urban green* is an essential element in the life quality of urban dwellers as it serves various functions: aesthetic, recreational, social, ecological, and educational [21–23]. At the same time, its management can become problematic whenever public governments must deal with limited funds for their maintenance [24]. Many city administrations see vacancy as synonymous with urban problems and decline (i.e., high maintenance costs, no tax-revenue for abandoned areas, loss of value of municipal properties, social tension and violence), without recognizing lots as sites for innovation in public policy, and an opportunity for communities to "regenerate" their neighbourhoods while bringing

together different cultures and marginalized people. The production of vacant lots has coincided and interwoven with an urban history characterized by an increasingly privatized public realm and growing socio-political and economic polarization [25].

Nonetheless, the transformations of vacant lands into sites of urban agriculture may be possible, thereby returning such unutilized or underutilized land to a productive use [26]. Consistently, these spaces characteristically lack utilization and activity but also hold the promise of new life and new possibilities. From this point of view, every void or unused space in the urban fabric can be considered a vacant area: the flat rooftop of an urban building can become a community garden, or an abandoned public building can become a space of urban renewal for a neighbourhood. These spaces can be transformed into political and social opportunities for the whole community, places where it is possible to experiment with new public policies and new social interactions and processes.

### *1.2. European Policies on Vacant Land Use*

Europe is one of the most densely urbanized continents on the globe, with the highest share of land (up to 80%) used for settlements, production systems (including agriculture and forestry) and infrastructure. Every year, more than 1000 km<sup>2</sup> of land is transformed into housing, industry, roads or recreational uses [27]. At the same time, the amount of green space per city dweller for many European cities remains less than the minimum standard suggested by the World Health Organisation [28]. The percentage of green space in Europe varies from 1.9% in Reggio Calabria, Italy (i.e., 3–4 m<sup>2</sup> of green space per person), to 46% in countries which have more than 300 m<sup>2</sup> of green space per person (e.g., Liège in Belgium, Oulu in Finland and Valenciennes in France) [29]. Generally, the proportion of green space per person diminishes as population density increases.

Within this context, the principles of re-use and regeneration have become key elements of territorial development and city planning within the EU [30]. Several EU policies and laws support cities in using land in a sustainable manner by providing green habitats (92/43/EEC and 2009/147/EC), quiet places to live and by promoting respect for urban heritage [31]. The EU's promotion and protection of green spaces help to restrain urban sprawl which, if unregulated, can lead to dependence on private car use, increased land-use and higher demand of resources, as well as detrimental effects on the services nature provides [31]. The Europe 2020 Strategy intends to drive EU growth toward a smart, sustainable and inclusive society, defining priorities for the coming decade. The flagship initiative of the strategy, the "Resource Efficient Europe", highlights that land is a finite and shrinking resource, subject to competing pressures from urbanisation, infrastructure, increased food, feed, fiber and fuel production and the provision of key ecosystem services. To stop this trend, the Roadmap to a Resource Efficient Europe sets the target of "no net land taken by 2050". The EU Territorial Agenda recommends the application of an integrated and multilevel approach in urban development and regeneration policies. In this context, the renovation of vacant and abandoned spaces can contribute to a more efficient use of urban land and prevent the expansion of cities.

### *1.3. Bringing Horticulture into 21st Century Cities*

Vacant lands resulted in an opportunity to bring back agriculture to cities through urban farming projects. A renovated urban agriculture arose worldwide as a response to several facts [32]. First, the year 2007 marked world history as the starting point for the first global financial crisis while the rate of world urban citizens exceeded that of the rural ones [33,34]. Second, a general rise in food prices was experienced until mid-2008 [35] due to an increased price of oil resulting from enlarged demand by growing Chinese and Indian economies and a constrained supply because of political conflicts in Iraq and Iran [36]. Consequently, food shortages led to a number of conflicts (e.g., the Myanmar protests in 2007 or the food riots in the Philippines in 2008) [37–39]. In the next years, mainstream economic theories were re-discussed and the weaknesses of a globalized and unsustainable system were evidenced. In particular, the limitations of food systems based on long and energy-costly transport chains were highlighted. As a response, a general rise of "proximity agriculture" projects in cities was

observed, where urban horticulture is widely promoted for its contribution to the city food security as well to a range of other functions.

Nowadays, the most common form of urban horticulture is the allotment garden, which originated from the “Schrebergärten”, initiated by Daniel Gottlob Moritz Schreber in the nineteenth century [40]. These gardens were a crucial element in ensuring city food security during world conflicts. At this juncture, they are widely recognised for their social, health and environmental functions, generally involving the urban elder population [41]. In the late 1970s, community gardens gained relevance as a different form of urban agriculture. Community gardens have sprung up frequently in residential areas, although they are also likely to be found in vacant lands in marginal districts. Community gardens are most often grassroots initiatives established by groups of citizens and can become a key political tool in promoting bottom-up decision-making processes [42]. Therefore, community gardens comprise sites of local control over design and management, as a way to increase the functionality of land use while improving neighbourhood perceptions [43,44] and promoting overall sustainable degrowth processes [45,46]. Community gardens are perceived as a way to restore contact with nature, to know the origin of the products we eat and to improve the quality of food and food safety [47–49]. Community gardens occupy diverse types of vacant lands: former civil and military areas (e.g., the Allmende Kontor garden in the former Tempelhofer airport in Berlin), as well as dumpsites (e.g., the soilless structures at Prinzessingarten in Kreuzberg, Berlin); abandoned industrial districts (e.g., the Ford City Community Garden, Ontario or the Toronto’s Don Valley Brick Works) [50]; any irregular space accessible to citizens (as properly expressed by the guerrilla gardening movement) [51,52]; or concrete car parks (e.g., the Pop Up Patch, in Melbourne, Australia). Finally, urban horticulture grown in casual or creative spaces is a strong response to the isolation of entire neighbourhoods in post-industrial areas and the concurrent marginalization of its residents.

#### *1.4. Requalification of the Public Space and Civic Engagement*

“Critical gardening” defined in a broader sense is given new momentum by social media, together allowing an energized context for the urban organization [52]. On the one hand, the urban gardens are elective tools for residents, through which they revitalize social ties and a sense of community on a local level. On the other hand, urban gardens become a field of civic engagement, participation and empowerment at both the individual and group level. Concretely, common spaces and tools are being acquired and managed by citizens, and the culture of subsidiarity (often advocated by local government institutions themselves) emerges [53]. In so doing, the collective care of an urban garden means taking care of the community to which these gardeners belong to and generates a symbolic community.

The term “agri-civic-mindedness” [54] refers precisely to the civic engagement of the citizens in which they take on the responsibility to manage these “freed spaces” and wasteland (waste of space). Hou [55] defines these areas as “insurgent public spaces”, as they meet the needs of groups and communities as a means to express and develop a collective identity and where residents actively nurture social relations. In this way, participation in urban gardening becomes something greater than “eco-awareness”. This development of the community is confirmed in the growth of urban horticulture in the developed world [56]. In 2013, as many as 57 municipalities enabled urban horticulture areas to be managed by the local residents, especially in the Northern cities [57], and from 2011 to 2013, urban agriculture either for domestic use or leisure gardens almost tripled (from 1.1 to about 3.3 million m<sup>2</sup>) [58].

#### *1.5. Benefits and Challenges of Urban Horticulture on Vacant Lands*

Gardens generally have a multifunctional role, and may be guarantors of food security [59]. Local food can strengthen both community stability and environmental sustainability [60]. Intake of local vegetables and fruits also contributes to the improvement of nutrition levels of urban and peri-urban residents. Gardens complement rural agriculture in supplying cities with fresh food products such as vegetables, milk and eggs, thereby improving the efficiency of the regional food system [61].

Nonetheless, constraints related to the social acceptance of urban gardening have been identified in the literature. Hirschmüller [62] outlined that gardening in public spaces may not be appreciated by urban residents who associate these practices with dirtiness and hard work, want to spend their time with friends and family doing activities other than gardening, or who do not care so much about new social relationships as they lack the time to maintain their current friendships. Furthermore, Specht et al. [63] identified that urban gardens are sometimes perceived as a competitive use of urban land that can lead to conflicts. Finally, when it comes to the whole range of ecosystem services provided, while some functions are strongly linked to one another (e.g., food security and food safety), others may occur independently (e.g., aesthetic and ecological functions), as described by Jørgensen and Kenan [64] in the so-called “urban wildscapes”.

In particular, urban agriculture is sometimes simply a transitional activity to lend function to pieces of vacant land until investors decide about their development for private use, since real estate development is more lucrative [11]. For example, the vacant lands program initiated in 2012 by the municipality of Barcelona consists of allowing the temporal use of vacant spaces within the urban fabric for collective experiences, such as gardens, to improve the image and quality of abandoned areas due to the economic crisis [65]. This temporal limitation leads to questions about the long-term outcomes of urban agriculture as a solution. Other challenges faced by urban agriculture initiatives are related to the disparities in the access to resources provided by local governments, exclusive dynamics, limited knowledge, dependence on financial and political support and consequent gentrification [66–69].

#### *1.6. From Vacant Lands to Vacant Areas for Urban Gardens*

In city centres, the lack of available space has been a major drawback in the diffusion of agricultural activities. As a result, the implementation of horticulture in available spaces in cities has recently been observed in both land-based and non-land-based vacant spaces. First, non-constructed areas (e.g., abandoned plots, green spaces or interstitial areas) are being converted into urban gardens when available and vacant. Second, innovative methods for turning concrete into urban green infrastructures for vegetable production have been developed in the last decade, ranging from vertical farms [70,71] to the most ordinary rooftop gardens. Such efforts result in “mixed-use buildings” (also known as vegetated architecture) hosting both apartments/offices and green infrastructures [72]. The model is successfully represented by a significant number of rooftop garden experiences across the world, out of which the most cited are the Brooklyn Grange and the Sky Vegetables projects in New York City.

Consequently, the modern requalification of urban spaces into urban horticulture combines both the transformation of non-constructed areas (e.g., traditional urban gardens in green and available spaces) and the regeneration through the new so-called Zero-Acreage farming (ZFarming) [73]. ZFarming takes advantage of available spaces on already constructed urban areas. Therefore, the evaluation of modern urban horticulture requires employing the term “vacant areas”, encompassing both land-based and non-land-based spaces, rather than “vacant land”.

#### *1.7. Goal and Objectives*

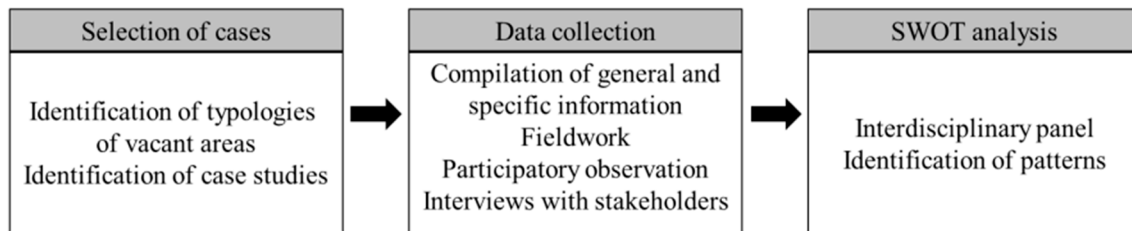
The goal of this paper is to analyse current practices in the requalification of vacant areas as urban gardens towards community building and landscape and life quality improvement. To do so, the specific objectives are to (a) identify and evaluate typologies of urban horticulture placed on vacant areas; (b) assess the function of urban horticulture in enabling citizens to re-appropriate spaces and observe the role and participation of different urban stakeholders; and (c) identify recommendations for future policy-making processes. The city of Bologna (Italy) was employed as a case study, where multiple urban horticulture forms in vacant areas were identified.



## 2. Methods

### 2.1. Methodological Scheme

The assessment of vacant areas and their role in society were evaluated following a three-step methodology (Figure 1): (a) selection of cases; (b) data collection; and (c) SWOT analysis.



**Figure 1.** Methodological scheme for the evaluation of vacant areas and their role in society.

#### 2.1.1. Selection of Cases

The city of Bologna was chosen as a study area for the assessment (see Section 2.2). The study area was evaluated to identify the different typologies of vacant areas where urban horticulture can be implemented, varying from the macro-scale (e.g., neighbourhood) to the micro-scale (e.g., flowerbeds). As a second step, examples of each typology were identified in the city as the basis for selecting the case studies. Finally, six case studies were mapped and chosen for the study based on the following criteria: (a) representative of the identified typologies of vacant area for urban gardening; (b) importance of the project in the city; (c) maturation of the project; and (d) inclusion as urban gardening initiative in the European research projects HORTIS ([www.hortis-europe.net](http://www.hortis-europe.net)) and URBAN GREEN TRAIN ([www.urbangreentrain.eu](http://www.urbangreentrain.eu)). The resulting case studies are characterized by common objectives related to the collective recovery and reuse of urban vacant areas, despite strong differences related to the mode of acquisition of the spaces (occupied or granted) and to the development strategy of the projects (bottom-up vs. top-down).

#### 2.1.2. Data Collection

As the basis for evaluating the case studies, different types of data were collected from each urban horticulture project. General and specific information was collected through fieldwork, participatory observation and interviews with the various stakeholders involved (e.g., garden manager, garden users, municipality, associations, research entities, neighbours). Data were collected between July 2012 and May 2016. A detailed list of the number and type of stakeholders interviewed by case study can be found in the supplementary information (Table A1, Appendix A).

#### 2.1.3. SWOT Analysis

We identified and compiled the strengths, weaknesses, opportunities and threats of the different cases in a SWOT analysis, thereby evaluating both contributions to society and viability. Given that initiatives may vary according to the dimensions explored (e.g., ecological, social and individual) [45] or the physical features of the individual experience (e.g., spatial and socioeconomic) [74], the analysis of the main features was structured into four main categories: management, urbanism, society, and education and culture (Table 1). An interdisciplinary academic team of agronomists, environmental scientists, sociologists and geographers evaluated these diverse elements to complete the SWOT table.

**Table 1.** List and description of the elements considered in the SWOT analysis.

Element	Description	
Management	Location	Mobility status for accessing the place or distributing the produce
	Self-organization	Capacity of community to organize and manage the garden
	Participation	Involvement of the community in the garden
	Public-private relations	Dialogue between public entities and gardeners
	Public funding	Financial support by public bodies
	Networking	Setting of relations with other institutions and experiences
	Vandalism	Destructive or robbery actions
Urbanism	Long-term viability	Capacity of maintaining the experience active and viable
	Landscaping	Improved aesthetics of the area
	Up-scaling	Current potential for repeating the experience in other cases
	Urban regeneration	Regeneration of abandoned and unused urban spaces
Society	Place-making	Development of sense of place
	Social inclusion	Involvement of disadvantaged groups of the society
	Community building	Creation of networks and relations among citizens
	Food security	Provision of food to the community (in quantitative terms)
	Individual health	Contribution to mental and physical health of participants
	Collective health	Livability (e.g., air quality, microclimate regulation, climate adaptation)
Education and culture	Food safety	Quality of food products regarding contamination
	Economic development	The experience results in a business model
	Cultural heritage	Maintenance and transfer of traditional knowledge
	Education and training	Formal knowledge transfer to the community (e.g., schools)
	Life-long learning	Acquisition of practical knowledge by citizens (e.g., adult education)
Education and culture	Research	Production of knowledge through research activities
	Recreation and culture	Use of garden for recreational and cultural activities

## 2.2. Study Area: Urban Horticulture and Vacant Areas in Bologna

Bologna is the main city of Emilia-Romagna region (North of Italy) with a metropolitan area of approximately 400,000 inhabitants [75] and a geographical area of 140 km<sup>2</sup> [76]. The city council of Bologna is responsible for territorial planning, as well as protection and enhancement of the environment. Notwithstanding that the percentage of land used in Bologna grew from 30.7% in 1989 to 36.5% in 2011, the percentage of public green remained stationary (8.0% of urban area) [77]. Such figures result in a surface of green area per capita of 30 m<sup>2</sup>·inhabitant<sup>-1</sup>, corresponding to the average value of Italian cities, apart from Verona and Cagliari (>100 m<sup>2</sup>·inhabitant<sup>-1</sup>) [77].

Bologna has always been at the forefront of urban green management in Italy. It was one of the first Italian cities to join the urban green plan in 2000, as a part of the *Piano Regolatore Generale* (PRG, a planning tool that regulates construction activities within a territory), which defines an action program for the development, management and maintenance of urban green spaces [77]. Moreover, Bologna has been a pioneer in Italy in the area of urban agriculture and horticulture, resulting in a large number of urban horticulture initiatives since the 1970s. At this juncture, there are more than 2700 urban gardens accessible to citizens of all ages and an online service for applications. Urban gardens in Bologna include both municipality-supported and grassroots experiences, such as allotment gardens and food coops. Furthermore, the city council supported the creation of the first rooftop community garden of Italy in a social housing development [61,78–81]. In 2015, Bologna also signed the Milan Urban Food Policy Pact, which encompasses a range of food policies towards sustainability and social justice [82].

Regarding policies related to vacant areas, the Italian policy regulates the development of urban green spaces (Law n. 10/2013) [83], including the promotion of local initiatives to increase and maintain urban green areas, and land consumption is restricted in favour of land re-use, urban regeneration and land use limitation [84]. As a municipality, Bologna is engaged in relevant networks to promote social, ecological and policy innovation (e.g., ICLEI—Local Governments for Sustainability, Eurocities, Local Agenda 21). In line with EU and national directives and within the Operational City Plan, Bologna



City Council approved in 2014 an Operational Programme for Urban Re-qualification [85] including 30 initiatives to regenerate urban areas and public buildings.

### 3. Results

In this section, we identify the typologies of vacant areas present in the city of Bologna that have a potential to be requalified as horticulture areas. In a second step, we analyse case studies that exemplify the different uses of vacant areas for urban horticulture.

#### 3.1. Vacant Areas for Urban Horticulture in Bologna

Four types of vacant areas were identified as potential spaces for developing urban horticulture activities:

- *Flowerbeds along streets and squares:* These spaces represent a cost for the municipality and often appear abandoned and degraded. In many cities, however, some guerrilla gardening initiatives are emerging. Activists organize demonstrative actions with the specific aim of transforming derelict plots by transplanting flowers and vegetables.
- *Balconies and rooftops:* Urban buildings have many open-air flat surfaces that can be converted to urban horticulture. Although each of them may represent a negligible agricultural surface, their overall vacant area may represent a crucial factor in greening the city. As reported by Orsini et al. [81], in the city of Bologna about 82 ha of flat rooftops can be found, which could contribute to more than three-quarters of urban food needs. Additionally, their aboveground height is associated with a reduction in environmental pollution related to heavy metals [86]. However, these spaces are often inaccessible to residents either for the high managing costs or more frequently due to the lack of a common and shared management project. If residents were able to conduct gardening on these premises jointly, increased food security would be among the range of advantages that would also include social and mental health functions [87,88]. Furthermore, the available literature indicates that rooftop agriculture initiatives show an environmental advantage compared to conventional and imported food [89]. In these locations, the application of simplified soilless systems may minimize manual labour, ease growing practices, intensify production and improve the use of resources [90–93].
- *Abandoned buildings:* The rate of abandoned public buildings in cities is constantly growing, as the public administration is unable to cover the management expenses of oversized departments and dismissed military bases and offices, and remains unable to sell them [94]. An emerging number of experiences where the civil society takes over these spaces is observed all across EU cities (Berlin providing one of the most diversified scenarios).
- *Abandoned neighbourhoods:* These lots lie primarily in suburban districts previously devoted almost exclusively to industrial activity. These are muted, transformed environments, difficult to re-adapt due to both the high cost required and to their scarce connection to the city centre. Nonetheless, urban horticulture has become a tool for establishing a re-ruralisation process in abandoned neighbourhoods. As an example, the failure of the automotive industry of Detroit (United States) resulted in an abandonment of the city. Detroit's inhabitants actively adopted gardening as a strategy to pursue food security and environmental sustainability, leading the city to be conceptualized as an "agricultural powerhouse" [66].

#### 3.2. Requalification Experiences in Bologna

Six case studies representing requalification experiences in the four typologies of vacant areas identified were analysed (Table 2, Figures 2 and B1).

**Table 2.** Requalification experiences of vacant areas employing urban horticulture.

Type	Case	Year	City Area	Stakeholders	Property	Type of Agreement	Users	Type of Production	Motivation	Description	Main Outputs
<i>Flowerbeds along street and squares</i>	I Colori dell'Orto	2014–2015	Suburbs	ResCUE-AB <sup>1</sup> DipSA <sup>2</sup> Municipality of Bologna BiodiverCity <sup>3</sup>	Public	Official agreement to manage the space	Citizens, primary schools	Aromatic plant Vegetables plant Flowers	Community building	Top-down strategy with participatory process. Social urban horticulture projects. Requalification of public spaces	Activities useful to create new collaboration group, which work for the same objective: get better their cities and develop relationships.
	Orti della Fornace	2014–2015	Suburbs	ResCUE-AB <sup>1</sup> DipSA <sup>2</sup> Municipality of Bologna BiodiverCity <sup>3</sup>	Public	Official agreement to manage the space	Citizens, primary schools	Aromatic plant Vegetables plant Flowers Cereals	Community building	Top-down project. Social urban horticulture projects. Requalification of public spaces	Educational programmes in public schools; networking of local associations.
	Aiuola Donata	2011	City centre	Terra di Nettuno <sup>4</sup> Trame Urbane <sup>5</sup>	Public	Occupied	Citizens	Aromatic plant Vegetables plant Flowers	Active citizenship	Bottom-up project. Green actions along streets.	Repossessing of public spaces, exchange of seeds.
<i>Balconies and rooftops</i>	Green Housing <sup>6</sup>	2010	City centre	DipSA Municipality of Bologna BiodiverCity	Private ACER <sup>9</sup>	Official agreement to manage the space	Residents, Citizens	Aromatic plant Vegetables plant Flowers	Community building Food production	Top-down strategy with participatory process. Social horticulture done in a vacant surface in the city centre. Inhabitants take care of garden and share products.	Creation of a residents' associations to manage the rooftop garden. Event organization to promote the project.
<i>Abandoned buildings</i>	Làbas <sup>7</sup>	2012	City centre	Political collective	Public	Occupied	Citizens	Vegetable plant	Active citizenship Community building	Bottom up project. Urban horticultural activities (garden and farmer market) in an ex-military barrack of 9000 m <sup>2</sup> .	A place for citizens with a strong cultural movement.
<i>Abandoned neighbourhoods</i>	Orto Circuito	2015	Suburbs	ResCUE-AB DipSA Municipality of Bologna BiodiverCity EtaBeta Cooperative <sup>8</sup> Enel Cuore Onlus	Private (EtaBeta Coop)	Official agreement to manage the space	Citizens Cooperative	Aromatic plant Vegetables plant Flowers	Social inclusion Food production	Bottom-up project. Creation of a permaculture garden. Requalification of a vacant building in an abandoned ex-industrial area. Proximity and Community Supported Agriculture.	Professional training and generation of new jobs in the agricultural field. Ethical purchasing groups. Multifunctional center. Eating place with home-grown produce. Creation of a new association "Spazio Battirame".

<sup>1</sup> <http://rescue-ab.unibo.it/website/it/index.php>; <sup>2</sup> <http://www.scienzeagricole.unibo.it/en/>; <sup>3</sup> <http://www.bdcity.it/>; FB: BiodiverCity; <sup>4</sup> <http://terradinettuno.blogspot.com.es/>; FB: Terra di Nettuno; <sup>5</sup> <https://trameurbane.noblogs.org/>; <sup>6</sup> FB: Gandusio Green Actions; <sup>7</sup> <https://labasoccupato.com/>; FB: Làbas; <sup>8</sup> <http://www.etabeta.coop/>; FB: Eta Beta Cooperativa Sociale; FB: Spazio Battirame; <sup>9</sup> ACER (Azienda Casa Emilia-Romagna) <http://www.acerbologna.it>.

Case studies include both bottom-up and top-down initiatives, where citizens either grew the activities independently or were invited to participate in a multi-stakeholder project, respectively. While top-down activities were lead and supported by the local government, bottom-up ones usually challenged the established power relations between administration and society. Stakeholders involved are the Municipality of Bologna, the University of Bologna and a variety of other institutions (e.g., Cooperatives, associations, research centres). The six experiences are distributed over the administrative borders of the city (Figure 2).



**Figure 2.** Location of the case studies (city centre identified in light blue). (1) Flowerbeds along streets and squares: (1a) “I Colori dell’Orto”, Piazza dei Colori, 27; (1b) “Gli Orti della Fornace”, Via della Beverara, 123; (1c) “Aiuola Donata”, Piazza di porta San Donato, 1; (2) Balconies and rooftops: “GreenHousing”, Via Antonio Gandusio, 12; (3) Abandoned buildings: “Làbas”, Via Orfeo, 46; (4) Abandoned neighbourhoods: “OrtoCircuito”, Via del Battirame, 13.

### 3.2.1. Flowerbeds along Streets and Squares—“I Colori dell’Orto”

**Location:** “I Colori dell’Orto” is an on-going garden experience on a flowerbed in Piazza dei Colori (suburbs of San Donato neighbourhood) where social housing buildings offer affordable accommodation to disadvantaged citizens.

**Objective:** The project pursued two aims: improving the image of the area, and enhancing community building in a neighbourhood where residents tend to close themselves in their houses rather than experience public and open space.

**Stakeholders:** This top-down initiative was promoted by the City Council [95], the University of Bologna and the association BiodiverCity.

**Design process:** The project started in 2014 by supporting a participatory process called “CommunityLab” where all residents were invited to join public activities towards the district innovation and regeneration. Different professionals and stakeholders joined the initiative including sociologists, facilitators, members of the municipality and associations. The interdisciplinary team evaluated the neighbourhood to identify the social weaknesses of the area and plan a range of interventions or solutions. The outputs of the “CommunityLab” identified the public space as the area where interventions might have the largest effects and highlighted flowerbed requalification as a tool, calling residents to live in and transform their space.

**Project activities and outputs:** A 60-m<sup>2</sup>-garden hosting aromatic, ornamental and vegetable species was created, bringing together intercropping, organic and synergistic practices. Gardeners positively renewed the image of the square and regenerated the area, which changed from an unused space to a productive landscape. BiodiverCity provided the residents with knowledge in agricultural practices and managed the garden during an initial stage due to a limited self-organization of the residents. Although different participatory activities were organized, only a few residents engaged in the garden, while opposition from non-participating residents and local youngsters took the form of direct complaints or even vandalism. Nonetheless, beside the apparently low participation, the garden became an intergenerational meeting point for elderly and young people, where traditional and intercultural knowledge (e.g., crop biodiversity, food preparation recipes) was exchanged [96]. In the two years of external support (2014–2015), the project activities involved around 630 people, half of which were children attending the primary schools of the area. The training activities operated by BiodiverCity had a total participation of 160 people. The dissemination event “Par L’Ort Parata” (Vegetable Garden Parade) was attended by about 200 people who accompanied by live drum bands playing *batucada* walked through the city and transplanted flowers [95].

**Current status and prospects:** Engaged residents still visit and employ the flowerbed as a social garden. Other flowerbeds of the Piazza were requalified for the same purpose. The garden also activated other activities encouraging the use of the public space as a meeting point.

### 3.2.2. Flowerbeds along Streets and Squares—“Orti della Fornace”

**Location:** “Orti della Fornace” was realized in Via della Beverara, an area situated in the suburbs of the Navile neighbourhood. The district is characterized by a great, historical presence of public housing and an interesting transformation process since the late 90s, when the “Museo del Patrimonio Industriale” (Industrial Heritage Museum) and a new university campus were created.

**Objective:** Requalification of a public space for community building.

**Stakeholders:** The top-down project involved the Municipality of Bologna, the University of Bologna, the associations BiodiverCity and TerraVerde, a primary school (Scuole Bottego) and several socio-educational groups working with teenagers.

**Design process:** In the spring of the first year, several public meetings with the local citizens were organized to understand their needs and requirements. Participants expressed their desire to start a small cultivation area with simplified soilless systems.

**Project activities and outputs:** In the summer of the first year, an open competition was launched for creating a soilless vegetable garden with a double function: cultivation of vegetables and creation of a meeting place. Participants from different Italian cities built 10 gardens, involving up to 100 people [97]. In the second year, activities focused on education for primary school children, teenagers of the socio-educative groups and residents. A series of workshops were organized on different topics (e.g., conservation of biodiversity, use of recycled materials, agricultural practices, care of common spaces). Resulting from this training process, a community garden in an abandoned green area near the social housing buildings was established. In the second year, the project involved about 400 people [98], half of which were children attending the local primary school. Notwithstanding the large participation of external users (e.g., competitors of the designing context, non-profit associations

with little connections in the area), local inhabitants were barely involved in the garden design and implementation.

Current status and prospects: The garden was abandoned by the users at the end of the project.

### 3.2.3. Flowerbeds along Streets and Squares—“Aiuola Donata”

Location: Aiuola Donata is a “possession” of a vacant space, a flowerbed, on the University grounds which was transformed into a garden.

Objective: Guerrilla gardeners promote more visible, but potentially more fleeting shows of alternative urban land use. Aiuola Donata is a re-appropriation of space and a creation of an urban garden as a way to improve spaces and develop relationships, reconstructing a small urban social fabric.

Stakeholders: Two main organizations, namely *Terra di Nettuno* and *Trame Urbane* [79], practice guerrilla gardening in Bologna. These associations were created by student or political groups, without official recognition as associations.

Design process: Citizens and volunteers were called to transform an abandoned urban brownfield into a biodiverse flower meadow. The garden was designed to host aromatic (e.g., thyme, sage, rosemary, lavender), grain (e.g., ancient cereal ecotypes) and flower (e.g., roses, bidens, stachys byzantine, perovskia, buddleja, hemerocallis, oleander) species, all identified by explanatory signs.

Project activities and outputs: The occupation took place in 2012 and a group of volunteers managed the garden and built recreational spaces (e.g., table and benches) with recycled materials.

Current status and prospects: In March 2016, the flowerbed was removed by the municipality to install an electrical control unit and plants were transferred to other places. The municipality declared that *Donata* will not be cemented, but covered with grass and managed by the urban mobility company (TPER).

### 3.2.4. Balconies and Rooftops—“GreenHousing”

Location: The area of the project is comprised of four housing buildings where nearly 160 families live in the San Donato neighbourhood.

Objective: Encourage the alternative use of the 200 m<sup>2</sup> of each roof terrace towards community building and social inclusion in a public housing development. The realization of a community garden has been a way to improve relationships between building residents, to act on social and regeneration themes, as well as to produce pesticide-free vegetables for self-sufficiency [81].

Stakeholders: GreenHousing is a collaboration with the City Council of Bologna and ACER, the institution responsible for the maintenance, restoration and qualification of lodging for public housings in Emilia-Romagna. The University of Bologna and the association BiodiverCity were involved in the project.

Design process: During approximately six months (Autumn–Spring), a participatory design process was performed through multi-stakeholder meetings. The stakeholders and the residents decided together the typology of plant production to be adopted in the garden as well as the crops (e.g., plants grown on recycled plastic bottles hanged on the garden fences).

Project activities and outputs: The pilot rooftop garden was set-up in 2010. However, this was removed due to objections from the residents on the top floor of the building who complained about noise and dirt resulting from the garden. The two on-going rooftop gardens were created in 2011. Initially, a sociologist assisted residents in the creation of a group, by sharing their opinions and different cultural heritage. During the project, new methods for spreading good co-existence practices were explored to overcome language, cultural and personal difficulties within the often-difficult existence associated with life in public housing. The cultivation of a community garden allowed residents to work together and enjoy the common activity in redeveloping unused space. Community gardeners are constantly evolving while expanding their knowledge on vegetables’ production and quality.



**Current status and prospects:** The project's long-term sustainability has been confirmed in the four years that have passed since the end of the project. Since then, gardeners have been proceeding autonomously in improving cultivation with the technical support of the University of Bologna who involves them in dissemination and experimental activities. Furthermore, gardeners collaborate with two students associations (BiodiverCity and L'AltraBabele) in organizing training and dissemination events. A number of scientific studies have addressed its potential for food security and safety, social inclusion, biodiversity and environmental sustainability [81,86,99].

### 3.2.5. Abandoned Buildings—"Làbas"

**Location:** The requalified vacant area is the Masini military barracks, which covers approximately 9000 m<sup>2</sup> in the heart of Bologna.

**Stakeholders:** Làbas is a political collective of students established in 2012 that has worked to prevent the abandonment, degradation and speculation of vacant spaces in Bologna through occupation.

**Objective:** The purpose of this bottom-up project is to give back to the community, the neighbourhood and the whole city this unused space by enhancing it through several initiatives.

**Project activities and outputs:** In the occupied Masini, the Orteo project was created to establish a community garden for the volunteers and residents. Beyond food production, Làbas is extensively engaged with alternative food systems and open to the public a weekly farmers' market, where the association of small producers Campi Aperti (Open Fields) meets with the citizens. Làbas is a place for cultural expression, and courses, festivals and concerts continuously take place, becoming a meeting point for Bologna's citizens. The Làbas cultural centre also offers useful services to local families, organizing the Làbimbi workshops for children introducing them to environmental and nutritional concepts with a range of activities in the community garden. Finally, Làbas plays a key role in the migrant community of Bologna through the so-called "reception point" which offers assistance.

**Current status and prospects:** Today, however, the Làbas experience is at risk, due to the absence of an agreement with the City Council on the long-term availability of the space. After abandonment of the garden, it seems that volunteers are currently reactivating this action.

### 3.2.6. Abandoned Neighbourhoods—"OrtoCircuito"

**Location:** "OrtoCircuito" is located in the industrial Roveri district, which was abandoned during the industrial decay of the area.

**Objective:** Requalify an abandoned area to the creation of a food cooperative based on social integration.

**Stakeholders:** The "OrtoCircuito" or Battirame project is led by Eta Beta, a social enterprise that creates long-term, self-sustaining job opportunities for disadvantaged people, and has the scientific guidance of the University of Bologna and the financial support of the City Council and the private foundation Enel Cuore Onlus.

**Design process:** The first garden was designed following permaculture and biodynamic agriculture principles. Composed by two circles (one dedicated to vegetable production and the other to ancient fruit three species), it was technically designed by the association BiodiverCity who promoted shared management of plant choices and agricultural activities. Later, the project expanded and requalified an adjacent area of 4 ha, also from the abandoned industrial neighbourhood. The design of this second garden (i.e., organic production of vegetables and cereals) was conducted by members of the social cooperative Eta Beta. Both gardens count on drip-irrigation systems and soil fertility is maintained by compost application.

**Project activities and outputs:** The project started in 2013 and initially included a permaculture biodynamic community garden and a soilless therapeutic garden occupying over 1300 m<sup>2</sup>. The high biodiversity of this garden eased the implementation of educational activities (e.g., workshops with schools) and the organization of demonstrative events to the general public. Local residents, but also



volunteers and Eta Beta’s workers, managed this garden while assisted by students from the University. The project is related to handcraft atelier of ceramic, glass and wood. Furthermore, the Battirame project has renovated and opened a house where bread production, cuisine activities, educational workshops and other knowledge exchange take place. On May 2016, the “Spazio Battirame” was inaugurated, as a result of constant and collective work. The financial sustainability of the garden is ensured by direct selling of the produce in the farmers’ market, as well as providing fresh ingredients to the newly built restaurant of Battirame. Moreover, local residents will ultimately be allowed a portion of the garden for their family needs, either growing crops themselves or hiring socially disadvantaged people from Eta Beta to get help in agricultural activities. Food safety of the cultivated species is being assessed by the ResCUE-AB who periodically monitors the eventual presence of contaminants in both soil and vegetable samples.

Current status and prospects: The long-term sustainability is ensured by the well-established public–private collaboration and the formal agreement with the City Council for land use over a 20 year period.

### 3.3. SWOT Analysis

The strengths, weaknesses, opportunities and threats of each case study were identified in the SWOT analysis (Figure 3).

		I COLORI DELL'ORTO	ORTI DELLA FORNACE	AIUOLA DONATA	GREENHOUSING	LABAS	ORTOCIRCUITO
Management	Location	W	W	S	S	S	W
	Self-organization	W	W	S	W	S	S
	Participation	W	W	W	W	S	
	Public-private relations	O	W		W	W	S
	Public funding	T	T		T	T	T
	Networking	S	W	O	S	S	S
	Vandalism	T	T	T	T		W
Urbanism	Long-term viability	T	T	T	O	T	S
	Landscaping	S	S	S	S	S	S
	Up-scaling	O	O	O	O	O	O
	Urban regeneration	S	S	S	S	S	S
	Place-making	O	O	O	O	O	O
Society	Social inclusion	S	O		S	S	S
	Community building	O	W	O	W	S	
	Food security	W	W	W	O	S	S
	Individual health	S			O	S	
	Collective health				O	O	O
Education and culture	Food safety	T	T	T	S	T	S
	Economic development				O	O	O
	Cultural heritage	S			O	O	O
	Education and training	S	S		S	S	S
	Life-long learning	S	S		S	S	S
	Research				S		S
	Recreation and culture	O	O	O	O	O	O

Figure 3. SWOT analysis of the six case studies. Strength (S, green), Weaknesses (W, orange), Opportunities (O, light blue) and Threats (T, red).

## 4. Discussion

Urban horticulture is a tool to physically and culturally regenerate urban spaces or infrastructures affected by abandonment and degradation. In the city of Bologna, different urban horticulture projects have improved the image and requalified vacant areas both in the city centre and the suburbs and at different scales: from small flowerbeds in a square to large plots in an abandoned industrial neighbourhood. Notwithstanding that social benefits are pursued in all cases, the assessment of these projects unmasked strong differences between top-down and bottom-up experiences and outlined policy-making recommendations for strategic planning.

### 4.1. Addressing Social Gaps in Urban Areas

The different urban horticulture projects identified in vacant areas pursue social inclusion and community building by creating a new meeting point for the community. Urban agriculture practices are, thus, an opportunity to reactivate relationships, cooperation and solidarity that were in crisis not only due to the domination of industry but also the hyper-individualized model of contemporary society. These new forms of community can easily become the basis for real political claims on vacant spaces and urban design, as well as an opportunity for stimulating increased environmental awareness and civic engagement [42,100,101].

The engagement in the garden is a way to improve the food security of disadvantaged social groups who deal with limitations in accessing affordable healthy food and decrease the risk of creating “food deserts” in the suburbs and marginalized areas of cities [102,103]. As a result, individual health is enhanced not only through a better diet but also through mental and physical improvements. Furthermore, the improved image and quality of the neighbourhood positively contribute to the collective health. The occupation and requalification of vacant areas in new urban gardens is also a response to the prior policy of the municipal allotment gardens. Until 2013, allotment gardens were exclusively assigned to elderly people, as also happened in cities like Barcelona [99], and other social groups reacted to this by organizing themselves and cultivating public spaces. The new inclusive policy (PG n. 55096/2009 and PG n. 314310/2013) resulted in an intergenerational knowledge exchange with a lively debate on practices and methods that could bring innovation in styles of cultivation and management.

### 4.2. The Role of Local Governments: Top-Down vs. Bottom-Up Experiences

The assessment of requalification experiences highlighted an important dichotomy between top-down and bottom-up initiatives. The role of the local government in Bologna is essential, contrary to other regions where food aid programs or the involvement of the gardeners was a key factor in the long-term sustainability of urban agriculture initiatives [11]. Top-down projects showed some benefits in the short-term like the support and funding from the local municipality and the involvement of professionals in the initial stages. This fact leads to a multi-actor exchange of knowledge and experiences tied to life-long learning, education and training [104]. However, notwithstanding that public bodies employ participatory processes to engage citizens in the design and management of urban gardens, top-down projects were also linked to low participation and weak self-organization. This issue is related to the fact that some citizens are reluctant to join municipality-led initiatives.

On the contrary, bottom-up gardens are implemented by the community as a form of contestation towards a better life quality [101]. Consequently, a strong linkage is created among citizens as well as with the garden, resulting in good self-organization and strong participation. On the other hand, the viability of bottom-up initiatives strongly depends on the support of the local government, especially for projects occupying public spaces. Accordingly, when an agreement with the city council on the vacant area use was not ensured, the long-term sustainability of the gardening actions were put at risk. The potential loss of land access is unfortunately a common issue in community gardens [105].

### 4.3. Policy-Making Recommendations

Local governments have a significant role in the regeneration of vacant areas, particularly in public-owned ones. The SWOT analysis and the experiences of the different case studies highlighted some issues that might be considered in future policy-making not only in the city of Bologna but also in other cities where urban agriculture is emerging.

The full and actual integration of urban agriculture into planning tools is essential towards the promotion of regenerating vacant areas and enlarging green and productive areas in cities. Since urban agriculture is strongly linked to bottom-up processes rather than top-down urban planning schemes [106], local municipalities need to establish participatory and multi-stakeholder dialogues to integrate bottom-up perspectives and practices in urban planning, particularly regarding urban regeneration actions and plans. In particular, such action might avoid the social unacceptance of top-down urban gardens in areas where citizens are not interested or have other claims [62] and thus reject the garden, as happened to the case Orti della Fornace or in the start-up phase of GreenHousing rooftop garden.

Programs and plans might have a long-term perspective to promote the engagement of citizens, who feel the support of the administration. The top-down cases evaluated showed indeed opposite experiences. On the one hand, GreenHousing was a 2-year project where the administration invested in the improvement of the entire building and the implementation of the garden as well as in the maintenance of the initial period. Once the project was over, the established relations with the university and the local associations supported the inhabitants in all management issues. On the contrary, Orti della Fornace was a project established to please the neighbours, who pointed to the degradation of the area and demanded an intervention from the Municipality. Therefore, little action was taken to ensure its long-term sustainability limiting the viability of the project. In the case of bottom-up experiences, cases also showed this dichotomy. Interestingly, a central location was crucial for the establishment of bottom-up gardening projects (e.g., Lâbas or Aiuola Donata), whereas municipal intervention usually concentrated on disadvantaged sub-urban districts. As shown by a number of studies, however, perceived distance (from home or work) is a crucial element in determining the usability of an urban green space [17,107], and consistently a central garden is likely to be visited and appreciated by a wider and more diversified audience. While guerrilla gardening (e.g., Aiuola Donata) or squatting (e.g., Lâbas) projects are still not supported by the local government due to the challenge of the power relations and the “commonization” of public spaces [51], OrtoCirtuito was accepted by the local government who offered a 20-year contract for the legal use of the land.

In general, any program and plan that considers the regeneration of vacant areas through urban horticulture should include a food safety test as normative [108,109]. Vacant areas, particularly former industrial spaces [110], have large risk of soil contamination due to the accumulation of chemicals that can be transferred to food products by bio-assimilation. Therefore, policies might guarantee food safety through chemical monitoring of vacant areas prior the implementation of gardens and perform soil remediation activities in case of risk. Such aspects are limited to those land-based vacant areas since places like rooftops or buildings are generally not exposed to soil contamination [86,111].

Local policy might consider the integration of economic development in the regulation of urban horticulture and regeneration of vacant lands since business models can be developed based on the production of local food, education and recreation. Among the cases evaluated, OrtoCirtuito and Lâbas projects resulted in a business model which could be employed by other entrepreneurs. Both projects were born from abandoned buildings; people and organizations aggregated around collective work, revitalizing vacant spaces, organizing horticultural activities and maintaining and transforming on-site architectural structures. Both places became multi-functional and important sources of cultural enrichment for citizens.

Finally, local governments might work on transversal activities beyond specific policies. Dissemination activities of on-going projects might improve the knowledge and acceptance of citizens. Networking activities and collective spaces might enhance the creation of projects based on

multidisciplinary collaboration, which favors the success of urban horticulture initiatives because of the advantage of knowledge exchange among stakeholders, and how that knowledge may be brought to bear in other social domains.

## 5. Conclusions

This paper demonstrates how the requalification of vacant areas, founded on the principles of environmental responsibility within a viable economic and legislative framework [112], may be pursued by promoting urban horticulture. Regeneration of vacant areas is accompanied by rational innovation in both urban agricultural technologies, business models as well as tools for the design of urban redevelopment [41,113,114]. As such, it effectively ties social integration to land reuse within the urban setting. By analysing the city of Bologna (Italy), the requalification of different types of areas is exemplified through case studies that set the basis for policy-making guidelines for the requalification of vacant areas in cities.

In the case of Bologna, different typologies of vacant areas that could be requalified as new urban horticulture spaces were identified: flowerbeds along streets and squares, balconies and rooftops, abandoned buildings and abandoned neighbourhoods. In most cases, urban horticulture improved the image and the quality of the areas as well as brought social benefits regarding life quality, food access and social interaction among participants. Such activities empower citizens by increasing the desire to take care of vacant areas that are usable by the whole community. Strong differences in some aspects were found between top-down and bottom-up initiatives and a bottom-up strategy is preferable to a top-down process regarding the engagement of citizens (i.e., participation and organization of the garden), notwithstanding that social processes can be slow and complicated.

Public entities (e.g., from the regional to the local level) have a fundamental role in encouraging the regeneration of vacant areas in the inner city (e.g., squares) as well as outskirts (e.g., former industrial areas) through not only financial support but also policy instruments. In particular, public bodies might pay attention to establishing a transparent and participatory planning regulation framework guiding the potential use and the requalification processes of vacant areas, promoting long-term action, ensuring food safety, enhancing business opportunities and establishing collateral programs that also support bottom-up processes. The integration of the different stakeholders related to urban horticulture (e.g., citizens, agronomists, environmentalists, ecologists, sociologists and urban planners) would ensure a successful process for valuing vacant areas towards the regeneration of cities.

This research was applied to a specific study area to observe the dynamics in the same geographical and legal contexts, although this approach limited the assessment of other typologies of urban gardens on vacant areas, such as indoor farming. The evaluation of other cities would then increase the variety of cases. Furthermore, the comparison with other urban areas might allow the definition of common and divergent patterns among study areas, minimizing the bias produced by contextual factors.

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Appendix A

Table A1. Stakeholders interviewed, by type and case study.

Case Study	Type of Stakeholder				
	Manager	User	Local Administration	Association	Total
I Colori dell'Orto	1	-	2	-	3
Orti della Fornace	1	2	1	-	4
Aiuola Donata	-	1	-	-	1
GreenHousing	1	2	1	-	4
Làbas	1	-	-	-	1
OrtoCircuito	1	2	1	1	5
Total	5	7	5	1	

Appendix B



Figure B1. Cont.





Figure B1. Cont.





**Figure B1.** Pictures of urban horticulture projects in Bologna selected as case studies. (1) Flowerbeds along streets and squares: (a) “I Colori dell’Orto”, Piazza dei Colori, 27; (b) “Gli Orti della Fornace”, Via della Beverara, 123; (c) “Aiuola Donata”, Piazza San Donato, 1; (2) Balconies and rooftops: “GreenHousing”, Via Antonio Gandusio, 12; (3) Abandoned / squatted public buildings: “Labàs”, Via Orfeo, 46; (4) Abandoned neighbourhoods: “OrtoCircuito”, Via del Battirame, 13.

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