C40 CITIES

photo credit: PlayCore

COOLING SCHOOLS

EXPERIENCES FROM C40'S COOL CITIES NETWORK

HOW TO ADAPT SCHOOLS TO RISING URBAN TEMPERATURES

C40 KNOWLEDGE

INTRODUCTION

Schools play a key role in urban life - they are not only places of education and socialising for children, but also act as neighbourhood hubs. As cities are increasingly facing the impacts of climate change, also urban-heat-islands are becoming more intense. To protect children from extreme heat, cities around the world are starting projects to adapt their schools to rising temperatures and implement awareness rising projects as well as cooling and greening measures of schoolyards and -buildings. This report showcases examples of six member cities of C40's Cool Cities Network - **Accra, Barcelona, London, Madrid, Paris and Rio de Janeiro.**

6 reasons to start a cooling schools project in your city:

1. Children are **particularly vulnerable** to extreme heat.

2. Cooling the **indoors of school buildings** – ideally with passive design, shading and natural ventilation features – increases the thermal comfort and creates a better learning environment.

3. Creating **schoolyards** with enough shaded areas encourages children to play outside and increases physical activity in breaks.

4. Using schools as community hubs can bring **heat-awareness** to homes and parents.

5. Schools are often owned by the municipality and can function as **demonstration projects** of cooling features on buildings (green roofs/ walls, shading, water features etc.) that can be distributed throughout the city/neighborhoods.

6. Schools can even act as '**cool islands**' (cooling centres) that can be opened to the public on weekends in heatwaves periods.

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RECOMMENDATIONS

These recommendations have been collected from the cities featured in this report:

- Prioritise schools that are **located in particular heat vulnerable areas** in your city.
- **Departmental coordination**: ensure close collaboration between Education, Environment, Health and other municipal or regional/ national departments for successful planning and implementation of schools' climate adaptation projects.
- **Maintenance responsibilities:** Secure funding and assign clear roles & responsibilities to professional maintenance partners in order to keep green infrastructure in schoolyards alive.
- **Involve whole school community** - from students, teachers, parents, neighbours, school staff - in the design and implementation of the projects to best meet the needs of each stakeholder.
- **Incorporate passive cooling for school buildings**, like shading, cool roofs, wind circulation, green roofs/walls in order to save energy.
- **Promote nature-based solutions** as they are transversal and generate multi-benefits - such as social cohesion, heat reduction, rainwater regulation, students' wellbeing, cognitive and social development etc.
- **Favour low tech, local and natural materials** for schoolyard designs, like wood, grass, sand woodchips, reemployed materials etc.
- **Find opportunities to piggyback** onto already planned school upgrade and funding opportunities to include climate adaptation criteria.
- **Start with pilot projects** that can then be scaled up across schools city-wide.

photo credit: GettyImages-1288133

ACCRA

FRUIT TREE PLANTING

Accra is facing increasingly hotter temperatures and started a programme to plant fruit trees at local schools with the aim of increasing greenery and shade and also awareness amongst students.
The Department of Agriculture at the Accra Metropolitan Assembly, under the Planting for Export and Rural Development (PERD) programme, collaborated with the Resilience and Sustainability unit of the Assembly in carrying out the project by supplying and monitoring fruit tree crops (Coconut seedlings). Monitoring was done by the department to ascertain the level of growth of the seedlings supplied. The department identified other schools that can also benefit from the fruit tree crops during the monitoring. Between 2018 and end of 2019 a total of about 200 coconut seedling had been distributed to about 15 schools. The department intends to extend this program to other schools and houses in 2020.

Images: Accra Municipality

Further info:
https://ama.gov.gh/news-details.php?n=NXE2NjU0NXJycTQwNXM1Nzl2cjdwNDZzNHA2MDM3bm40cjEwbjZucQ==

BARCELONA

OVERVIEW

Barcelona has refurbished 11 schools through a package of **blue measures** (incorporating water points), **green measures** (spaces for shade and vegetation) and **grey measures** (works on buildings to improve insulation). To select schools, the City ran an open application process and evaluated the schools based on 1) heat impact, 2) special distribution in city, 3) energy behaviour of buildings, and 4) characteristics of playgrounds. School pupils and citizens alike are able to enjoy these improvements, as school playgrounds will remain open throughout the summer. The project also has a teaching element to it, as children are taking part in designing climate solutions and evaluating the measures taken. In parallel, various research centres scientifically assess the results of measures taken in terms of health and climate comfort.

KEY PRINCIPLES

- Schools funcioning as climate shelters that are open to the public on weekends and evenings in case of heatwave emergency.
- Passive architecture in buildings and playgrounds that always incorporate vegetation and water.
- Participatory process with kids, teachers, parents, school staff, neighbourhood.
- Establishing processes for the naturalization of schoolyards, recovering paved land and new tree plantations.

PARTNERS

The project partners include Barcelona City Council and municipal entities: Urban Ecology Area, Social Rights Area, Barcelona Public Health Agency (ASPB), Barcelona Water Cycle, Energy Agency (BCASA); the Barcelona Education Consortium; the UAB Institute for Environmental Science and Technology (ICTA-UAB); Barcelona Institute for Global Health (IS Global); and the school community.

FUNDING

The City has received funding from Urban Innovation Action (UIA), a European Commission programme as part of the 'Adapting schools to climate change through green, blue and grey', project. The Barcelona project has received an ERDF subsidy for €4 million (more than €1 million contributed by the city) and a commitment has been made to carry it out from 2018 to 2022.

CHALLENGES

- Improving the climatic comfort of school facilities.
- Creation of pilot projects for climate shelters in public schools.
- Using passive architecture by introducing nature and water to all schools.
- Opening new spaces to citizens in days of emergency due to extreme heat.

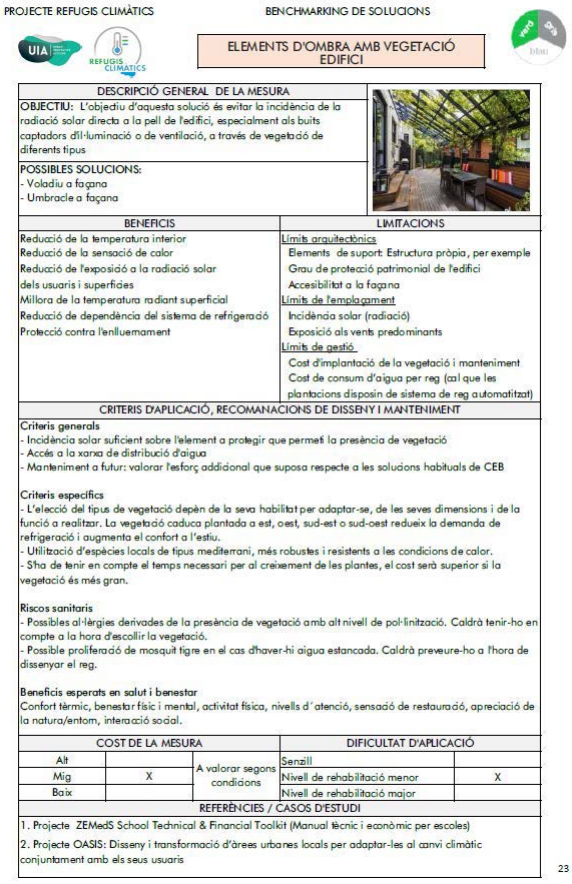
FURTHER INFO

- https://www.barcelona.cat/barcelona-pel-clima/en/climate-shelters-schools
- https://www.barcelona.cat/barcelonasostenible/ca/escoles-sostenibles




Images: Barcelona Municipality

Barcelona's Catalogue of Cooling Solutions



PROJECTE REFUGIS CLIMÀTICS BENCHMARKING DE SOLUCIONS

ELEMENTS D'OMBRA AMB VEGETACIÓ EDIFICI

DESCRIPCIÓ GENERAL DE LA MESURA
OBJECTIU: L'objectiu d'aquesta solució és evitar la incidència de la radiació solar directa a la pell de l'edifici, especialment als buits captadors d'il·luminació o de ventilació, a través de vegetació de diferents tipus
POSSIBLES SOLUCIONS: - Voladiu a façana - Umbracle a façana

BENEFICIS	LIMITACIONS
Reducció de la temperatura interior Reducció de la sensació de calor Reducció de l'exposició a la radiació solar dels usuaris i superfícies Millora de la temperatura radiant superficial Reducció de dependència del sistema de refrigeració Protecció contra l'enlluernament	Límits arquitectònics Elements de suport: Estructura pròpia, per exemple Grau de protecció patrimonial de l'edifici Accessibilitat a la façana Límits de l'emplaçament Incidència solar (radiació) Exposició als vents predominants Límits de gestió Cost d'implantació de la vegetació i manteniment Cost de consum d'aigua per reg (cal que les plantacions disposin de sistema de reg automatitzat)

CRITERIS D'APLICACIÓ, RECOMANACIONS DE DISSENY I MANTENIMENT

Criteris generals
- Incidència solar suficient sobre l'element a protegir que permeti la presència de vegetació
- Accés a la xarxa de distribució d'aigua
- Manteniment a futur: valorar l'esforç addicional que suposa respecte a les solucions habituals de CEB

Criteris específics
- L'elecció del tipus de vegetació depèn de la seva habilitat per adaptar-se, de les seves dimensions i de la funció a realitzar. La vegetació caduca plantada a est, oest, sud-est o sud-oest redueix la demanda de refrigeració i augmenta el confort a l'estiu.
- Utilització d'espècies locals de tipus mediterrani, més robustes i resistents a les condicions de calor.
- S'ha de tenir en compte el temps necessari per al creixement de les plantes, el cost serà superior si la vegetació és més gran.

Riscos sanitaris
- Possibles al·lèrgies derivades de la presència de vegetació amb alt nivell de pol·linització. Caldrà tenir-ho en compte a la hora d'escollir la vegetació.
- Possible proliferació de mosquit tigre en el cas d'haver-hi aigua estancada. Caldrà preveure-ho a l'hora de dissenyar el reg.

Beneficis esperats en salut i benestar
Confort tèrmic, benestar físic i mental, activitat física, nivells d´atenció, sensació de restauració, apreciació de la natura/entorn, interacció social.

COST DE LA MESURA			DIFICULTAT D'APLICACIÓ	
Alt		A valorar segons condicions	Senzill	
Mig	X		Nivell de rehabilitació menor	X
Baix			Nivell de rehabilitació major	

REFERÈNCIES / CASOS D'ESTUDI

1. Projecte ZEMedS School Technical & Financial Toolkit (Manual tècnic i econòmic per escoles)
2. Projecte OASIS: Disseny i transformació d'àrees urbanes locals per adaptar-les al canvi climàtic conjuntament amb els seus usuaris

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PROJECTE REFUGIS CLIMÀTICS BENCHMARKING DE SOLUCIONS

FONT D'AIGUA MULTIFUNCIÓ

Fonts multifunció

Font inclosa al catàleg del CEB que es pot combinar amb d'altres actuacions

Font d'aigua instalada a Paris. A part de la funció de font de beure, té punts per acoplar mànegues o altres accessoris.

Font multifunció instal·lada a Paris (15e arrondissement) per beure, refrescar l'ambient amb els dolls d'aigua i refrescar el terra.

Concurs d'innovació a Paris (2018-2019) per a la instal·lació de fonts multifunció (beure i nebulització) https://www.defis.eaudeparis.fr/defi-

Projecte co-finançat amb fons europeus FEDER en el marc de la 3ª convocatòria UIA

02

Catalogue of Cooling Solutions
(in Catalan) --> **LINK**

Examples:
GREEN - Nature
on: patches, gardens, roof, facade and partitions
- trees
- meadows and natural vegetation
- orchards

BLUE - Water
- water pressure points
- drinking water foutains
- leisure elements: fountains, sprinklers
- tanks - rainwater collection cisterns

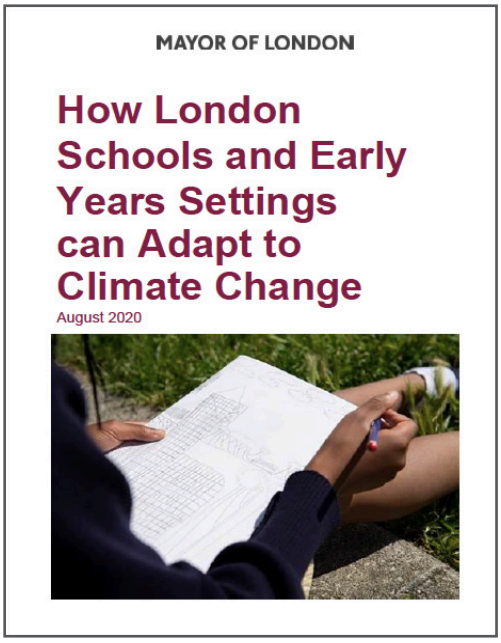
GRAY - Archtecture
- energy generation: photovoltaic panels, solar thermal panels and mini wind
- insulation on roofs and facades
- sun protection: curtains, blinds, sunbeds, porches, pergolas
- cool roofs

LONDON

OVERVIEW

The Mayor of London's Environment Strategy seeks to build resilience to climate impacts for people and environments throughout the city. The Greater London Authority therefore developed a guidance report on "How London Schools and Early Years Settings can Adapt to Climate Change". This guidance report provides accessible information to school and academy trust leaders, governors, business managers, teachers and other decision-makers.

Measures have been broken down into physical measures, operational changes, and learning and awareness-raising opportunities. This Guidance focuses on measures to adapt schools to increased heat risk, flood risk and water scarcity, which are the three highest priority risk areas identified in the UK Government Climate Change Risk Assessments over the past decade, and those that threaten London most directly.



KEY PRINCIPLES

An important first step in preparing a school for the impacts of climate change is to develop a climate adaptation plan and assign the roles and tasks necessary for its delivery. The Guidance Document describes six steps towards a clear School Climate Adaptation Plan:

- Understanding the risks and setting priorities (section 4)
- Preparing your school for climate change (section 5)
- Responding to and recovering from severe weather events (section 6)
- Learning and awareness raising (section 7)
- Delivery and funding (section 8)
- Monitoring and evaluation (section 9)

The Appendix A of the Document includes an Adaptation checklist designed to help the schools focus in on the climate adaptation measures that are most appropriate, and to begin to plan how to implement these measures.

PARTNERS

The guidance draws on stakeholder consultation with several state-funded London schools and Early Years Settings, that were selected to represent the diversity of London's school types, considering factors such as local green space, heat and flood risks.

CHALLENGES

Funding is likely to be a major challenge for many schools and may be the deciding factor about whether any adaptation measure is viable or not. A clear understanding of both capital and operational costs (i.e. "whole life costing") will be needed to support any decision. It is important to note, however, that in some cases adaptation measures may come at no additional cost to existing school maintenance regimes and could be absorbed by existing school budgets. This applies particularly to operational and behavioural measures which simply require a change to normal practices, but it may also be relevant to buildings and grounds measures.

In addition, due to national lockdown measures during the Covid-19 pandemic, only a reduced number of schools and Early Years settings could have been engaged when developing this Guidance Report.

Further info:
https://www.london.gov.uk/WHAT-WE-DO/environment/environment-publications/how-schools-and-early-years-settings-can-adapt-climate-change

LONDON

"HOW LONDON SCHOOLS AND EARLY YEARS SETTINGS CAN ADAPT TO CLIMATE CHANGE" - EXAMPLE PAGES

Table 2: Adaptation measures for school buildings

Adaptation measure	Risk(s) addressed	Affordability	Impact	Wider benefits	Wider benefits & key considerations	
Shade structures In addition to or instead of planting trees, free-standing structures intercept sunlight and can significantly reduce heat risk in buildings and grounds.		● ● ●	● ● ○	○ ○ ○	Cheaper than mechanical cooling. When used to cool buildings, shade structures require careful design to ensure good quality daylight and ventilation is maintained according to Department for Education specifications. Movable options are available that allow for flexible operation, though at a higher cost.	
Filter drain A stone-filled trench that collects runoff from hard surfaces to clean it and drain it to the ground. The runoff rate is reduced, and runoff storage is also provided. Filter drains can include a perforated pipe to slow the flow and enable runoff to soak into the ground.		● ● ○	● ● ○	○ ○ ○	Reduces pollution to groundwater from surface runoff.	
Permeable hard surfaces Replacing tarmac and other impermeable surfaces with permeable paving alternatives (e.g. grasscrete or permeable tarmac) allows rainwater to infiltrate through the surface, and be temporarily stored, transported or discharged, whilst being able to support people and vehicles. These permeable surfaces can be designed for a range of purposes, e.g. play areas, Multi Use Games Areas, parking areas etc.		● ○ ○	● ● ○	● ○ ○	Filters impurities from runoff. Multi-use surface. Note depending on the intended use, these surfaces will carry differing space requirements.	
Green surfaces If replacing hard impermeable surfaces, consider whether these can be planted (i.e. using hard-wearing grasses) as this will deliver wider cooling (and other) benefits.		● ○ ○	● ● ○	● ● ○	Filters impurities from runoff. Provides a habitat for wildlife, such as insects.	

Table 3: Climate change educational resources.

Heat risk		
Session plan – Hot hot hot		**British Red Cross**
Key stage(s): 3 – 4 **Subject(s):** PHSE **Resource type:** Session plan	**Overview** Go to resource This session plan helps to prepare pupils to build resilience by discussing potential scenarios that could cause harm during a heatwave and encouraging them to think about decisions to take to protect themselves.	
Flood risk		
Flood Aware Schools Pack		**Defra and Northamptonshire County Council**
Key stage(s): 2 **Subject(s):** Science, Geography **Resource type:** Curriculum-linked teachers' notes, PowerPoint presentations, pupil resource sheets, interactive 'flood scenario'	**Overview** Go to resource This pack includes a range of resources to guide lessons covering four key themes: • What makes the rain fall? – the water cycle, weather and measurement • Finding out about the weather – how to find information from various sources • Being prepared – precautions that any household (or school) can take to reduce risks and impacts of natural disasters • Dealing with emergencies – including teamwork, decision-making and proportional response	

Table 4: Example school roles and responsibilities

Stakeholder	Example roles and responsibilities
Headteacher	Ownership and leadership of the adaptation, response and recovery plans, ensuring that plans are kept up to date, that delegated task leaders are fully enabled to deliver on their responsibilities, and that all new staff, parents and other school stakeholders are briefed on the key aspects of the school's plans.
Finance team or Bursar	The school finance team or Bursar will be the lead actors in budgeting for adaptation, response and recovery measures, whether that is through existing school budgets or by identifying and accessing external funding/financing mechanisms. The finance team or Bursar will report to the headteacher and governors on adaptation spending and funding opportunities.
Caretaker / site managers	The caretaker or site management team is likely to be the main "project manager" coordinating the implementation and maintenance of adaptation measures across buildings, grounds and site operations. The site management team should be directly connected with the external contractors that can support in every stage of implementing and maintaining adaptation measures and recovering from severe events. Site managers will deliver a proactive and rolling maintenance strategy, including regular equipment checks and ensuring proper functioning of all measures, and will report into an ongoing monitoring system to quickly flag issues. Every member of the site management team should be trained about the adaptation measures that are implemented on the site.
Contractors	A list of trusted and suitably expert contractors should be kept by the school, who are qualified to install/maintain any specialist measures selected for the site, and who can be called upon as needed for design, implementation, trouble-shooting and maintenance.
Governors	The school governors will provide specialist support on aspects of adaptation planning and delivery, such as finance or funding applications, estate management, legal considerations, staff training, etc., working closely with the headteacher. Governors may have specialist knowledge related to engineering or design.

Images © London Authority

MADRID

OVERVIEW

Madrid implemented a pilot project "Caring for School Environments" in 2018/19 with the objective to change schoolyards into healthy, more socially inclusive and diverse places that are better adapted to the effects of climate change. The City first did a diagnosis study to assess the status of 241 public schools with quantitative (e.g. schoolyard surface, ratio schoolyard/pupil, equipment) and qualitative (e.g. shadow, vegetation, building materials, accessibility) criteria. Three pilot schools were then selected based on the diagnosis results and the schools' vulnerability to extreme heat (sensitive population + high exposure). The Municipality worked with partners to conduct an in-depth consultation process for 3 months with the different schools' stakeholders (students, parents, teachers, neighbours etc.) to co-create cooling solutions appropriate for each context, and also developed a Design Guidelines for Schoolyards.
After the conclusion of the pilot projects, several Districts have taken the initiative forward and - inspired and guided by the "Caring for School Environments" project - are undertaking similar actions in other schools.

KEY PRINCIPLES

Participatory process - the whole school community is involved in the process.
Space intervention - the process results with a transformation of the schoolyard.
Re-nature - Nature-Based-Solutions should be the key instrument for schoolyard transformation.

PARTNERS

Madrid Health Department ("Madrid, A City That Cares"), Urban Planning Department ("Plan Madre – Urban Regeneration Strategy"), Environment Department ("Plan A – Air Quality and Climate Change Plan"), several Districts

FUNDING

The pilot budget was implemented with Municipal budget that is assigned for yearly upgrades of schools.

CHALLENGES

- Leadership & scaling-up: identifying lead department for project
- Financing: securing financing beyond pilot
- Jurisdiction: different regional jurisdictions in different schools. City Council can only take on maintenance, but generally schools belong to jurisdiction of regional government.
- Maintenance: not relying on teachers/ pupils/community volunteers, but needs a professional maintenance plan
- Monitoring: demonstrating the impact of interventions

FURTHER INFO

- Schoolyards diagnostic study: http://madridsalud.es/wp-content/uploads/2016/04/MICOS-Regeneracion-urbana.pdf
- More info: http://madridsalud.es/cuidado-de-los-espacios-publicos-de-los-colegios/
- More info: https://www.researchgate.net/publication/325335197_Guia_de_diseno_de_entornos_escolares

Images: Madrid Municipality

Madrid Municipality developed "**Design Guildelines For Schoolyards**" showcasing the participatory approach the City took, as well as many design examples to refurbish three schoolyards with adaptation, health and inclusivity aspects.

The Guide is available here (in Spanish) http://www.madridsalud.es/pdf/guia_diseno_entornos_escolares_opt.pdf

Design criteria for climate adaptation of schoolyards projects:

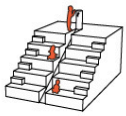
Increase shadow (Vegetation, shading structures)
- Vegetation adapted to environmental conditions
- Deciduous tress
- Plantation conditions
- High index of shadow
- No allergenic species or with toxic fruits or parts
- Low maintenance

Increase soil moist and infiltration.
(Natural and permeable pavements)
- Natural soil (avoiding clay)
- Permeable materials
- Hydraulic design. Management of rainwater flows avoiding waterlogging
- Water storage capacity
- Sustainable materials (recycled, local...)

Cycle of water.
(Sustainable Urban Drainage System)
- Natural cycle of water
- Infiltrate - store and reuse
- Improvement of water management and sewer

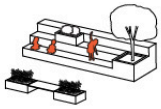

Sombra (con soporte o sin soporte): de vegetación


Sombra (con soporte o sin soporte): textil, opaca


Agua: fuentes, riego


Agua: chorros (suelo, techo, paredes), láminas


Bancos, mesas, sillas


Gradas, jardineras

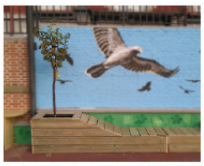
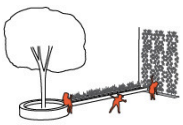


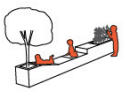


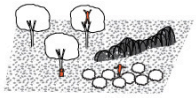




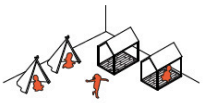





Alcorques, parterres, jardines verticales


Jardineras, bancales


Árboles, arbustos, trepadoras, tapizantes, flores - guía niños


Huerto (mesas de cultivo, invernaderos)


Casitas, cabañas, cobijos


Armarios, baúles, bibliopatio












PARIS

OVERVIEW

As part of the 2007 Parisian Resilience Strategy and coherent with the city's Climate Action Plan, the Oasis project is converting Paris' concrete schoolyard into 'cool islands'; spaces which are more pleasant, cooler, greener and shared by all, namely an "oasis". More precisely, by increasing the nature's share in the schoolyard, the Oasis project provides heat relief during hotter moths for children and the neighbourhood's inhabitants while lowering the urban temperature across Paris. In a 'multi-benefits' logic and centred around the children's wellbeing, this project addresses a variety of issues - from urban heat island, climate change, rainwater management to gender-based unequal use of space, while fostering students' socialisation and environmental awareness and social cohesion at the neirghbourhood level. In October 2018, the project was selected by the "Urban Innovative Action" (an initiative funded by the European Regional Development Fund – ERDF) as part of a call for projects. Since the start of the programme in 2018, 30 schoolyards have already been transformed. The aim is to have all 770+ Parisian schoolyards to be transformed by 2050.

KEY PRINCIPLES

- Promotion of **wellbeing**: increased thermal comfort, free play, enhanced cooperation and interactions between pupils, less (gender-based) conflict over the use of space
- **Enhanced awareness** with regards to climate change and biodiversity from students
- **Co-design and participatory approach**: Spaces are co-designed with children and school community (discussion, miniature model creation, ...)
- **Social Cohesion**: Schoolyards are envisoned to become a new public space, to create new spaces of interaction amongst the neighbourhood community.
- In-depth **evaluation of impacts** on various aspects (microclimatic and thermal impact measurements, noise level, biodiversity potential, wellbeing, social impact, etc.)

FUNDING

The programme is financed by the City's budget. It receives subsidies from the Water Agency (Agence de l'Eau) and the French state.
In addition: 10 Schools are co-funded through the ERDF as part of the "Urban Innovative Action" call for project.

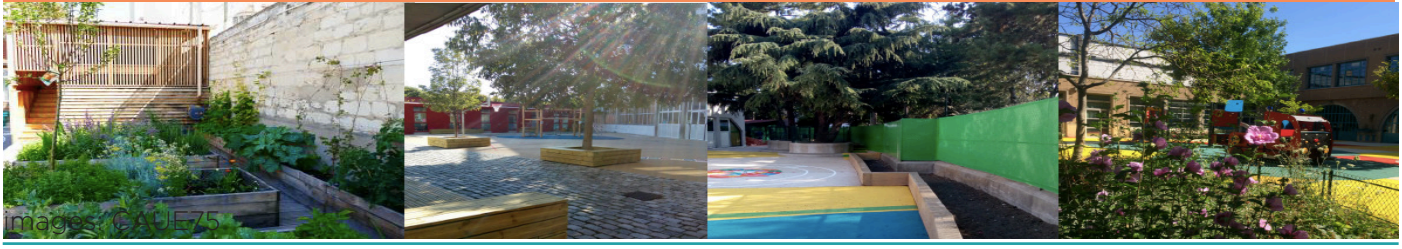
CHALLENGES

- Natural and low-tech amenities
- Learning through children empowerment
- Changes of professional practices across sectors
- New forms of management and maintenance
- School openness to the neighbourhood

PARTNERS

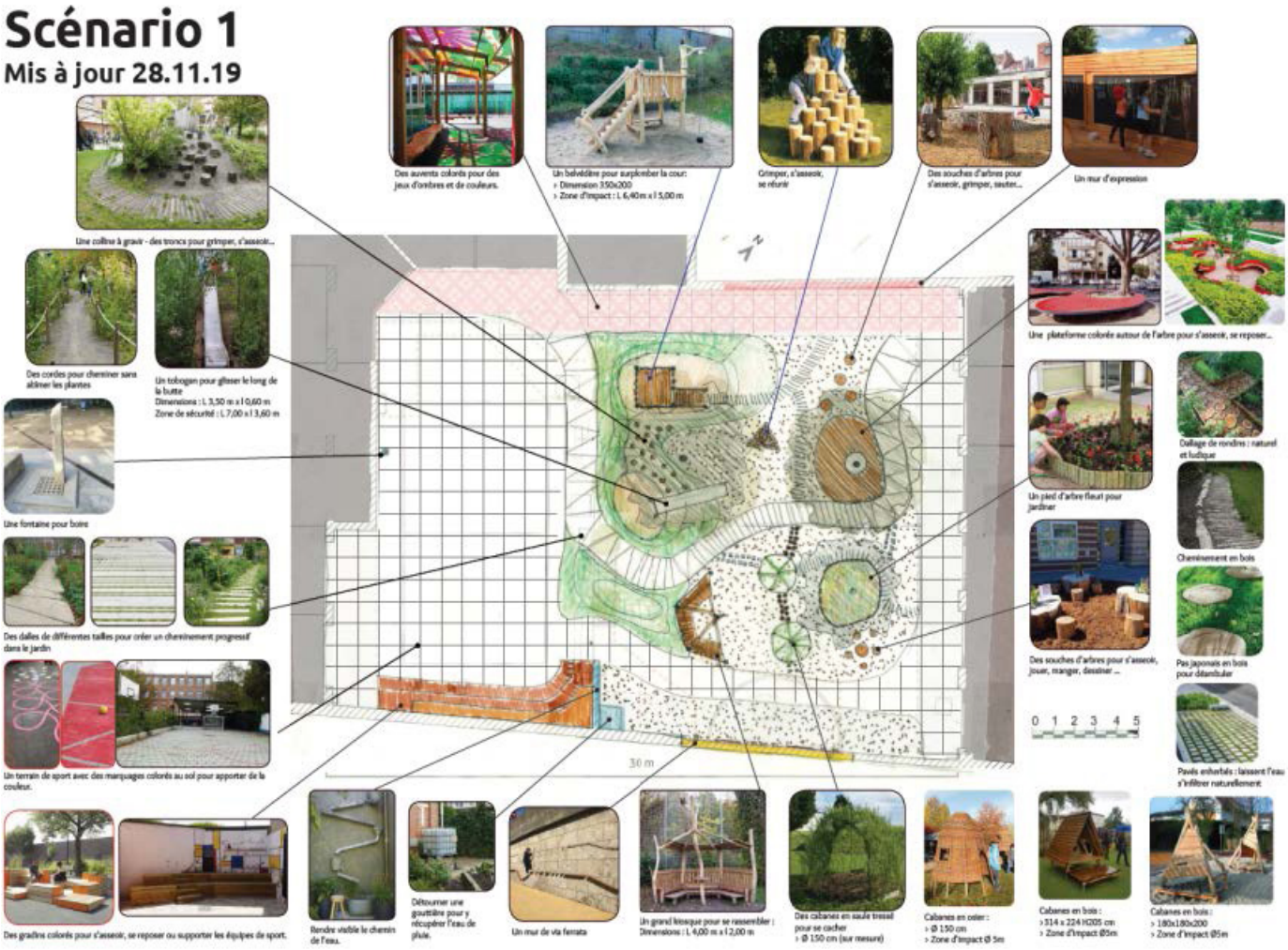
FURTHER INFO

- https://www.paris.fr/pages/les-cours-oasis-7389
- http://www.100resilientcities.org/projects/paris-oasis-schoolyards/
- https://www.uia-initiative.eu/en/uia-cities/paris-call3



images: CAUE75

Paris' Design and Planning Examples



Design parameters

Focusing on soil:

- Better management of rainwater
- Avoiding storing heat if it is not shaded
- Balance between permeable areas, with a preference for open ground when possible, and an impermeable soil allowing the management of rainwater

Increasing plated areas:

- Tree plantations, green roofs and walls, educational gardens, orchards, plant cabins
- The species chosen are plants adapted to the school environment and more resistant to climate change

Furniture:

- Meeting the needs expressed by the children, in particular for a better sharing of space (between young and old, girls and boys, etc.) and allow various outdoor activities.

Shading and water:

- Installation of fountains, fun and educational use of water and addition of shade houses and trees

RIO DE JANEIRO

HORTAS ESCOLARES (SCHOOL GARDENS) PROJECT

The Hortas Escolares ("School Gardens") project was created by the 'Coordination of curricular extension projects' and approved by Rio's Municipal Secretariat for Education in 2018 with the funding from the Federal Government, to build or improve gardens and green spaces. Until today, about 250 schools have been involved in total in the project.

The spaces include alternative, organic, hydroponic, aquaponic gardens, as well as poultry farming and native bees. To support the schools, the City opened a seedling nursery in order to supply the gardens with thousands of vegetable and garden seedlings. During 2019, the Project also supported teachers with technical and pedagogical assistance, and offered classes to the school community with the aim to teach how to deal with the soil, how to plant and maintain the gardens.

Images: Rio de Janeiro Municipality

Further info:

- https://www.rio.rj.gov.br/web/rioeduca/escolas-sustentaveis
- https://prefeitura.rio/rio-acontece/professor-cultiva-horta-com-alunos-e-garante-a-salada-da-merenda-escolar/
- http://prefeitura.rio/educacao/1a-mostra-de-hortas-escolares-sera-realizada-no-campo-de-santana/

FLORESTAR CARIOCA PROJECT

The FloEstar Carioca is a side project on the Hortas Escolares, with the objective to offering school gardening and composting courses to teachers, managers, staff and school community, as well as the reforestation of schoolyards. In 2019, 34 trees have been planted in schools as part of the project.

The overall aim is to connect communities, create a natural relation between students and healthier nutrition, and contribute to reducing the city's heat island effect - building a more climatic resilient Rio de Janeiro.

Images: Rio de Janeiro Municipality

Further reading

- "When the Heat is on, student learning suffers", Gavel, 2018, Harvard Kennedy School --> article
- "Poorer kids may have less shade in their schoolyards", Caroll, Coughlin/Potts, 2019 --> article --> study
- "Guidance on high classroom temperatures", UK National Education Union, 2018 -->link
- "Climate Adaptation of School Buildings through MOM – A Case Study", Steinar Grynninga, Jørn Emil Gaarder, Jardar Lohne, 2017 --> link
- "Unless we act now: The impact of climate change on children", Unicef, 2015, --> link
- "Adaptación al cambio climático y reducción del riesgo de desastres en el sector de la educación - MANUAL de recursos", Unicef, 2012 --> link

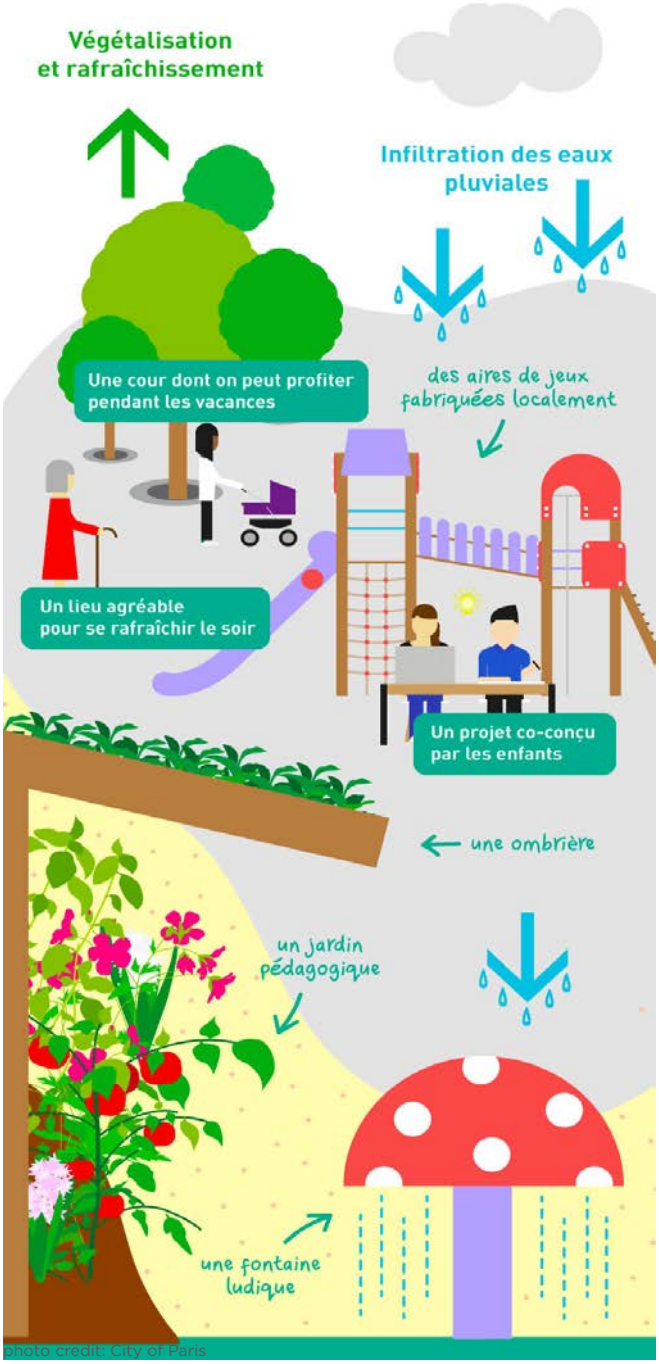


photo credit: City of Paris

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