Edible Cities Network
Integrating Edible City Solutions
for social, resilient & sustainably productive Cities

BuGG
Bundesverband GebäudeGrün e. V.
Dach-, Fassaden- und Innenraumbegrünung

EdiCitNet Global Lunch Talks
Building-Integrated Agriculture

This Project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 7776665.

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Who and what is BuGG?

Founded on: 17.05.2018
Headquarter: Berlin
Office: Saarbrücken
Members: approx. 400
Industry: roof greening, facade greening and interior greening

Inform and educate

- Brochures, technical information, symposia, ...
- www.gebaeudegruen.info

Networking

- "Network Manager" for cities and universities, bringing together industry, planners and cities.
- Members: Industry (roof, facade, interior), planners, contractors, cities, universities, etc.

Promote and research

- Support in research projects

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Who and what is BuGG?

BuGG-Team 2021

Felix Mollenhauer

M.Sc. land use planning

Focus on construction technology for green roofs and facades

Participant in EdiCitNet

Rebecca Gohlke

M.Sc. Landscape architecture

Focus on municipal funding instruments for green roofs and facades

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Who and what is BuGG?

Holistic sustainability. With roof, facade and interior greening!





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Who and what is BuGG?

Schematic of a green roof

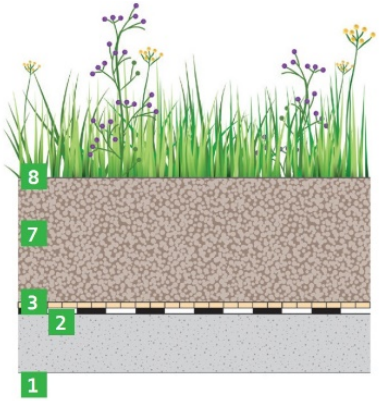

Fig. 13: Schematic representation of a single-layer green roof.
Source: BuGG

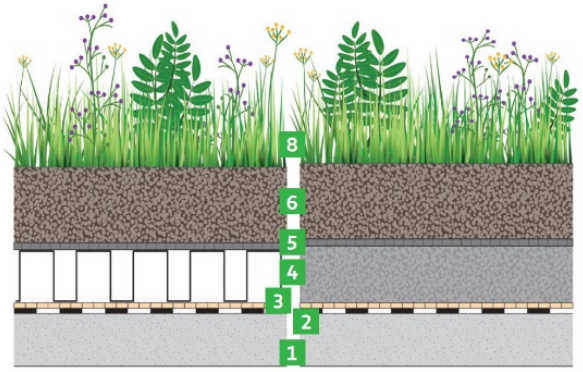

Fig. 14: Schematic representation of a multi-layer green roof.
Source: BuGG

1 Suitable roof substructure
Sufficient load-bearing capacity, suitable thermal insulation if necessary.

2 Roof waterproofing or root protection membrane
Root resistant according to FLL or DIN EN 13948 protection against water and roots.

3 Protective layer
Protective layer of fleeces, rubber granulate mats, etc., to protect the roof waterproofing from mechanical damage.

4 Drainage
Storage of rainwater and drainage of excess water to drainage facilities. The drainage can consist of plastics („solid drainage") or bulk materials such as lava („bulk drainage").

5 Filter fleece
Synthetic fleeces that separate the drainage from the vegetation base layer and prevent fine particles from being washed into the drainage.

6 Multi-layer substrate
Vegetation support layer; special, technically produced substrate according to the characteristic parameters of the FLL Green Roof Guideline for multi-layer construction.

7 Single-layer substrate
Vegetation support layer and drainage layer; special, technically produced substrate according to the characteristic values of the FLL Green Roof Guideline for single-layer construction.

8 Vegetation
Plant species adapted to the special habitat and proven over many years.

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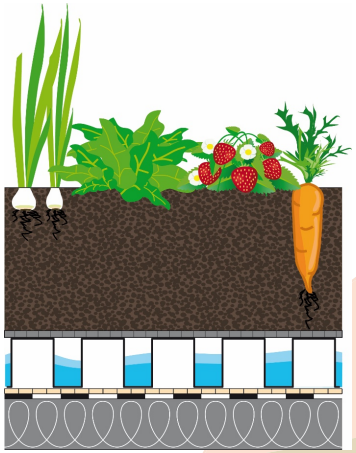
Who and what is BuGG?

Green roof + edible plants = Urban Farming Roof

green roof type:	intensive
roof slope:	0 – 5°
plants:	Fruit, vegetables, lettuce, kitchen herbs, etc.
heigh:	from 25 cm
weight:	from 300 kg/m²
maintenance:	high



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Who and what is BuGG?

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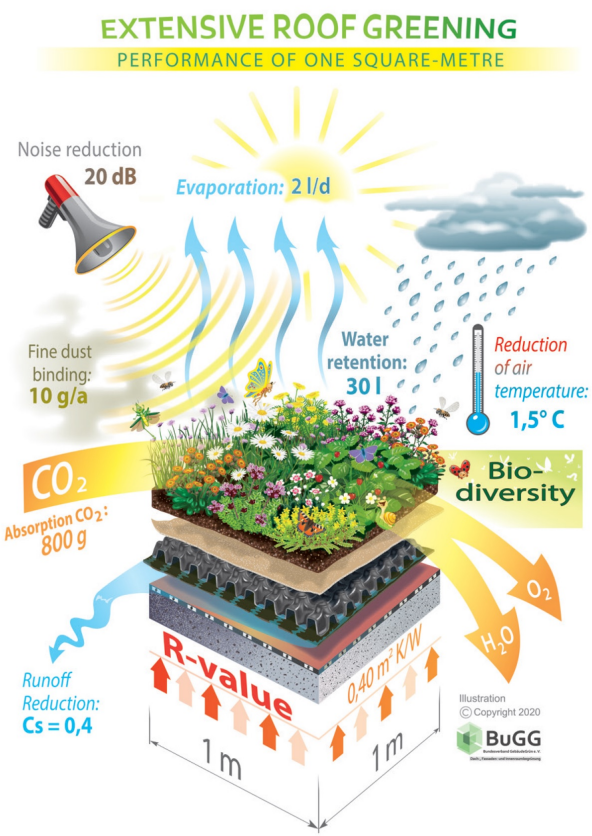
Edible green roofs and green walls as part of nature-based ECS



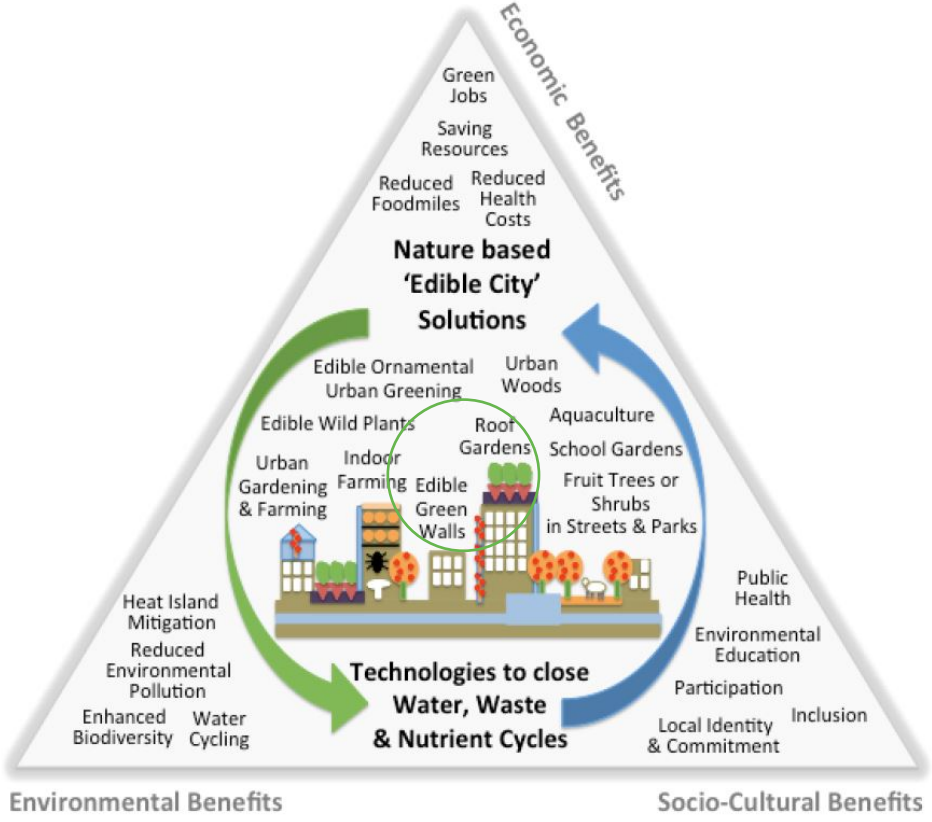


Figure 2. Examples for nature-based ECS and benefits.

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2. How can cities push ECS? Opportunities in Germany

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Which urban planning tools can cities use to push ECS?

Promotion tools for building greening in Germany

Public relations work

Indirect	Direct
request	subsidies
▪ Informal planning ▪ Stipulation in local development plans ▪ Design statutes	▪ Financial funding programmes

Differences in terms of scope of action, binding character and financial outlay for the city

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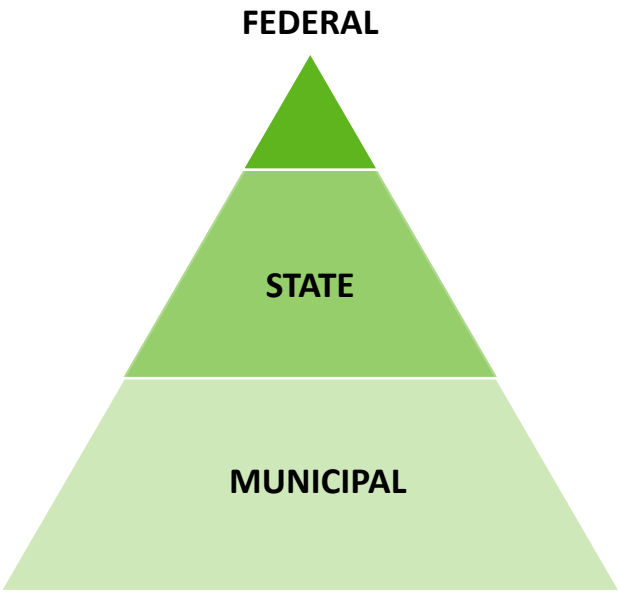
Which urban planning tools can cities use to push ECS?

Financial funding programmes



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Which urban planning tools can cities use to push ECS?

Financial funding programmes - municipal level

- Voluntary service of a municipality
- Financing from the municipality's own budget or in conjunction with state and federal funds.
- Offer a financial incentive for citizens to voluntarily implement green roofs and facades.
- Enables funding of building greening in areas with a high need for action or when other instruments are not effective.

Website funding programme City of Düsseldorf 2021

- low binding nature
- high scope of action
- high financial outlay for the city

Concerns new construction and existing buildings

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Financial funding programmes

Goals of a funding programme for green roofs and facades

Reduction of heat load and increase of cooling capacity in summer

Creation of new habitats for flora and fauna (urban stepping stone biotopes)

Expansion of green spaces close to housing and increasing the attractiveness of the residential environment

Relieving the burden on municipal drainage facilities through rainwater retention and strengthening infiltration and evaporation

Improving air quality by binding dust and pollutants

Including ECS?

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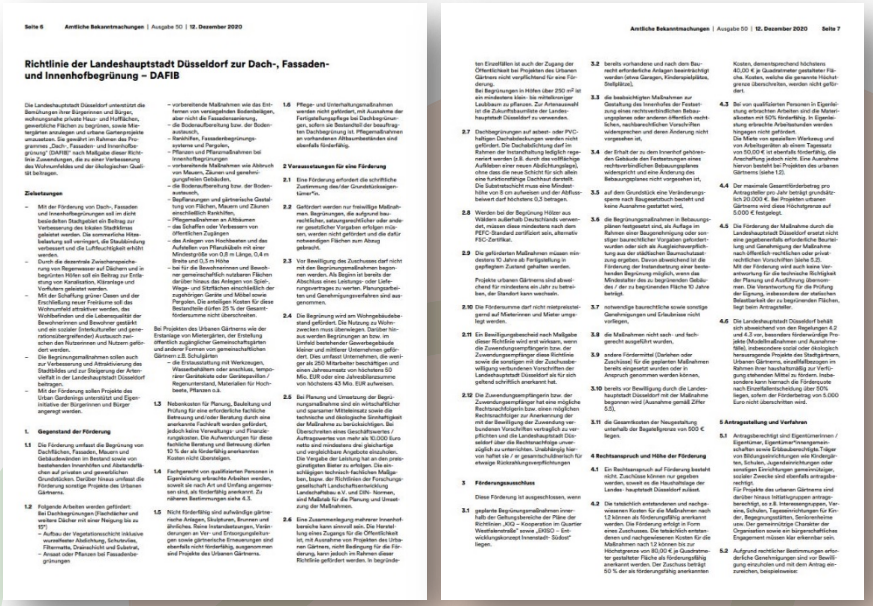
Financial funding programmes

Programme “Green Roofs, Facades and Courtyards (DAFIB)” City of Düsseldorf 2021

Funding example that integrates ECS

“In **urban gardening projects** such as the initial establishment of tenant gardens, the creation of publicly accessible community gardens and other forms of community gardening e.g. school gardens

– Initial equipment with tools, water containers or connections, temporary equipment box or equipment pavilion / rain shelter, materials for raised beds, plants or similar.”



Richtlinie der Landeshauptstadt Düsseldorf zur Dach-, Fassaden- und Innenhofbegrünung – DAFIB

Funding guideline City of Düsseldorf 2021

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Financial funding programmes

Hamburg Prize for Building Greening (BUE 2017)

Preisträger

Wohnen

Demenzgarten KerVita Senioren-Zentrum ‚Am Inselpark' 31

Objekttyp:	**Dachbegrünung (intensiv)**
Nutzung:	**Wohnen, gemeinschaftlich**
Fläche:	**410 m²**
Baujahr:	**2011-2013**
Standort:	Neuenfelder Str. 33a, Hamburg Wilhelmsburg
Bauherr:	KerVita Willhelmsburg GmbH & Co KG
Planung:	Feddersen Architekten, schoppe + partner freiraumplanung
Ausführung:	Osbahr GmbH

Während der Internationalen Bauausstellung IBA Hamburg entstand das Senioren-Zentrum ‚Am Inselpark'. Hier wurde oberhalb des 4. Geschosses ein besonderer Ort, ein Dachgarten, geschaffen, der als Demenzgarten gestaltet wurde. Pflegebedürftige Hausbewohnende finden einen Raum im Freien, an dem sie ihre Sinnen bewusst erleben oder einfach nur entspannen können. Der Dachgarten überzeugt das Preisgericht, da er die räumlich benachteiligte Lage eines Daches in einen klaren Vorteil umwandelt: Den demenzkranken Bewohnerinnen und Bewohnern bietet er einen geschützten und gut nutzbaren Freiraum mitten in der Stadt. Der Dachgarten kombiniert vorbildlich Dachbegrünung mit gesundheitlichen Aspekten. Das Projekt zeigt einen neuen Freiraumtypus für Hamburg auf. Die vielfältige Pflanzenverwendung, die Errichtung von nutzbaren Hochbeeten und die Aufenthaltsnischen ermöglichen den Nutzenden gemeinschaftliches Beisammensein und gärtnerische Betätigung. Der Dachgarten beeindruckt durch sein starkes Konzept, das soziale, ökologische und funktionale Ansprüche vorbildlich vereint.

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Which urban planning tools can cities use to push ECS?

BuGG Urban Dialogue for Building Greening 2021 - 2023

Von der Deutschen Bundesstiftung Umwelt unter dem Az 35148/01 gefördertes Projekt

Mit freundlicher Unterstützung

Goals

- Basic knowledge on green roofs and facades and the legal framework
- Support communication between experienced and inexperienced cities
- Development of best practice examples and working aids for the various instruments

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Which urban planning tools can cities use to push ECS?

BuGG Market Report Building Greening 2021

- Current figures on the green building market from surveys and research 2021
- Evaluation of the BuGG city surveys on direct and indirect promotion of green roofs and facades
- Development of the individual promotion tools since 2010
- Overview of all cities > 50,000 inhabitants on promotion tools
- Detailed tables on cities with financial funding programmes for green roofs and facades

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Financial funding programmes

BuGG City Survey 2010 – 2019 (2020)

	FBB-NABU Umfrage 2010	FBB-NABU Umfrage 2012	FBB-NABU Umfrage 2014	FBB-NABU Umfrage 2016/2017	BuGG Umfrage 2019	BuGG Umfrage 2019 + Recherche 2019/2020
Anzahl der angeschriebenen Städte	1.499 (>10.000 EW)	1.499 (>10.000 EW)	1.499 (>10.000 EW)	1.499 (>10.000 EW)	700 (>20.000 EW)	191 (>50.000 EW)
Anzahl der Rückläufe (= n)	579 (39 %)	564 (38 %)	510 (34 %)	400 (27 %)	199 (28 %)	
Dachbegrünung						
Direkte Zuschüsse (Förderprogramm)	36 (6 %)	32 (6 %)	31 (6 %)	32 (8 %)	37 (19 %)	49 (26 %)
Gebührenreduktion bei GAbwG	221 (38 %)	276 (49 %)	270 (53 %)	217 (54 %)	98 (49 %)	137 (72 %)
Festsetzung in B-Plänen	198 (34 %)	208 (37 %)	202 (39 %)	213 (53 %)	133 (67 %)	140 (73 %)
Ökopunkte	50 (9 %)	59 (11 %)	55 (11 %)	50 (13 %)	42 (21 %)	45 (24 %)
Fassadenbegrünung						
Direkte Zuschüsse (Förderprogramm)	32 (6 %)	30 (5 %)	25 (5 %)	28 (7 %)	34 (17 %)	45 (24 %)
Festsetzung in B-Plänen	188 (32 %)	187 (33 %)	172 (34 %)	135 (34 %)	89 (45 %)	78 (41 %)

Approx. **26 %** of cities in Germany with more than 50,000 inhabitants offer financial funding for **green roofs**

Approx. **24 %** of cities in Germany with more than 50,000 inhabitants offer financial funding for **green facades**

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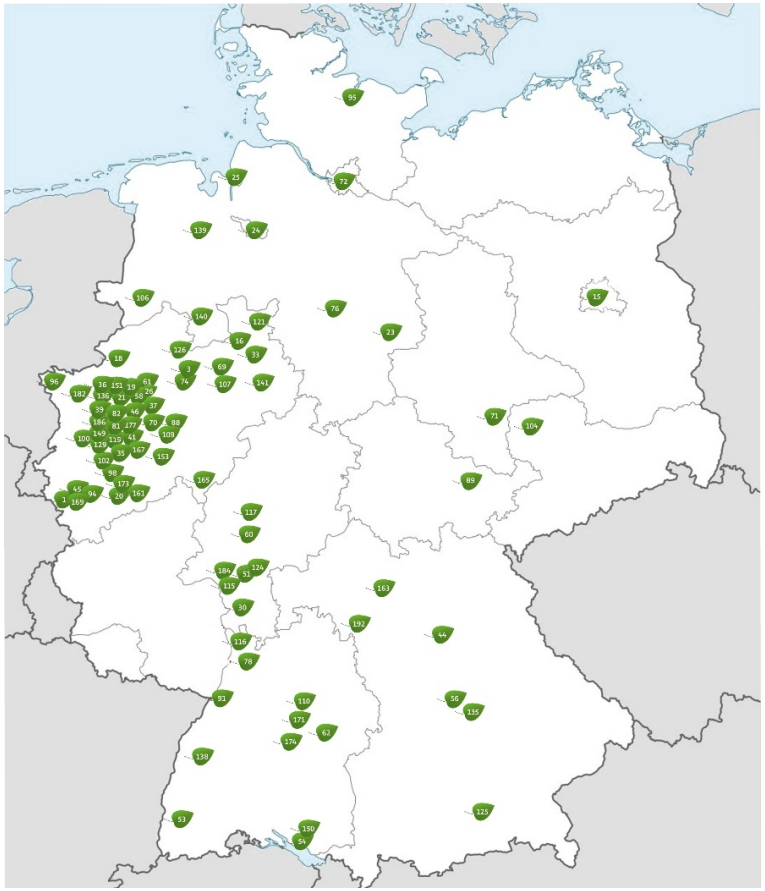
Financial funding programmes

Map of cities in germany offering financial funding



- 106 cities with funding programmes for green roofs
- 81 cities with funding programme for facade greening
- New funding programmes based on special programme "Climate resilience in municipalities" from state NRW

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Financial funding programmes

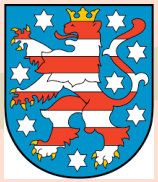
Financial funding programme – state level

- First states launch funding programmes for municipalities
- Focus on the urban climatic effect of building greening
- Investment projects for building greening only one of many eligible measures

NRW

Hessen

Thüringen



Niedersachsen

Target groups for funding

Focus on municipalities (partly also for public institutions, associations/ societies, companies, educational and research institutions)

→ Support for financially weak municipalities

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Financial funding programmes

Financial funding programme – federal level

- goals of different funding programmes:
  - Climate protection and adaptation,
  - Energetic building refurbishment
  - Increasing sustainability

- Urban development funding:
  - vibrant centres
  - social cohesion
  - Growth and sustainable renewal

- Broad terms offer multiple opportunities to fund building greening and ECS

- Funding of many model projects

- Target groups very different

Urban development funding: Model Project Socially Integrative City Strategy (BMI 2021)

Financial support for nationwide tasks

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3. International Best-Practices: Copenhagen, Paris, Singapore

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International Best-Practice

Copenhagen – from informal to formal planning

- Pioneer in the areas of municipal rainwater management and flood prevention
- 2012: **“Cloudburst Management Plan”** in response to severe damage caused by heavy rainfall events in previous years, includes a catalogue of measures e. g. building greening
- The city has stipulated the greening of flat roofs with a roof pitch of less than 30 ° in most new development plans since 2010
- Green roofs have also been integrated into the guidelines for sustainability in construction, so that a green roof is mandatory for municipal buildings.

The following projects have already been implemented since the intensive promotion of green roofs:

- Amager Bakke (CopenHill)
- SUND Nature Park / Mærsk Tower
- Public roofscape: The City Dune, The New National Archives, TCC-Hotel
- Park `n` Play

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International Best-Practice

Paris – Joined forces und funding

- Pioneer in urban agriculture. Goals: CO2 reduction, production, social cohesion, healthy food, new jobs
- 2016: the charter **"Objective 100 hectares"** was launched. Various public organisations, Parisian businesses and the city administration have joined forces for the project and signed the charter (today over 80 partners).
- In the same year, the city of Paris set up the **"Parisculteurs programme"** to support the installation of agricultural projects in urban spaces.
- To date, more than **50 projects** with approximately **30 ha** of urban farmland have been realized.

The following projects were realised within the framework of the "Parisculteurs programme":

- Lions Court Grammar School
- Les Permaculteurs de la Chapelle
- Headquarters of the Régie Immobilière
- Georges Rigal Gym and Swimming Pool

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International Best-Practice

Singapore – Vision and funding

- Pioneer in intensive forms of building greening
- Singapore is one of the most densely populated countries in the world today. Almost 6 million people live on an area of about 700 km². High-rise buildings are being erected in many places.
- Guiding principle of urban development: **“City in a garden”**
- 2009: **“Skyrise Greenery Incentive Scheme” (SGIS)** Goals: To reduce negative impact on environment, To gain new open spaces, To create a total of 50 ha of green space at high-rise buildings by 2030.
- SGIS subsidies for developers up to 50 % of the installation costs

With the support programme, **110 buildings** have already been greened:

- Extensive green roofs
- Recreational roofs (intensive green roofs)
- Edible roof gardens
- green balconies
- Public roofscapes on multi-storey car parks
- Large scale green facades

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4. What can we do to implement more building-integrated agriculture?

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What can you do to implement more building-integrated agriculture?

As a municipality/city

- Develop a strategy/ informal plan
- Cooperate with associations such as BuGG and communicate with other cities
- If available, use funding programs from state or federal level
- Revise guidelines for municipal buildings and integrate building-integrated agriculture (role model)
- Offer direct funding for companies and citizens to implement building-integrated agriculture in existing buildings
- Work with developer and advise building-integrated agriculture in new development areas
- Raise awareness through public relations work

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What can you do to implement more building-integrated agriculture?

As a company or private person

- Research direct funding opportunities.
- Contact the municipality / city and ask for support.
- As private person ask the owner first!
- Contact companies that can implement such a project (ask for quotations).
- Provide them information on whether it is a new building or an existing building (different needs for greening)
- clarify questions about statics, accessibility, light conditions, irrigation, care and maintenance, logistic etc.
- Cost analysis for implementation and annual maintenance

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Examples of building-integrated agriculture in Germany

Rooftop Beekeeping

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Examples of building-integrated agriculture in Germany

Raised beds and greenhouses

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Examples of building-integrated agriculture in Germany

Company garden

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