



Urban Agriculture Observatory.

Barcelona Urban Allotments Analysis



CONEXUS

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Introduction

Credits

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Cities and regions in Europe (EU) and Latin American & Caribbean States (CELAC) face shared and urgent global-local challenges to integrate practical actions with strategies to achieve greater inclusion, biodiversity, climate change adaptation and environmental quality.

Many cities face the same issues of landscape fragmentation caused by rapid growth, urban sprawl and economic restructuring. Poorly planned urbanization leaves a legacy of cities lacking the green areas needed for ecosystems to provide the services essential to human life. Nature-based solutions (NBS) have the potential to help reverse these trends, and our combined EU-CELAC understanding of socio-cultural, ecological and governance contexts represents a huge opportunity to move forward – faster, together.

The CONEXUS project (2020-2024) has worked to co-produce, structure and promote access to the shared, contextualized knowledge needed to support cities and communities to co-create NBS, to restore urban ecosystems and to help drive the required step-change in urban policy and practice in EU and CELAC countries. The project's core concept is to co-create context-appropriate NBS for ecosystems restoration and sustainable urbanization in CELAC and EU cities, using a place-based approach (place-making, place-keeping and place-prescribing), solving problems together with citizens. Conexus project partners are already working to implement innovative nature-based solutions in Latin America and Europe, with a particular focus on Life-Labs in São Paulo, Bogotá, Santiago, Buenos Aires, Lisbon, Barcelona and Turin.



The Barcelona Life Lab has focused all its efforts on urban agriculture, through the creation of an Urban Agriculture Observatory. Urban allotments, as a nature-based solution, contribute significantly to urban environments as part of green infrastructure. The main objective of the Observatory is to establish a database of the environmental and social aspects of urban allotments and analyze their benefits. They contribute to the Urban Agriculture Observatory to build up a learning community that, collectively, exchanges and shares information, knowledge, ideas, experience, and expertise linked to urban agriculture.



In recent years, urban allotments and urban agriculture have increased in Barcelona and in many cities around the world. This follows a growing social demand for spaces in urban areas where you can cultivate and carry out various activities and raise public awareness of the importance of living in environmentally and socially sustainable cities. Several departments in Barcelona City Council have implemented municipal initiatives, policies and plans that include urban agriculture.

Urban allotments are multifunctional green spaces that are part of the green infrastructure of the city. Their benefits are wide and varied and can be classified into social benefits (social cohesion, environmental education, benefits for physical and mental health, improvement of the urban landscape, etc.) and environmental (agricultural production, soil permeability, thermal regulation, etc.). These spaces are nature-based solutions.

The city council has promoted several plans that include urban agriculture and urban allotments and their enhancement. The Urban Agriculture Strategy of Barcelona (2019–2030) set out the importance of urban agriculture for the present, and especially the future, of the city through various perspectives.

Despite this, there is an obvious lack of information and studies on urban allotments within Barcelona to provide a solid basis of data that serves the planning, promotion and management of these spaces.

In this sense, the Urban Agricultural Observatory's main objective is to establish an environmental and social database of urban allotments and analyze the environmental and social benefits that these bring to the city and its inhabitants. For the analysis of this data, a study methodology has been created which, along with other aspects, analyzes the socio-environmental services that urban allotments provide, quantifies production of a typical urban garden in the city, studies the biodiversity associated with urban allotments as well as the different social and environmental benefits that they can bring.

The Urban Agriculture Observatory, centralized through a website, collects the results of these studies and their dissemination and communication materials, with the ultimate purpose of disseminating this information and making it readily accessible to citizens and the administration. The Urban Agriculture Observatory aims to link urban agriculture with green infrastructure to provide ecosystem services and enhance biodiversity in the city, as well as providing management tools to the administration. With these goals in mind, it aims to be a consultation tool open to citizens and the city council as well as a platform for knowledge exchange and networking between the various actors (Administration, interested parties, citizens, etc.) interested in urban agriculture in the city.

Urban allotments as part of the urban green infrastructure

The concept of green infrastructure is defined in the report "Green infrastructure: improvement of the natural capital of Europe", prepared by the European Commission in May 2013 and approved by the European Parliament in the same year. This definition describes green infrastructure (GI) as a strategically planned network of natural and semi-natural areas with other environmental features, designed and managed to deliver a wide range of ecosystem services, while also enhancing biodiversity. The emphasis of the concept of green infrastructure lies in maximizing the ecosystem services based on the integration of natural solutions in planning and landscape management.

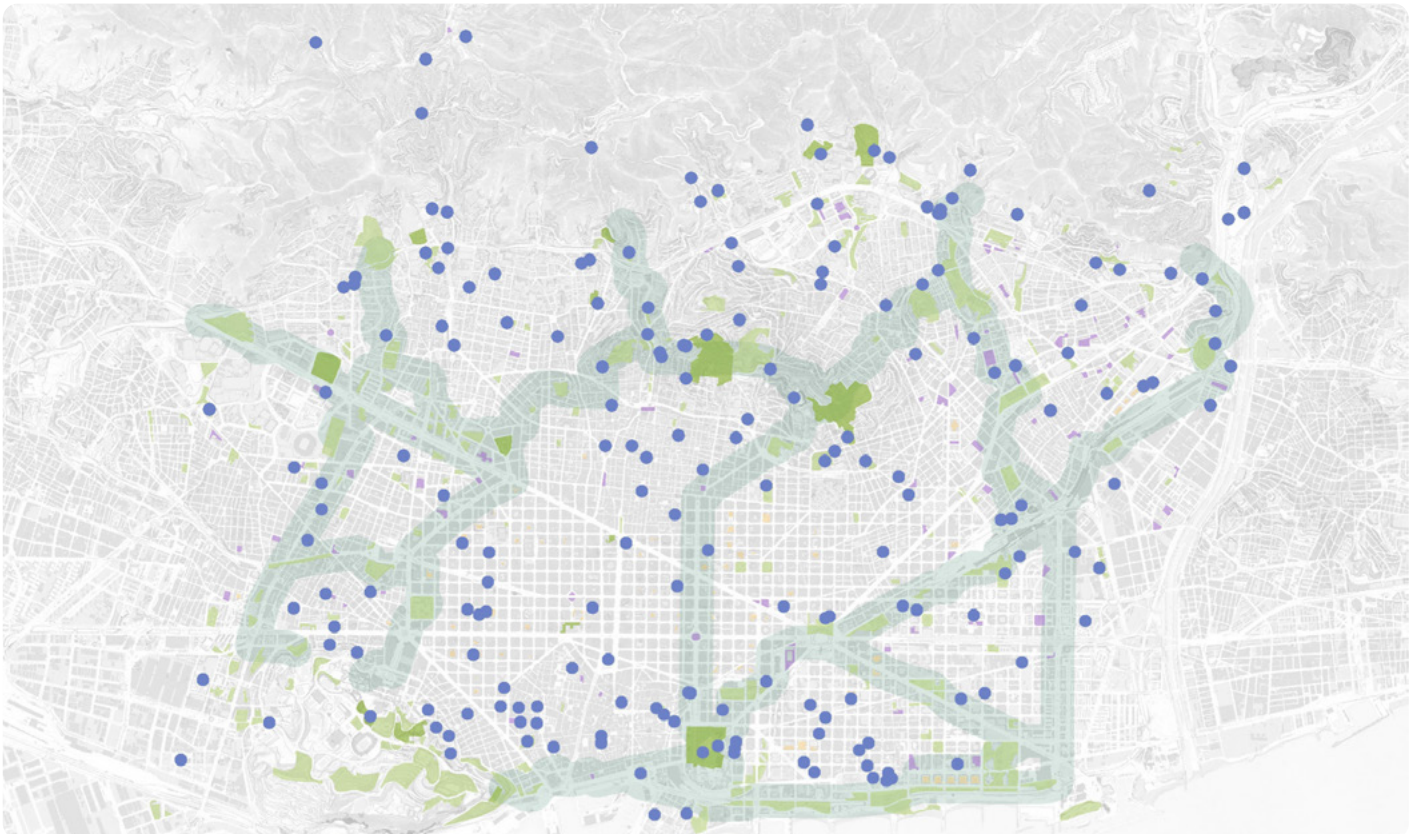
Urban allotments are an element of urban green infrastructure that provide many of the benefits which exist in other elements including urban parks. In addition, they offer different habitats and social opportunities than parks or street trees. They offer opportunities including the cultivation of food crops, as well as plants and animals not present in other urban greenspaces. They provide social benefits through the cultivation of crops and the communities this supports. Other advantages include the use of urban spaces which may otherwise be derelict.

Urban green infrastructure

- Urban allotments
- Urban parks
- Street trees
- Interstitial spaces

Natural green infrastructure

- Natural or semi-natural ecosystems
- Forest ecosystems and open spaces
- Agricultural areas
- Wet areas
- Others



What do we know about urban allotments?

Information and studies in Barcelona about urban allotments are too limited to provide a solid baseline of data for the planning and management of these spaces. The concept of urban agriculture is growing and has increased quite a lot in recent years, but baseline data is needed to manage it properly and to understand its value.

There is no assessment regarding productivity, and who, what and where the production is intended to benefit. There is no detailed knowledge about which plant species are cultivated, the demographics of urban allotment users, what social interactions occur, how allotments contribute to urban biodiversity or what activities take place there, among other issues. The possible environmental benefits and the biodiversity of allotments have not been studied and quantified in terms of their role in urban green infrastructure.



What do they contribute towards urban biodiversity?



What ecosystem functions and services do they provide?



What is agricultural production in the city?



What agronomic varieties are grown?



What is the production allocated to?



What social interactions take place there?



What health benefits do they have?



Who are the users?
Do all groups have the same opportunities to interact with nature?



What activities take place there?

Urban allotments and urban agriculture have increased in recent years in Barcelona as well as many cities around the world, due to a growing social demand for urban spaces where people can cultivate food and a greater public awareness about the importance of living in environmentally and socially sustainable cities. **Although the main objective of an allotment is usually food production in urban space, their purpose also encompasses different visions or movements regarding urban allotments as spaces of health and social interaction.**

They can be places that offer ecosystem services in the city as part of urban green infrastructure, recreation and leisure spaces providing contact with nature, spaces where an alternative food model is created, spaces for claiming a right to the city, therapeutic spaces for different groups and/or educational spaces for families and young people. An urban allotment can accommodate all these visions or just a few, which enables a high variability between the different urban allotments.

In the recent years, different parts of Barcelona City Council have been implementing initiatives, policies and municipal plans that sometimes include urban agriculture. The Barcelona Urban Agriculture Strategy is the main planning tool related to urban allotments. The strategy is an instrument that promotes and plans the necessary steps to improve and increase the agricultural area in the city, within an agro-ecological model. These allotments should maximize environmental and social services and grow nature in the city for the benefit of people and biodiversity conservation. The main purpose is to project a strategy up to 2030 that achieves an ecological, healthy, inclusive, cohesive, fair and resilient city with citizen involvement in the management of urban allotments and the promotion of agroecology and food security.



The Urban Agriculture Strategy is an instrument that plans necessary actions to improve and increase the agricultural area in the city, with an agro-ecological model; these allotments must maximise environmental and social services, and bring nature to the city for the benefit of the people and the conservation of biodiversity
The strategy lays down 4 strategic axes.

These are the main lines or areas of work in which the actions are marked.

- EIX 1. Territorial.
- EIX 2. Agro-ecological model
- EIX 3. Social and community
- EIX 4. Governance and coordination

One way of studying the benefits of urban allotments is to understand them from the perspective of socio-environmental services.

Socio-environmental services, also called ecosystem services in natural environments, are the benefits that humans get from ecosystems (De Groot et al., 2002), which contribute directly or indirectly to the well-being of people (TEEB 2010) and are fundamental to the functioning of the Earth's life support system (Constanza et al. 1997). Interest in ecosystem services has been increasing in recent years both in the scientific community and in politics (Constanza et al., 2014).

Classification of eco-systems

Source: TEEB, 2010. BR

Provisioning Services

Wells obtained for ecosystems

- Food
- Raw materials
- Water
- Medicinal plants

Cultural Services

Intangible benefits from ecosystems

- Mental and physical health experience
- Artistic inspiration
- Tourism

Regulatory Services

Services obtained from ecological processes

- Air quality
- Pollination
- CO₂ fixation
- Disaster moderation
- Purification
- Erosion
- Biological control

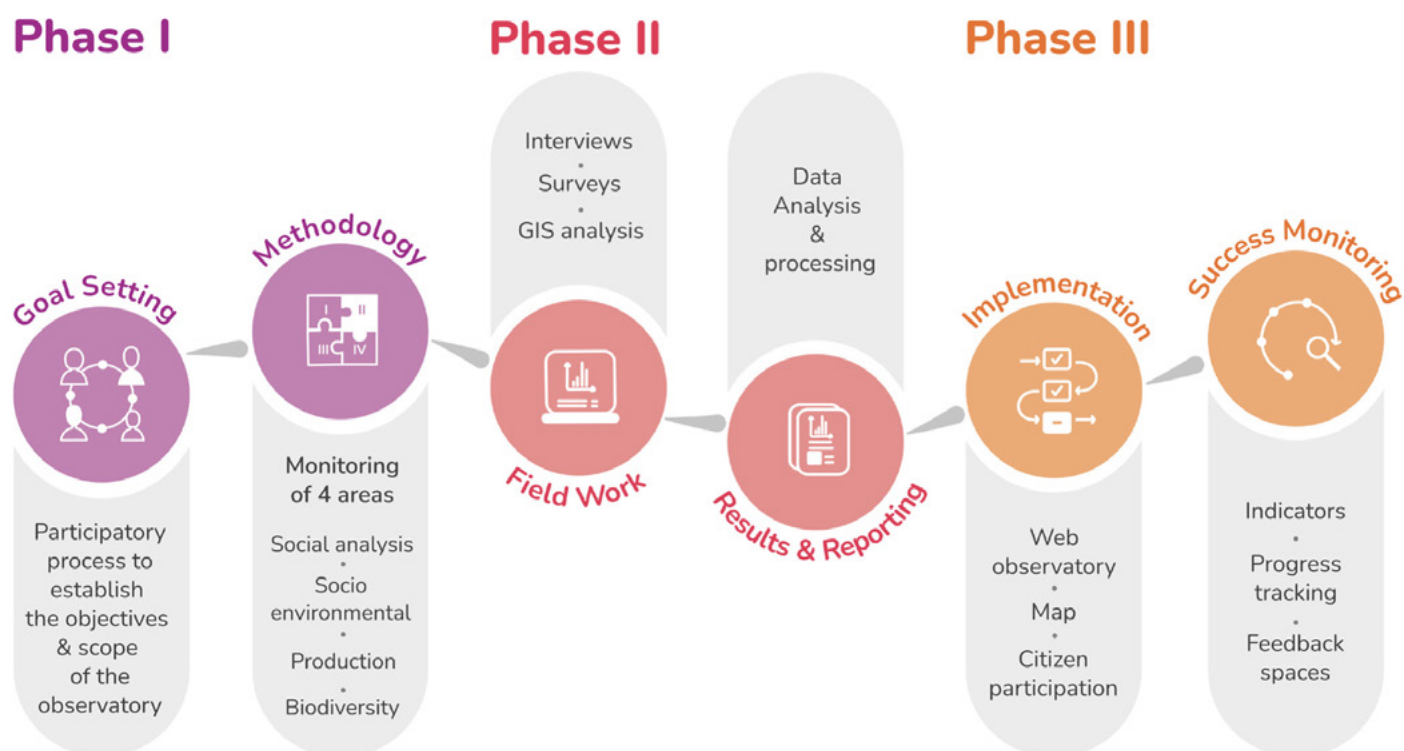
Support Services

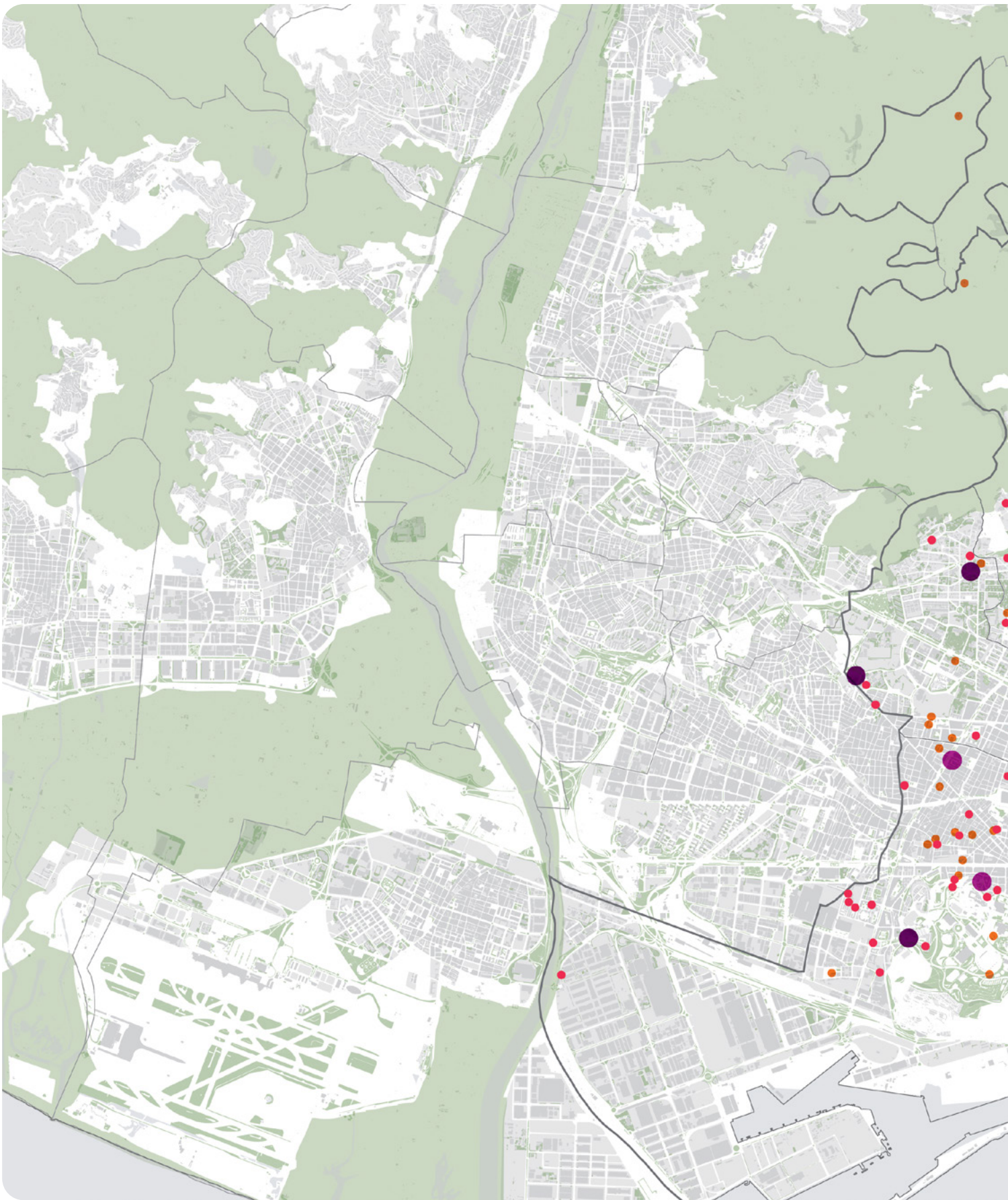
Environmental functions essential to the generation of services

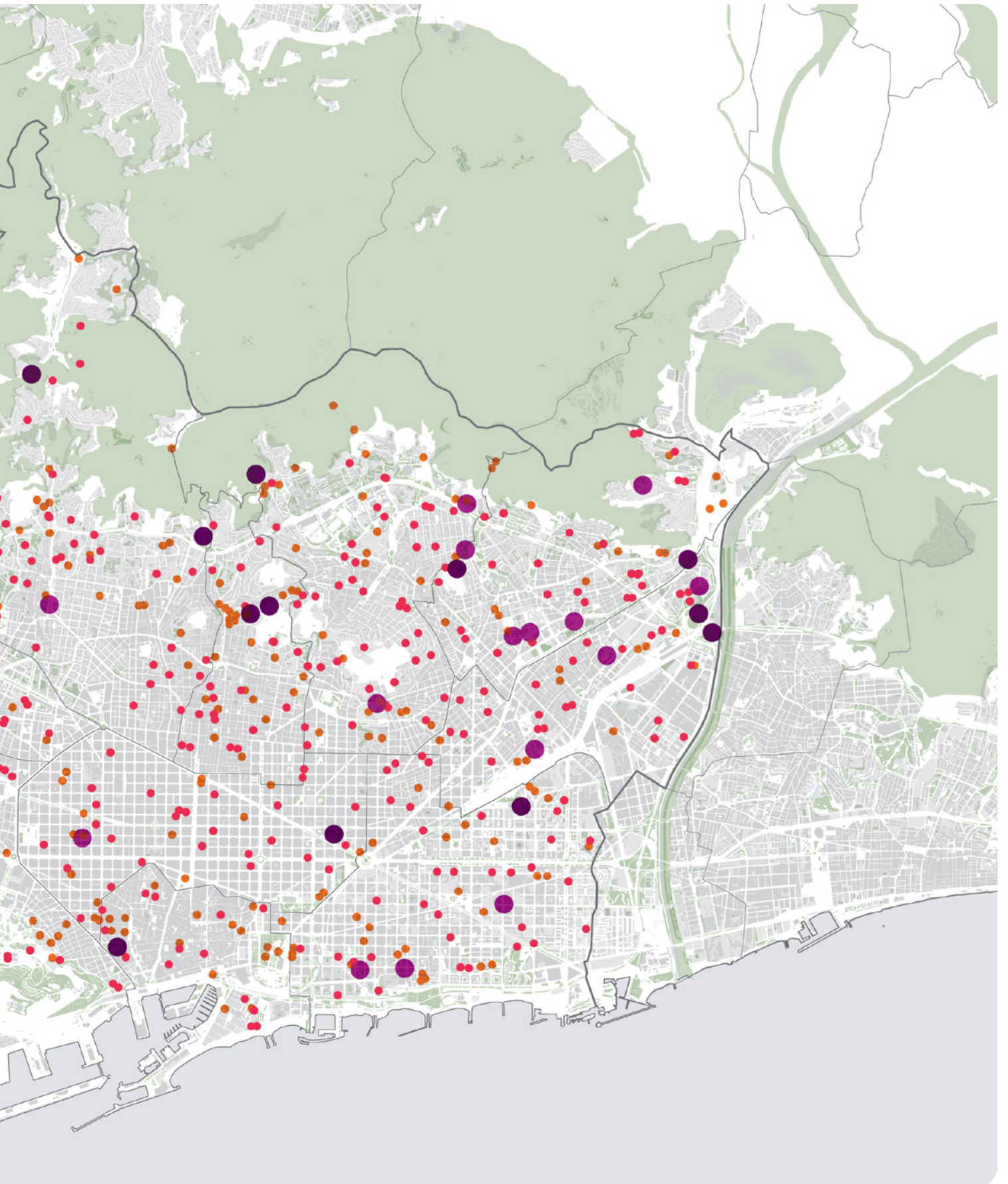
The monitoring has been divided into 4 areas:

- Users
- Socio-environmental services
- Estimation of agricultural production
- Cultivated biodiversity

We developed a methodology based on a combination of field and desk work. In terms of fieldwork, 242 surveys have been carried out with users and entities. In addition, socio-environmental indicators were collected across all urban allotments, where people who have participated in the production study were surveyed.





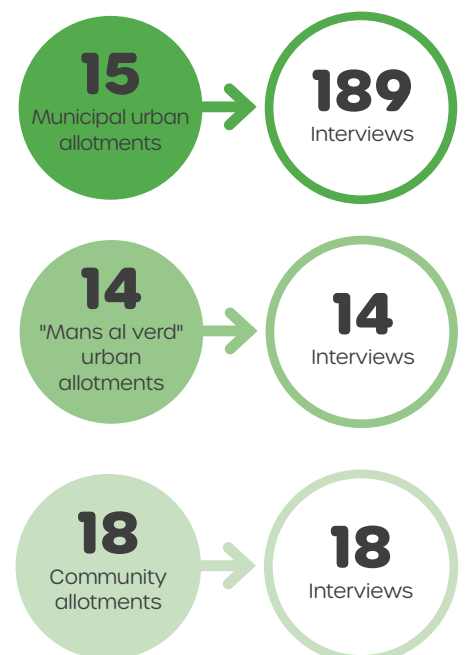




Survey to the different users and entities of each urban allotment

To quantify the social impact of urban allotments on users, a survey has been carried out regarding the different users and sites. To get a statistically significant sample for each of the urban allotments studied in terms of the number of users surveyed in the municipal urban allotments, a significance level of 90% was used and a sampling error of 15%.

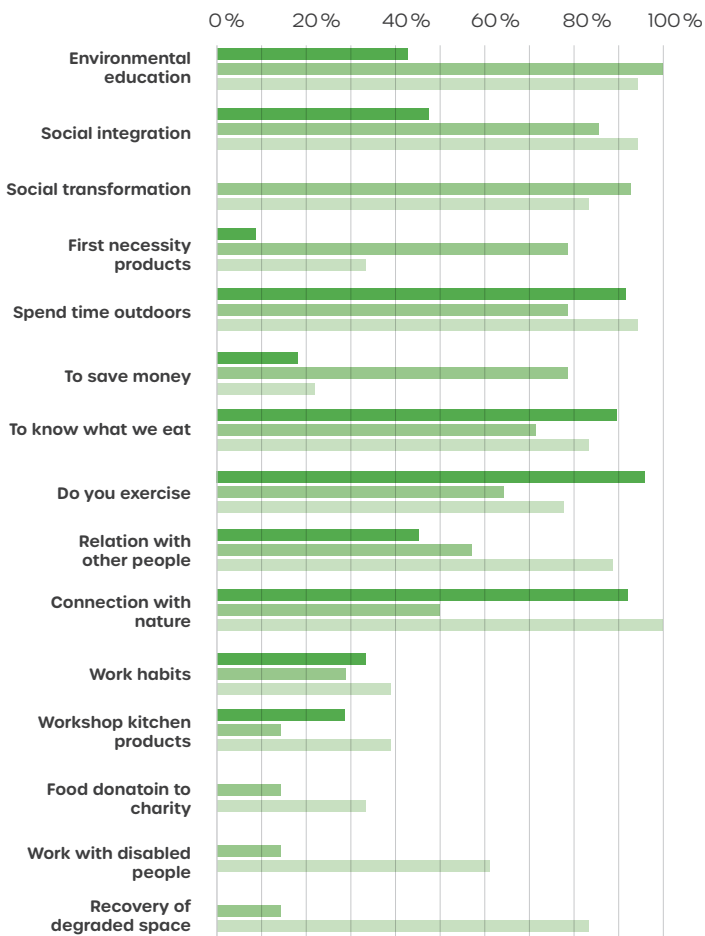
Based on these parameters, a total of 189 surveys have been carried out (168 users and 21 entities). In the case of the urban allotments corresponding to the "Mans al verd" program and community urban allotments, a single survey was carried out at the site organizing the space.



Social Cohesion

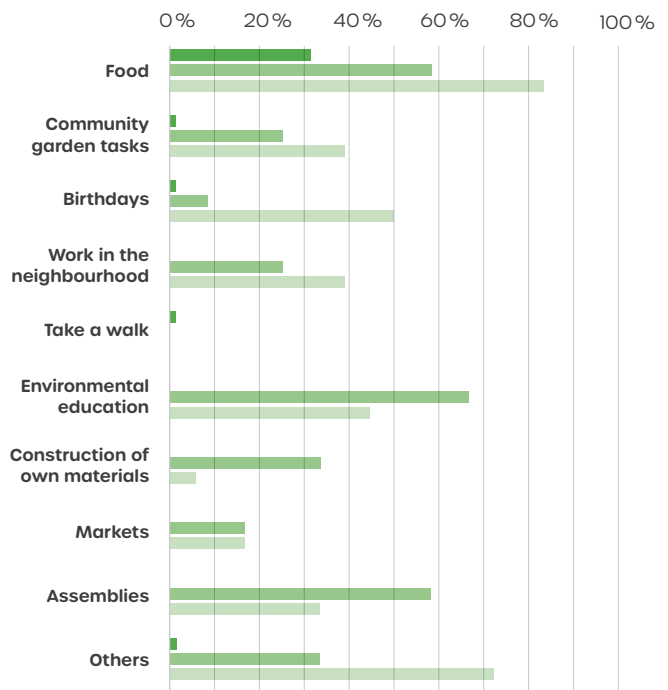
Motivations to attend the urban allotment of the users

In general, the sites associated with "Mans al verd" and community urban allotments have a greater range of goals than users and sites of the municipal urban allotments. The main incentives to attend the garden are to spend free time, understand what they are eating and the connection with nature and working in the garden as a form of exercise. This last reason for involvement is reduced in the sites associated with "Mans al verd" compared to the users and sites from the network of municipal urban allotments. Likewise, it is observed that there are motivations that are representative mostly in the urban allotments of the "Mans al verd" and in community urban allotments, such as assisting in the garden for environmental education and social transformation. Less so than these two types of garden, but not in the municipal urban allotments, there is also the donation of food to charity and the regeneration of degraded spaces.



Activities with other users

In general, it can be observed that the management organizations of community urban allotments and "Mans al verd" have a much wider range of activities than the organizations and users associated with the network of municipal urban allotments. In addition, all "Mans al verd" organizations carry out activities with the social circle of the garden, while this does not happen in all the municipal urban allotments and associated communities. Related activities stand out with the food where the users and the entities of the municipal urban allotments have their own main source of activities with other users. Other activities include going to look for sapling, reeds, among others, and the celebration of birthdays. Assemblies and environmental education are also key activities, especially in the "Mans al verd" orchard. In these two recent cases, the representation of users of the municipal urban allotments and those of the "Mans al green" with respect to the entities of the community urban allotments is much smaller.



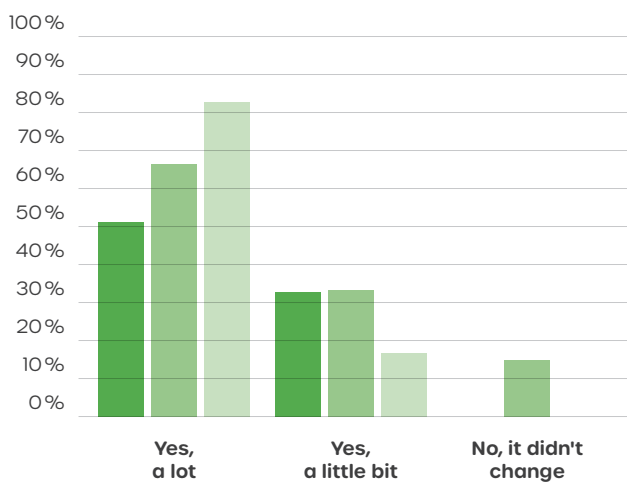
Perception of users' health improvement

Regarding the perception of improving the health of user populations, there are some differences among the types of urban allotments: users municipal (51%), "Mans al verd" (67%), and people from community gardens (83%). It should be noted that similar proportions consider that their health has improved somewhat since attending the garden, with a percentage almost identical between the first two groups: people from the municipal gardens (3%), those from "Mans al verd" (33%) and those from community gardens (16%).

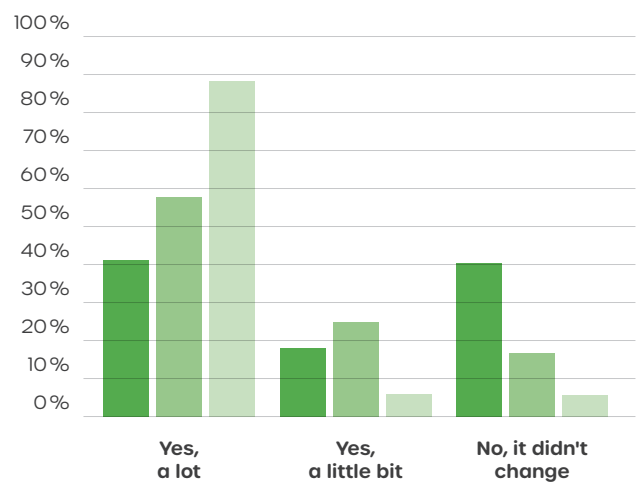
Perception of users' improved nutrition

For comparison in the perception of improvement of diet, the results have more points of diversity compared to the previous graph. In response to who considers the food to be theirs, this improves a lot when attending the gardens frequently; we have different results from the municipal users (4%), the "Mans al verd" (58%) and community gardens (89%). As for the users who consider that have improved their diet a little from attending the garden, the results are similar in the two groups: municipal (18%) and «Mans al verd" (25%). And in community gardens (6%) it is lower than the other groups.

Has attending the urban allotment improved your health?



Has attending the urban allotment improved your diet?

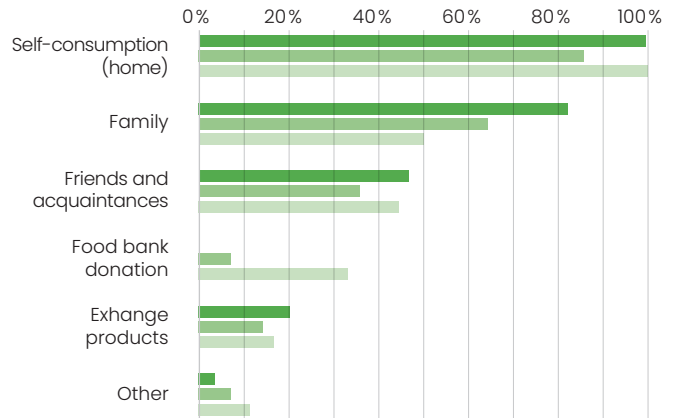


- Municipals
- Mans al verd
- Community and social

Agricultural production

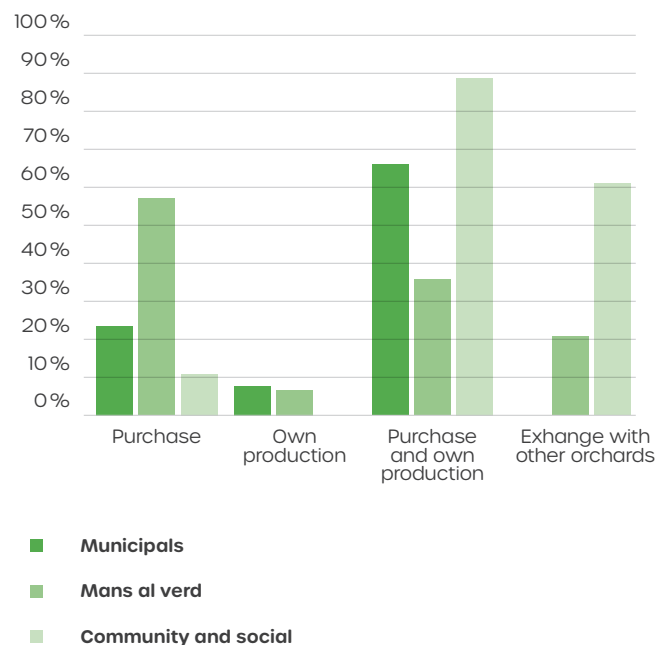
What is the destination of the agricultural products?

In the three types of urban allotments the main use of the food produce is self-consumption, followed by distribution between family, friends and acquaintances. It is observed that among the users of municipal urban allotments the use is mostly for self-consumption and to share with relatives and friends, while in the urban allotments of the "Hands on the green" and community urban allotments, there are some allotments that also provide produce to the food bank or other organisations, such as cooking workshops. The exchange of products (usually between users but also between groups) accounts for between 15-20% of users or urban allotments in the three typologies.



Origin of the seeds or the seedling

In the municipal urban allotments, there is a combination of buying and individual production of seeds and seedlings, although approximately 20% of users claim that they don't contribute to seed production, but only purchase. 8% of the urban allotments in the "Mans al verd" program only do their own production, 58% only buy, while the rest combine the two. In the community urban allotments, the majority combine the two options and 11%, only understand. The exchange of seeds or seedlings with other urban allotments only occurs in the urban allotments of the program "Mans al verd" (21%) and in the community (61%). Community and social urban allotments are creating a network with other urban allotments to promote the exchange of seeds or seedlings. The other two options ("own production only" or "exchange with other urban allotments") are less common, except in community urban allotments; this stands out above the other two types of urban allotments.



To evaluate each of the socio-environmental services, a system of indicators representative of green spaces has been used.

The methodology used has been created by Barcelona Regional based on the consultation of various bibliographic sources on possible relations between services and indicators, expert knowledge, and the contribution of the city council technicians. The way in which indicators, influence of the indicator and socio-environmental services are related to each service is calculated through a matrix of relationships.

Analyzed ecosystem services:

Environmental services

- Food production
- Functionality of ecosystems
- Thermal regulation
- Carbon retention
- Improvement of air quality
- Infiltration and permeability

Health services

- Benefits for mental health
- Benefits for physical health
- Active aging
- Connection with nature

Urban planning services

- Urban landscape
- Sponging urban fabric
- Peri-urban planning

Indicators

Surfaces

- Allotment area
- Cultivated area

Biophysicists

- Total green coverage
- Tree cover
- Vegetal coverage in the orchard area
- Maturity of the tree
- Native vegetation
- Soil permeability
- Surrounding trees (%)
- Proximity to forest areas (Collserola, Montjuic)
- Distance to the sea
- Connectivity with other urban green spaces

Accessibility

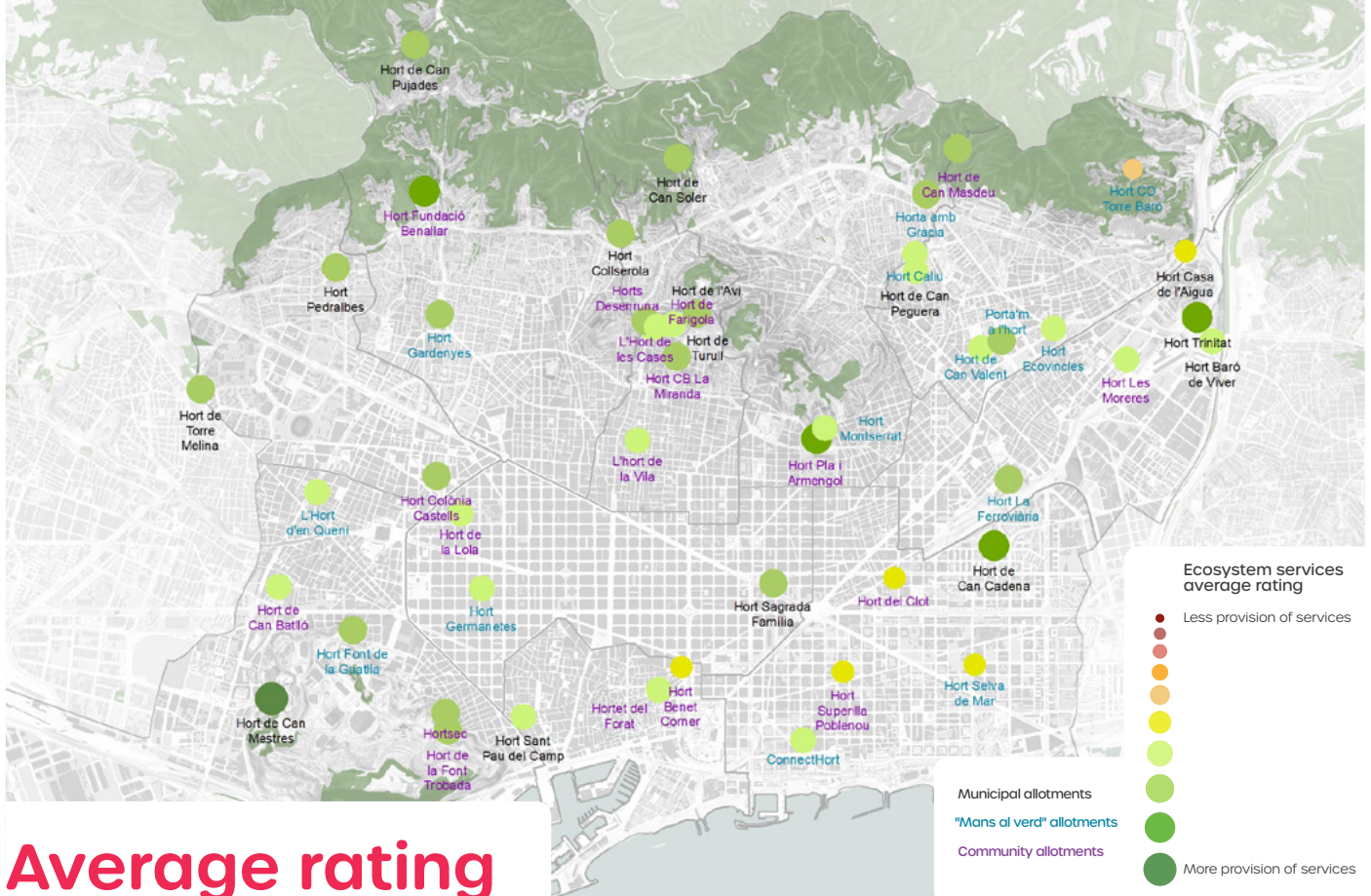
- Transport less than 500 m
- Educational centers, homes, etc. at 200 m
- Accessibility reduced mobility
- Proximity to slope 0 (within the park)
- Proximity slope 0 (surrounding slopes)
- Density of surrounding urban fabrics
- Town 5 minutes away

Social relations

- Common meeting space (benches, tables)
- Number of Entities

Pollution

- Surrounding sound level
- Air quality



Average rating

The average rating of the services is represented by 15 of the 16 services analyzed (peri-urban planning service is not included in the average, since it is not considered to be a positive or negative service). As a general trend, urban allotments that provide more environmental services are those that have a larger total surface area, a larger amount of productive land, and a higher

green arboreal cover. Many of those which offer high benefits are municipal allotments and only 2 "Mans al verd" allotments have high benefits on average: the vegetable allotment of Can Valent, which in addition to the cultivable space offers several environmental education workshops and Horta amb Gràcia, with a very large productive space.

Urban allotment	Type	Rating
Can Mestres	Municipal	9,12
Hort Pla i Armengol	Community	8,70
Can Cadena	Municipal	8,47
Hort de la Trinitat	Municipal	8,12
Hort de la Fundació Benallar	Community	8,08
Pedralbes	Municipal	7,80
Hort de la Font Trobada	Community	7,73
Hort comunitari Can Masdeu	Community	7,64
Font de la Guatlla	Mans al Verd	7,59
Sagrada Família	Municipal	7,53
Can Valent	Mans al Verd	7,52
De l'Avi	Municipal	7,50
Hort Colònia Castells	Community	7,47
Horta amb Gràcia	Mans al Verd	7,46
Hort de la Miranda	Community	7,42
La Ferroviària	Mans al Verd	7,37
Torre Melina	Municipal	7,34
Collserola	Municipal	7,34
Can Soler	Municipal	7,33
Can Pujades	Municipal	7,31
Hortsec	Community	7,18
L'Hort de les Cases	Community	7,10
Espai Gardenyes	Mans al Verd	7,00
Hort de la Lola	Community	6,98

Urban allotment	Type	Rating
Hort de les Moreres	Community	6,98
Turull	Municipal	6,94
Hort de la Farigola	Community	6,93
Connecthort	Mans al Verd	6,88
Hort del Caliu	Mans al Verd	6,81
Porta'm a l'hort	Mans al verd	6,67
Sant Pau del Camp	Municipal	6,58
L'Hort d'en Queni	Mans al Verd	6,54
Can Peguera	Municipal	6,53
Ecovincles	Mans al Verd	6,53
Hortet del forat	Community	6,41
Espai Germanetes	Mans al Verd	6,39
Hort Av. Montserrat	Mans al Verd	6,35
Baró de Viver	Municipal	6,34
Hort comunitari Can Batlló	Community	6,25
L'hort a la Vila	Community	6,08
Horts de Desenruna	Community	6,04
Hort del Clot	Community	5,83
Hort Isabel Vila	Community	5,59
Casa de l'Aigua	Municipal	5,59
Hort Selva de Mar	Mans al Verd	5,47
Hort de Benet Corner	Community	5,15
Hort del Centre Obert de Torre Baró	Mans al Verd	4,06



Observatori d'Agricultura Urbana (Urban Agriculture Observatori)

A portal of knowledge, information and networking around urban gardens

The Urban Agriculture Observatory is designed as a tool to bring together knowledge about urban allotments in the municipality of Barcelona, to disseminate the CONEXUS Project results, map the location of the different urban allotments, share information, and serve as a platform for the different urban allotments in the city for exchanging knowledge, experiences or workshops and other things.

In addition, it incorporates a map service to check the location of the different urban allotments in the city, and holds data associated with these allotments. It also includes the description of different urban allotments in the city, and the opportunity to consult the data of the present study.



Municipal allotments

Name	City district
Can Cadana	Sant Martí
Turull	Gràcia
Casa de l'Aigua	Nou Barris
Baró	Sant Andreu
Can Peguera	Nou Barris
Can Mestres	Sants-Montjuïc
Torre Melina	Les Corts
Pedralbes	Les Corts
Can Pujades	Sarrià-Sant Gervasi
Collserola	Sarrià-Sant Gervasi
Can Soler	Horta-Guinardó
De l'Avi	Gràcia
Parc de la Trinitat	Sant Andreu
Sant Paul del Camp	Ciutat Vella
Sagrada Família	Eixample



"Mans al Verd" allotments

Name	City district
L'Hort d'en Queni	Sants-Montjuïc
Espai Germanetes	Eixample
Espai Gardenyes	Sarrià-Sant Gervasi
ConnectHort	Sant Martí
Hort Aspanias	Sant Martí
La Ferroviària	Sant Andreu
Porta'm a l'hort	Nou Barris
Can Valent	Nou Barris
Ecovincles	Nou Barris
Hort del Caliu	Horta-Guinardó
Horta amb Gràcia	Horta-Guinardó
Font de la Guatlla	Sants-Montjuïc
Hort Av. Montserrat	Horta-Guinardó
Hort del Centre Obert de Torre Baró	Nou Barris



Community allotments

Name	City district
Hort de la Font Trobada	Sants-Montjuïc
Hort comunitari Can Masdeu	Nou Barris
Hortet del forat	Ciutat Vella
Hort comunitari Can Batlló	Sants-Montjuïc
L'hort a la Vila	Gràcia
Hort de la Farigola	Gràcia
L'hort de les cases	Gràcia
Hort de la Fundació Benellar	Sarrià-Sant Gervasi
Hort de la Lola	Eixample
Hort Pla i Armengol	Null
Hort de les Moreres	Sant Andreu
Hort Colònia Castells	Sants-Montjuïc
Horts de Desenruma	Gràcia
Hortsec	Sants-Montjuïc
Hort del Clot	Sant Martí
Hortde Benet Corner	Ciutat Vella
Hort Isabel Vila	Sant Martí
Hort de la Miranda	Sants Gràcia



Rating by environmental services groups

The largest urban allotments and the ones with more arable soil are those that offer most socio-environmental services. In some services, such as the environmental services and food production group these two parameters are more important, while in the social and health services group, the dimensions are not so relevant.

Both in the analysis of socio-environmental services, as in the case of social surveys, it has been noted that in the case of the "Mans al verd" orchards the construction of social links with users and associations of the city has an important weight.

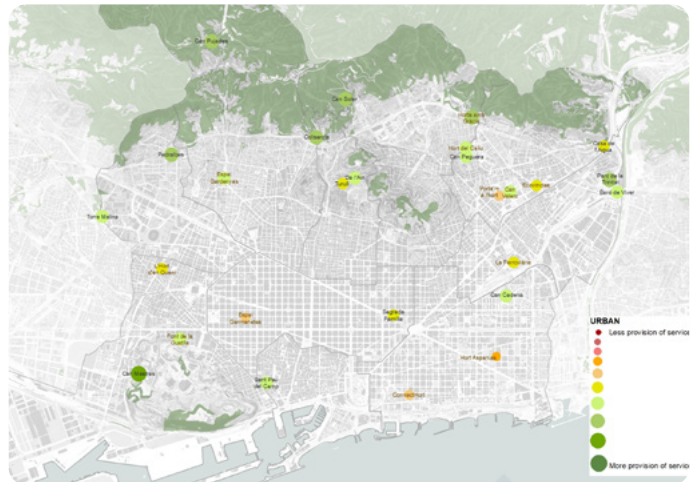
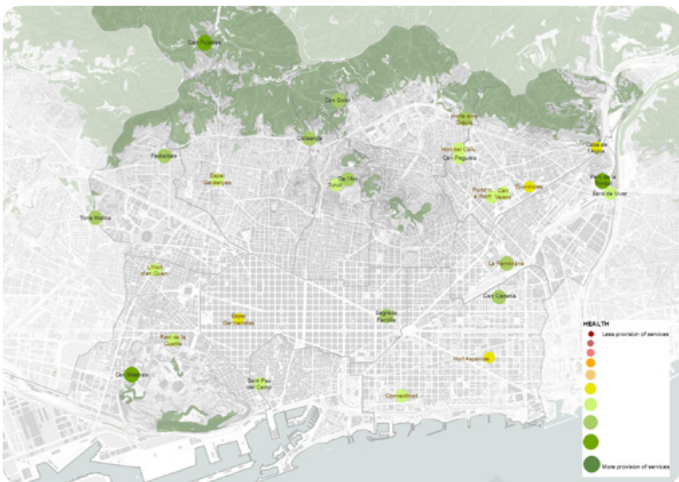
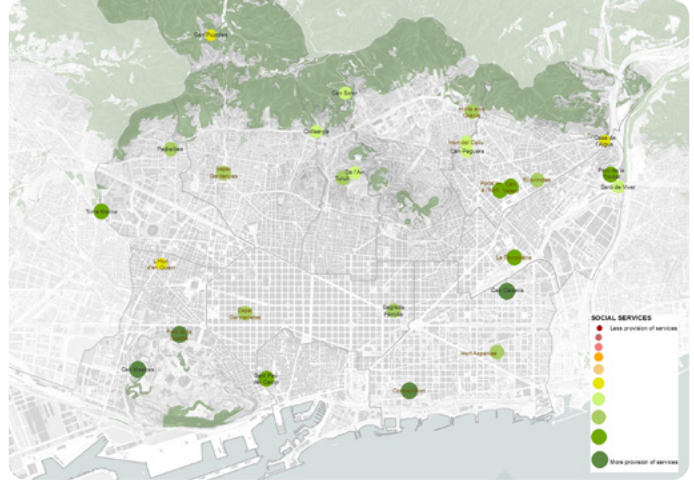
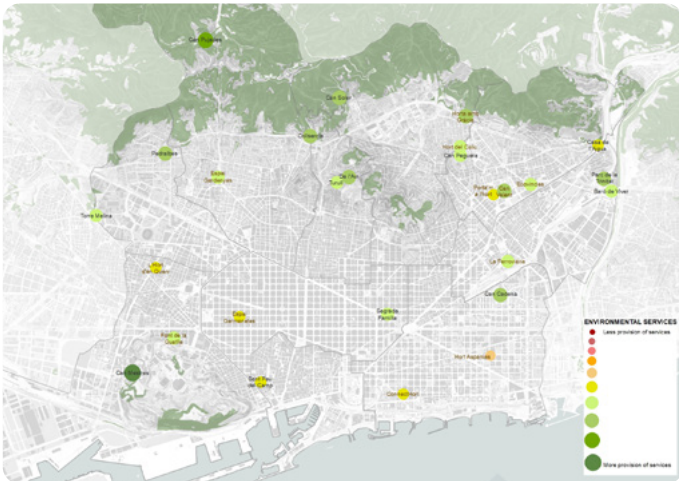
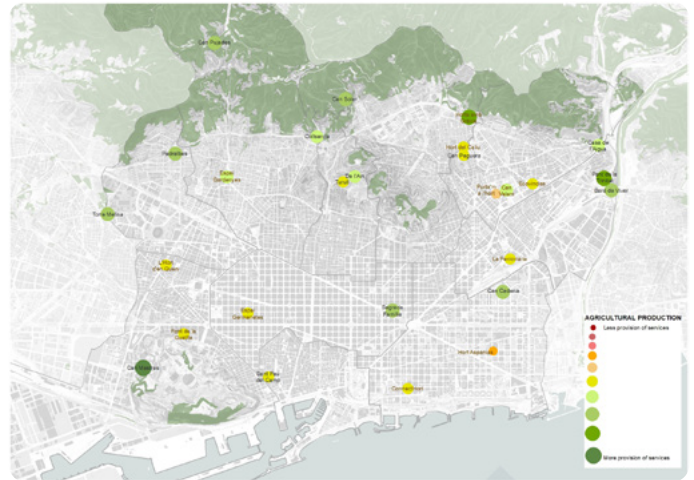
The cultivation of the garden, in many cases, although not in all, is more intended for environmental education, or to the application of therapies with the help of plants. On the contrary, in the municipal allotments it is a more productive motivation, without impairment of other benefits and services such as social interaction, or the health benefits physical and mental health of users.

Type	Name	Food production	Environmental services	Social services	Health	Urban	Services average
Municipal allotments	Masia can Mestres	9.8	9.1	9.5	8.9	8.8	9.0
	Masia Can Cadena	7.4	7.9	9.7	7.9	6.9	8.3
	Parc de la Trinitat	8.7	7.7	8.7	8.2	7.5	7.9
	Pedralbes	7.0	7.9	7.5	7.1	7.8	7.6
	Can Pujades	7.3	8.2	5.5	8.0	7.5	7.4
	Masia Can Soler	7.0	7.6	6.8	7.8	7.2	7.3
	De l'Avi	6.2	7.7	6.8	7.2	6.9	7.3
	Sagrada Família	7.2	7.0	8.0	7.2	5.9	7.2
	Collserola	6.3	7.5	6.6	7.6	7.2	7.2
	Torre Melina	7.6	7.0	8.1	7.1	6.3	7.2
	Turull	5.5	6.4	7.6	6.7	5.9	6.7
	Sant Pau del camp	5.6	5.7	8.4	6.1	6.2	6.4
	Can Pegura	5.9	6.4	6.4	6.3	6.1	6.3
	Baró de Viver	7.3	6.1	6.9	6.1	6.6	6.2
	Casa de l'Agua	6.6	5.5	6.0	5.1	5.9	5.4
"Mans al verd" allotments	Font de la Guatlla	5.4	7.2	9.4	7.0	6.6	7.6
	Can Valent	6.0	7.5	8.6	6.8	6.4	7.5
	Horta amb Gràcia	8.0	7.9	7.1	7.6	7.1	7.5
	La Ferroviària	5.7	6.8	9.0	7.3	5.8	7.4
	Espai Gardenyes	6.1	6.2	7.9	6.8	6.4	7.0
	Connect Hort	5.0	7.0	9.0	6.7	5.3	6.9
	Hort del Caliu	5.6	6.2	6.6	6.6	6.5	6.8
	Porta'm a l'hort	4.3	7.0	8.8	6.1	5.4	6.7
	L'Hort d'en Queni	5.1	6.2	6.4	6.4	5.9	6.5
	Econvincies	5.2	6.5	7.5	5.7	5.8	6.5
	Espai Germanetes	5.7	6.7	7.8	5.8	5.1	6.4
	Hort Av. Montserrat	4.9	6.1	6.1	5.4	5.6	6.4
	Hort Aspanias	3.3	6.9	7.7	5.2	4.1	5.5
	Hort del Centre	2.9	4.5	3.3	4.4	4.5	4.1
	Community allotments	Hort Pla i Armengol	8.5	8.9	8.9	8.5	6.9
Hort Fundació Benallar		8.6	8.7	7.2	8.6	7.3	8.1
Hort de la Font Trobada		7.5	7.8	7.7	7.8	7.4	7.7
Hort Can Masdeu		9.2	7.8	7.5	8.6	6.8	7.6
Hort Colònia Castells		8.2	7.2	8.5	7.2	6.0	7.5
Hort de la Miranda		7.2	7.2	8.3	7.3	6.2	7.4
Hortsec		7.3	7.0	8.0	6.9	7.0	7.2
L'Hort de les Cases		5.6	6.8	8.3	6.8	6.6	7.1
Hort de la Lola		5.5	6.4	8.5	7.0	5.0	7.0
Hort de les Moreres		7.4	6.9	7.8	6.5	6.6	7.0
Hort de la Farigola		6.0	6.8	7.8	6.4	6.5	6.9
Hortet del forat		4.8	6.2	7.3	5.9	5.1	6.4
Hort Can Batlló		6.4	6.2	7.2	5.6	6.2	6.2
L'hort a la Vila		4.5	6.2	5.6	5.8	5.6	6.1
Horts de Desenruna		5.9	5.7	7.2	5.7	5.7	6.0
Hort del Clot		4.8	5.1	8.2	5.1	5.3	5.8
Hort Isabel Vila		5.9	5.7	4.8	5.7	5.1	5.6
Hort de Benet Corner	4.2	4.1	7.9	4.8	4.4	5.1	

In terms of social and cultural services, these are prominent among the benefits of urban allotments, especially in the "Mans al verd" allotments which are more focused on this aspect.

Other services highlighted include social cohesion, environmental education, connection with nature or environmental education considering that the small size of these spaces conditions much of the offering of environmental services, which they can have more of an impact on at a neighborhood scale but not so much on a larger scale.

Health services (benefits for physical health and for mental health, active ageing and connection with nature) have benefits in most urban allotments. The results of the study of socio-environmental services are similar for male and female users, in which a high percentage of people answer positively to the question about whether attending the urban allotment is beneficial for health.



Cultivated biodiversity

The study also counted the number of species grown in each allotment. Data collection has been carried out through a survey of the different users and sites of each urban allotment, asking which species users planted in the last year.

This blog shows the results about the species grown in urban allotments, classified in vegetables, herbs and fruit trees. Among the municipal gardens, the Hort de la "Sagrada Família" (31 vegetables grown) and the "Baró de Viver" allotment (31 vegetables grown), are the municipal allotments where most species of vegetables are cultivated. As for the "Mans al verd» allotments, "Porta'm a l'hort"(34) followed by "Espai Gardenyes" (26) are the ones with the greatest variety of vegetables.

As for herbs, the "Pedralbes" allotment has a greater number of species in the municipal allotments.

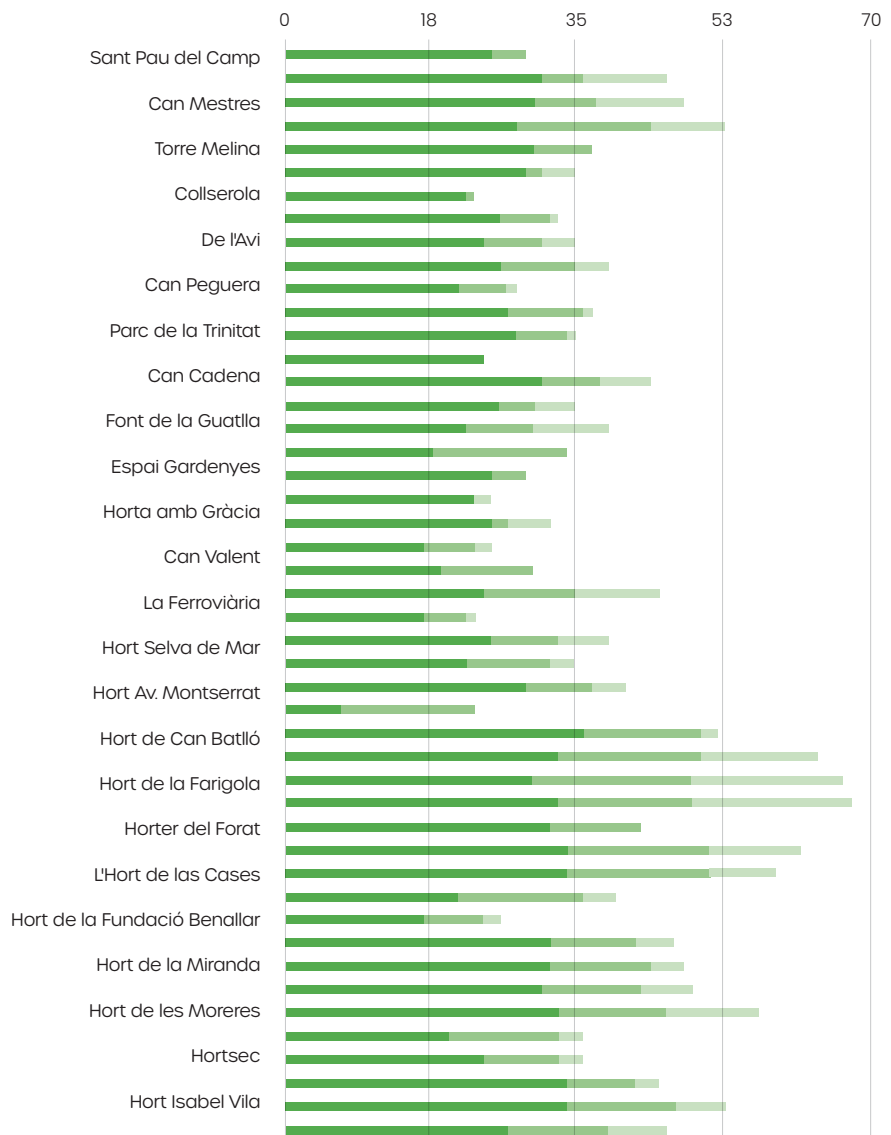
This allotment includes a "garden of the senses", which contains several aromatic herbs (11).

This garden is adapted for people with reduced mobility and for the visually impaired, and includes interpretation panels written in Braille. Another sensory vegetable garden with a similar purpose, is "Queni's" allotment, from "Mans al verd", which has up to sixteen aromatic species, intended for therapeutic purposes and for blind people.

	Municipals	"Mans al verd"	Community
Vegetables	41	39	46
Aromatic plants	27	23	30
Fruit trees	19	19	23
Total	87	81	99

Number of cultivated species

- Vegetables
- Aromatic plants
- Fruit trees



Agricultural production

To understand the agricultural production generated by the Barcelona Urban Allotments, and to co-create knowledge about urban allotments, collaboration was sought with users who were willing to regularly score on a sheet, over a year, the kilograms of vegetables, and aromatic plants that were collected from their allotment. To facilitate this work, a scale was provided to each user where they could weigh the harvested vegetables of their plot. This methodology gives the user who has agreed to collaborate an autonomy in the data collection, so that it is not affected by the availability of the technicians to weigh the products in the allotment. This has helped to engage users in the project. However, the weighing protocol was supervised by technicians with calls or visits to allotments every 2 weeks during harvest time or every month/month and a half during less productive times. Eight volunteers have participated in weighing their harvest over the course of a year.

Production total (kg)	1.497,2
Participants	7
Varieties	26
Period (months)	11
Average production per m2 (kg/m2/month)	0,98

The users, who have participated in the study have collected 1.497 kg of products from 26 different varieties. The average monthly production estimate of the studied urban allotments is 0.98 kg/m²/month vegetable products. From this data and considering the arable surface of the different urban allotments, it is estimated that the network of municipal allotments, "Mans al verd" allotments and community allotments would produce 29.826,6 kg/month, a total of 357.919 kg/year, which would cover the vegetable needs of 5.479 people.

Results summary

Users



19% Female

81% Males

Motivations to attend the urban allotment



- Connection with nature
- Spend time outdoors
- Relate to others people
- Improve physical health
- Know what you eat
- Social transformation (hands on the green)
- Recovery of degraded spaces ("Mans al verd")

Organic agriculture



96% Municipal allotments

100% Community allotments

86% "Mans al verd" allotments

Agricultural production destination (municipal allotments)



99% Self consumption

82% Family

47% Friends and acquaintances

21% Vegetable exchange

Composting



74% Municipal allotments

94% Community allotments

93% "Mans al verd" allotments

Number of species



Municipal allotments

87 species

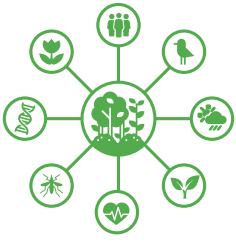
"Mans al verd" allotments

81 species

Community allotments

99 species

Socioenvironmental services



- Food production
- Thermal regulation
- Infiltration and permeability
- Ecological functionality
- Improved air quality
- Carbon retention
- Bonding with nature
- Social
- Active aging
- Environmental education
- Social cohesion
- Physical and mental health benefits

Agricultural production



0,98 Kg/m²/month
Average production



357.919 Kg/year
Total production
47 allotments

Conclusions

The most important conclusion is that the three typologies of urban allotments studied (municipal allotments, “Mans al verd” allotments and community allotments) have quite different characteristics from each other in some aspects, despite all being urban allotments. This happens both in the management model and in the type of plots and the motivations and objectives of the users and the entities. Regarding cultivated biodiversity, results shows that, although by combining all the urban allotments, there is quite a diversity of species (87 species in municipal allotments, 81 in “mans al verd” and 99 in community allotment), **the trend is for a few species to make up the majority of crops** (such as tomatoes, lettuce, aubergines or onions, among others) and many other species are planted in fewer allotments or fewer people cultivated them. In this sense, the increase of this biodiversity should be encouraged, either with the diversification of cultivated varieties of the majority species or encouraging people to grow some of the less cultivated crops or crops that are not currently being cultivated. **To promote cultivated biodiversity, a possible action could be raising awareness about the importance of local or ancestral varieties, and offering training workshops and tools to enable this,** such as a seed bank and seed exchange sessions.

Another important result concerns the percentage of men and women among retired people of the municipal gardens, 81% men and 19% women. Equality and the guarantee of equal opportunities regardless of gender, is an area that the administration needs to work on, enhance and improve. Although it is obvious that equal opportunities are an issue that encompass all of society, **the Urban Agriculture Strategy must take into account the benefits that these spaces have for people in many aspects already described in this work,** and these benefits must be able to be extended to the whole citizenship, regardless of gender. Regarding the production data collected, which has estimated a production of 0.98 kg/ m² per month of agricultural products in the municipal allotments, it is necessary to continue working in this area and expand the sample to more users to gain a more robust estimate. However, the results show how important the production in a urban allotment small plot is. The study has shown that urban allotments can be very different from each other. Apart from being spaces to cultivate, to a greater or lesser extent, urban allotments also support social cohesion, healthy eating habits, improving quality of life and social inclusion, the enhancement of the city's environment or the regeneration of disused urban spaces, among other issues.

The CONEXUS project has helped to boost knowledge about urban allotments in Barcelona. In addition, the Urban Agriculture Observatory website has been created, which serves both as a repository of information on the findings generated and a consultation space for citizens, as well as a space to promote new projects related to urban allotments. It also aids the dissemination and reach of research into urban allotments, as well as improving the management of and encouraging the use of urban allotments, current and future actions are proposed to continue the project:

Knowledge

- Expand the study of agricultural production.
- Expand the study of water. Currently, the scarcity of water makes it necessary to expand knowledge about the use of water: what water do we have in Barcelona, where do we get it, how do we optimize its use according to the type of irrigation, etc. Monitoring of these aspects would be necessary.
- Extend the cartography of the orchards to all the orchards in the city.
- Promote studies to measure the hypothetical absorption of pollutants by parts of the edible portions of plants.

Dissemination

- Publish the results of the study on the website of the Urban Agriculture Observatory.
- Hold feedback sessions on the results obtained in this study to the users of the urban allotments
- Make feedback sessions of the results to the technical staff of the City Council or other departments.

Networking and social justice

- Promote the relationship between urban allotments and with other municipalities through an online platform that can be linked to the Urban Agriculture Observatory.
- Work on gender equality in the network of municipal allotments to get more women users involved.
- Organize knowledge exchange days between urban allotments users.

Promotion of biodiversity and organic production

- Study the biodiversity of urban allotments by going beyond the cultivated biodiversity and studying the fauna groups present (insects, reptiles, etc.) and the ruderal and spontaneous flora.
- Organize sessions to exchange seeds.
- Conduct workshops to popularize the cultivation of local varieties and forgotten edible plants.
- Increase nature-based solutions (SBN), such as insect hotels, aromatic gardens or bat towers, among others.
- Encourage composting in people or groups that do not do it, and increase the composted plant residue in the garden itself.
- Recarbonize the soil, with the contribution of organic matter (compost, green manures or other applications).
- Promote and publicize biological treatments to fight potential pests.

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