



POLICY RECOMMENDATIONS ON THE DESIGN, IMPLEMENTATION AND ROLL-OUT OF NATURE-BASED & CLIMATE-ADAPTIVE SCHOOLYARDS

COOLSCHOOLS: Realizing potentials of nature-based climate shelters in school environments for urban transformation

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Disclaimer

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SUMMARY

This policy document presents key research insights and policy recommendations for urban planners, policy-makers, architects and school staff on the design, implementation and maintenance of nature-based and climate-adaptive schoolyards. It is informed by research done throughout the [COOLSCHOOLS](#) project (March 2022-February 2025), assessing the multiple co-benefits of implementing nature-based solutions (NBS) for climate adaptation in school environments. COOLSCHOOLS explored the biodiversity impacts, equity implications, health and safety considerations, educational potentials and governance of municipal programs developing nature-based climate-adaptive school environments across the cities of Barcelona, Brussels, Paris and Rotterdam. Its production stems from the recompilation of interviews, field work notes, literature reviews and project deliverables elaborated by COOLSCHOOLS partners, including universities and research centers, public administrations, local organizations, as well as European and international networks. The recommendations have been discussed and further elaborated by more than fifty experts in the field at the final project conference in the city of Brussels in January 2024.

In a nutshell, enhancing the social, health, educational, and justice-related benefits of nature-based climate-adaptive schoolyards requires the following core pillars:

- 1) Establish a holistic vision, grounded in sustainability values, for the co-creation of nature-based climate-adaptive schoolyards.
- 2) Embed nature-based schoolyards in public policies, programs, and plans as a cross-cutting issue.
- 3) Actively engage the school community in the preparation, implementation and maintenance of the nature-based climate-adaptive schoolyard.
- 4) Monitor and take care of the evolution of the nature-based climate-adaptive schoolyard.



Jaume I school. Barcelona (Photo: Isabel Ruiz)



Why do green schoolyards require more attention by policy makers?

A green, or nature-based, climate adaptive schoolyard is a place where children have the chance to experience nature on a daily basis, as part of an appealing and comfortable space for play and learning (1). These outdoor environments may have a range of features, including playground equipment, sports facilities, accessible pathways and trails, outdoor classrooms and community gathering spaces, abundant native vegetation with edible fruit and vegetable gardens. The “green” in these schoolyards also features the “brown”, such as sand, mud, branches, tunnels, and weathering wood, as well as the “blue” of water elements such as small ponds and fountains.

Such multi-functional and experiential schoolyards open room for creativity and diversity in play and movement (2) and have a wide range of social, health, and educational benefits (3). An increasing number of studies report that the daily, or frequent, use of green schoolyards enhances, or contributes to emotional (4) and physical (5) well-being, academic achievement and cognitive development (6), social cohesion (7). They are also found to offer more equitable and diverse play opportunities in a way that encourages gender equity in socialization (9). Crucially, in a context of stark inequalities in the availability and accessibility of naturalized areas between multi-ethnic, working-class neighbourhoods and territories inhabited by middle-class residents, greening schoolyards can be one of the multiple avenues for addressing the blatant urban green divide (8, 17).

Importantly, the vegetation, shadowed and non-permeable surfaces in nature-based schoolyards reduce heat island effects contributing to urban climate resilience, ecological connectivity and the protection of biodiversity in cities (10). Nature-based schoolgrounds are alive, and in a continuous flux of change, hence never completely finished. They require multi-stakeholder involvement, care and continuous maintenance. Through the co-maintenance of nature-based schoolyards children are encouraged to interact, play and learn from, and with nature (11).

Furthermore, an effective, just, responsive and vigorous schoolyard greening goes beyond the search for narrow technical solutions for climate adaptation or pedagogical innovation (13). It is a process of whole school (re)making (11). Green schoolyards need to be posited as integral elements of a wider sustainability transition, and require co-design approaches that intertwine social justice, pedagogical, psychological and ecological dimensions (7).

This brief systematizes the policy-relevant insights of the COOLSCHOOLS EU project, exploring the biodiversity impacts, equity implications, health and safety



considerations, educational potentials and governance of nature-based climate-adaptive schoolyards across the cities of [Barcelona](#), [Brussels](#), [Paris](#) and [Rotterdam](#). Its production stems from the recompilation of interviews, field work notes, and project deliverables. The recommendations have been discussed and further elaborated by more than fifty experts in the field at the [final conference and project meeting](#) (Brussels, Jan 2024).



COOLSCHOOLS final conference in Brussels, Jan. 2025. (Photo: Raquel Colacios).



How to enhance the social, health, educational, and justice-related benefits of nature-based climate-adaptive schoolyards?

Policy recommendation 1: Establish a holistic vision, grounded in sustainability values, for the co-creation of nature-based climate-adaptive schoolyards.

School communities, public administrations, architects and designers need to establish a common and holistic vision around the naturalization of schoolyards where the educational, socio-cultural, health, justice-related, climate change, and biodiversity enhancement objectives and benefits of the action, are jointly pursued and respectively – acknowledged (15).

Greening schoolyards is a response to multiple societal challenges, including climate change, biodiversity loss, social justice and inclusion, children's health and wellbeing, equitable access to nature and nature play.

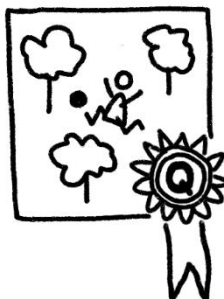
- The stakeholders involved in the transformation of the schoolyard need to strive towards a common and systemic vision of the naturalization process. Such vision should be aligned with sustainability values that promote a respectful relation between people and nature.
- The work towards such vision should best precede the naturalization and transformation efforts. Embracing the Whole School Approach could inform and nourish this process (14). It builds upon the systemic integration of sustainability issues at the levels of schools' vision, curriculum, pedagogy, infrastructure, teachers' training, and community.

The production and maintenance of the green schoolyard needs to be framed as a learning and pedagogic opportunity:

- The creation of a stimulating natural environment for learning needs to be framed as an element of school curricula.
- Public policies must adopt a comprehensive view of learning and integrate outdoor education, nature-based and experience-based learning in national educational agendas.
- Education Departments at regional and national level must recognize outdoor and nature-based education as an activity that helps reach multiple curriculum goals, and fosters various competences and skills.

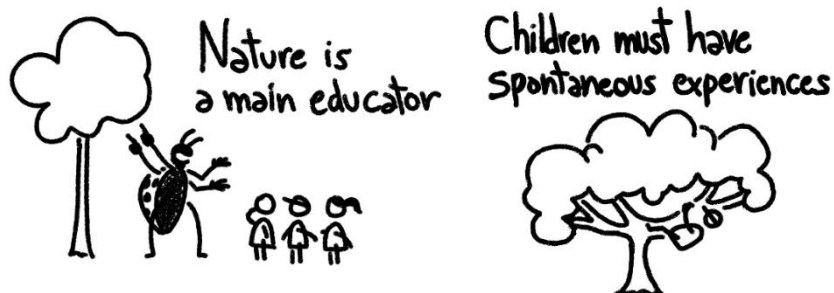
EDUCATIONAL REGULATIONS AND OUTDOOR EDUCATION IN NATIONAL AGENDAS

Outside = Quality
Education = Education



- o Given the decreasing connectedness to natural environments in cities, urban schools should try to facilitate this relationship, while recognizing the role for nature as a co-educator. Such vision stems from the need for spontaneous work and discretionary time for students to explore and experience nature on their own, even if this implies getting “dirty” every now and then.
- o Nature as a co-educator in planning educational activities furthermore implies enhancing empathy with all other living beings, along the lines of interspecies empathy and nature-inclusive thinking. Implementing activities and practices that actively engage, listen and incorporate the natural world in the educational process, require diverse representations of nature in the schoolyard, so as to enable the feeling of wonder and richer experiences in children (15).

NATURE AS CO-EDUCATOR PRACTICES



- o Teachers should use the schoolyard as a learning environment. This requires the institutional establishment of a minimum number of classes, tutorials, and teaching activities, formal and informal, that takes place outdoors, beyond recess hours and physical education. The Outer Classroom Day in the Netherlands is one example.

- To this aim, teachers need to be provided with institutional recognition of, and support for, their additional labour around using the schoolyard as a classroom, or maintaining its vegetation. This could take place by granting them special rewards or economic compensations.

INSTITUTIONAL RECOGNITION OF TEACHERS' INVOLVEMENT IN GREENING AND MAINTAINING SCHOOLYARDS

Maintenance must
be made fun



Freedom requires support
(e.g. from institutions)



Continuous trainings of school staff on outdoor education in the schoolyard and other school environments are required.

- Teachers need to develop the competences around using nature-based schoolyards as learning environments, and embodying sustainability values in particular. They need a wide range of tools and activities to enhance their confidence, motivation and experience in the fields of outdoor learning or nature as co-educator.
- This said, in a context of increasing pressure on teachers' time and activity, such training needs to be framed with care, and backed by institutional and school community support. Nonetheless, if trainings on outdoor and nature-based learning are institutionalized, teachers are likely to align these with their expectations and job requirements. One example here is Scotland where training on outdoor education is compulsory for primary teachers, and linked to the UNESCO sustainability education and agenda.

CONTINUED PROFESSIONAL TRAINING FOR TEACHERS

They need regular
and enjoyable
training

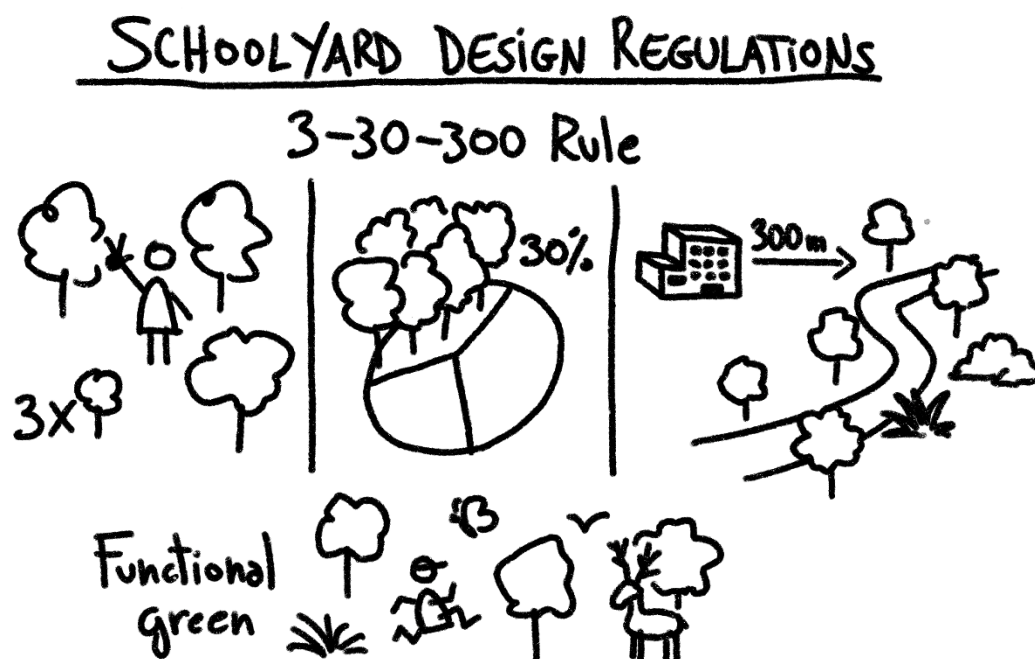


(It can be
overwhelming)

Policy recommendation II: Embed nature-based schoolyards in public decrees, directives, regulations, programs, and plans related to urban planning for climate adaptation and biodiversity conservation, health and education.

Green schoolyard planning and design should be guided by the ambition to reach 30% of the grounds, walls, or rooftop, and be linked to urban greening actions at the city level:

- o The 3-30-300 rule, established in the literature, should be adapted to schools so that every child: i) has at least 3 trees in the schoolyard; ii) enjoys a school environment with at least 30% tree/bushes cover (within and outside the courtyard); and iii) has an access to a high-quality public green space not further away than 300 meters from the school (12, 19).

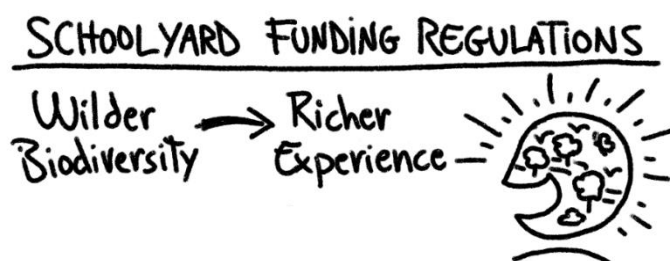


- o Such recommendation furthermore entails that, whenever schoolyard location can afford it, a minimum of 30% of the schoolground surface shall be de-paved, or permeable.
- o For schoolyards located on top of other infrastructure (e.g., underground facilities), or where the 30%, or 3-30-300 rule cannot be easily applied (e.g., in dense cities), a minimum percentage of rooftop or vertical greening shall be established.

- The schoolyard vegetation and the associated maintenance infrastructure, shall be tuned to local climatic contexts (e.g., allowing for prolonged droughts). This could involve the installation of rainwater, or grey-water harvesting systems.
- Nature-based schoolyard designs shall also distinguish between functional (e.g., weeds, bushes) that and decorative (e.g., ornamental plants) greenery, trying to accentuate the former whenever possible.

The particularities of each location need to be considered at the level of planning and design, rather than replicating a single, or “one-size-fits-all” approaches to schoolyard planning and implementation:

- The schoolyard design shall allow for certain degree of mimicking natural/wild landscapes and their seemingly “disorderly features”.
- Attention during the design phases needs to be paid so that one specific type of equipment (e.g., slides, seesaws) does not consume most of the budget, or space. A balanced mix between the different spaces shall be sought (e.g., avoid placing the sports pitch in a central, prominent position). Designing a good structure of walkways and connections is crucial, while considering existing and preferred paths.
- The designs of green schoolgrounds can be informed by the emerging literature around risky play, and open up for shifting beyond “zero-risk” strategies (18).



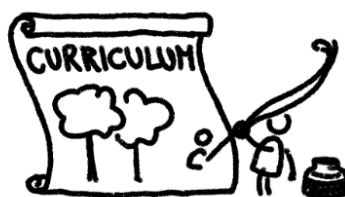
Outdoor education and nature-based learning need to be formally inscribed in university education program, (national) school curricula and the educational projects of all schools:

- Preparing teachers to use outdoor spaces on regular bases for educational purposes needs to start, and get consolidated, during their university education. New university curriculums at Bachelor and Master levels should build on theoretical knowledge, methodological approaches and practices, especially ones related to addressing various types of risks and attention dispersion. Such curriculums can be developed on the basis of existing best practices (applied by experts and NGOs) in the field.

- The development of outdoor nature-based learning courses in teacher university curriculums could also benefit from further research on the approaches to, and benefits of, such educational practices. Courses will need to differentiate between the needs of primary and secondary curricula.

CHANGES IN UNIVERSITY CURRICULA FOR PRIMARY SCHOOL TEACHERS

Include outdoor
education
in curricula



The availability of a steadfast institutional support and funding is an essential condition for sustaining naturalization efforts in schoolgrounds (13).

- The successful roll-out of schoolyard naturalization and climate-readiness requires that a designated fraction of the school budget is dedicated to the design, implementation and maintenance of schoolground's greening. Hence, a percentage of the national/municipal/regional educational budgets needs to be designated to the greening of schoolyards.
- Such funding needs to be steady and continuous, regardless of changes of political mandates. Funding needs to also consider the need for carefully budgeting between the different stages (planning, implementation and maintenance/follow-up).
- Funding schemes and arrangements are most effective at delivering a transformation that is tuned-in to the needs of each educational community, and when they allow for certain degree of flexibility (e.g., time-wise, Policy recommendation IV) and reflexivity (reflection on past experiences and continuously upgrading the program criteria and procedures) (13).
- This said, the development of a well-thought maintenance plan should be one of the criteria for granting funding. Another important criterion is opening schoolyards to the wider neighbourhood or community, as long as the public agency/institution funds the associated maintenance of the space.

The entry of small and medium sized, landscape ecology- and permaculture-oriented architectural and gardening enterprises shall not be obstructed in public procurement around schoolyard transformation:

- A number of municipal or public tenders for greening schoolyards require that architecture companies have had other major public works in their portfolio. Such rule automatically excludes small and innovative enterprises from public tenders, while they are the ones that (often) bring the new transformative approaches to planning schoolyard spaces in the first place. Conversely, large-scale architecture firms that routinely do public works can lack the vision and approach to the pedagogical, ecological, social and planning transformation that is at stake in the schoolyard.
- All architectural firms undertaking the transformation of schoolyards shall have a background in (or knowledge of) participation, educational practices, and either landscape ecology, ecological architecture, or permaculture.



Schoolplein de Vlinder. Rotterdam (Photo: Springzaad, IVN, City of Rotterdam)

There is a need for better coordination between public regulations on climate change, biodiversity loss, health and education:

- Climate change adaptation and mitigation, biodiversity and public health – related strategies, decrees, and normative frameworks need to be aligned with those in the field of education, especially with regards to greening schoolyards and outdoor, nature-based learning pedagogies.



Equity and justice need to be hard-wired in funding schemes related to greening schoolyards:

- Investing in economically-disadvantaged schools, and the ones located in less green neighbourhoods, is important for reasons of justice, since the benefits from greening schoolyards there will be bigger than elsewhere. Opening naturalized schoolyards to the local community is therefore fundamental.
- Schools attended by low-income and ethnically diverse schoolchildren and located in nature-poor urban environments need to have a priority in funding decisions that pertain to greening schoolyards and their maintenance.
- While school communities located in middle-class neighbourhood can easily access funds and volunteers with the skills and the time to contribute to project application and schoolyard maintenance, educational institutions located in economically disadvantaged districts (often) do not have the required resources, expertise, and time. The maintenance of the green schoolyard in economically deprived schools, for example, need not be left to the discretion of teachers, due to the complexity of other social and educational issues they need to address.
- These schools thus need to receive administrative support for funding applications, teachers' trainings and parental engagement around the development, pedagogic use and maintenance of the green schoolyard. Attention in schools with a majority of economic disadvantaged pupils also need to be directed to the effective communication with parents on the benefits of greening schoolyards (e.g., through meetings or social events).
- While ensuring enough outdoor space for all children should be a priority, some schools do not have a (sufficiently large) schoolyard. In these cases, greening around the school should be prioritized. This could take the form of pocket parks and adding more trees and bushes around the school and the streets leading to it, while making sure such urban greening does not add to house-price increases.

EQUITY AND JUSTICE-RELATED REQUIREMENT

Prioritise disadvantaged communities to obtain funding and accompany them



Policy recommendation III: Actively engage students, teachers and parents in the preparation, implementation and maintenance of the nature-based climate-adaptive schoolyards

As children are the core beneficiary of the schoolyard transformation, their early and authentic involvement in the schoolyard transformation is crucial:

- Children are more likely to benefit from, and care for, a place in whose production they have been deeply and continuously involved.
- Before the start of the participation/co-creation processes students need to have different and diverse frames of reference in mind by reviewing examples of nature-based schoolyards and playgrounds, or visiting relevant locations, whenever possible. Children need to understand the intention behind the co-creation of a nature-based climate-adaptive schoolyard, as a common basis for the participation process.
- In the design/participation phase the creation of “wish lists” (e.g., types of play equipment) shall be avoided and children shall be rather asked about the type of play and movement they wish to experience.
- Child participation needs a diversity of voices and many students involved, since (group) representation is not always effective and leads to skewed decisions, especially for smaller ages.
- Children should be involved beyond the design, thus in the implementation and management phases. They also need to be informed about any technical issues that might compromise their initial vision, or requests.



Jean Dolant Elementary School. Paris (Photo: Theo Menivard)



Engaging students in the implementation of the green schoolyards provides very positive results in terms of their sense of place-ownership and belonging.

- Children love participating in the building side, which makes for an excellent learning opportunity. They feel a strong sense of pride from participating in the construction process, driven from the idea that they can make a change by living the process of transformation.
- This said, few contracting companies are open to bearing the associated safety concerns, or the additional costs (e.g., time-delays) that - having sporadically children on the site – would entail. Possible solutions involve setting a small fraction of the budget for that, and writing specifically the need to allow children on the construction site, for small activities or works, on a few occasions. Indeed, in some UK schools, including children in the work is part of the contractors' requirements. Such approach also requires an assessment of the associated educational opportunities and the appropriateness of the timing of the intervention (as per the construction phase), as well as weighting these against the risks, or additional costs, this entails. The required engagement of teachers and consent of parents also needs to be factored in.
- When allowing children on the site is not an option, allowing them to observe and understand the various phases of the schoolyard remaking and greening, is a good compromise. Contractors could come in the classroom, enter in dialogue with children and explain what exactly they are doing in their schoolyard.
- Except for heavy construction works, children could be actively involved with the greening phase, (e.g., with tree and bush planting), or with the construction of huts and wooden play structures (see section IV on maintenance).

Preparatory and management works around schoolyards' greening needs to be better distributed among teachers and school staff:

- Teachers' involvement in schoolyards' greening often rests on one, or few, dedicated members of the school staff who participate in the preparation (design), and have an overview of the implementation. This distribution is not sustainable, especially if key members leave the school. The sense of responsibility for, and ownership of, the schoolyards or the culture of care for the new school commons, needs to be nourished and nested in the school community. This could be enhanced by rewarding or acknowledging teachers' engagement at every level, and activity (e.g., by gratitude cards, professional certificates, or discounting of class hours).
- Passionate, involved and supportive leadership is a central factor, or catalyst, for broader teacher involvement. This said (and as discussed in Section I), teachers need to know how they can employ the schoolyards for educational purposes. In addition, when school management demonstrates how schoolyards can accommodate multiple lessons and

educational activities, teachers could get more involved in the process of co-creation, and co-maintenance.

Parental involvement in schoolyard greening requires flexibility and openness to innovation:

- The participation of parents tends to stagger in both well-off, and low-income, working-class families. In the former case families often already have access to private green spaces, and in the latter - parents (often) cannot afford the time or mental load around engaging. The eventual result of this low participation could translate in lower quality greening. Yet and overall, most parents report to be interested in the schoolyard transformation. Parents need to be well informed about the health and well-being benefits of the transformation, and invited in the visioning process around the new schoolyard. Communications with parents further need to be inclusive, by making sure that every parent, regardless of their background or language, feels welcome with being involved.
- One way to encourage parental participation could be through incentives of sorts (e.g., mutual baby-sitting, meal-sharing). Parental engagement also needs to be seen and promoted as a socializing and community-building activity.
- Parents, grandparents and other children's guardians need to understand the ways they can get involved, (e.g. during the design, implementation, maintenance), at what times, and in what roles. Fundamentally, they need to be given a degree of trust and freedom when it comes to introducing new, or maintaining existing, nature-based solutions in the schoolyards.

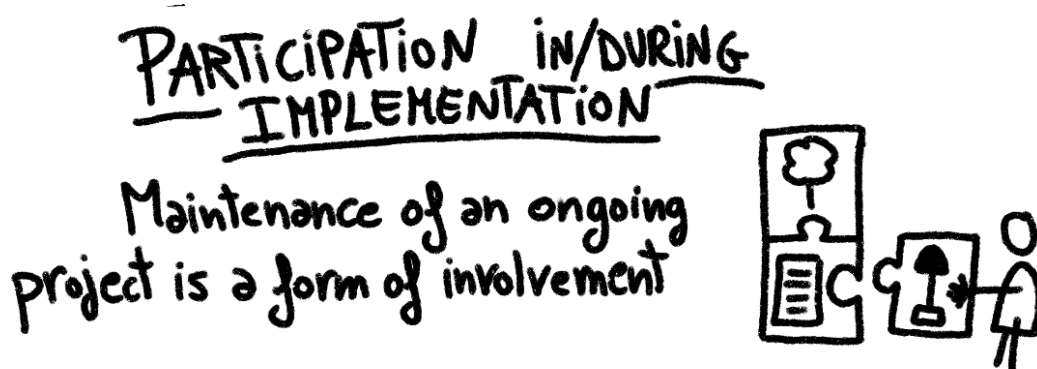
PARENTAL INVOLVEMENT, INCLUDING IN LOW-INCOME NEIGHBOURHOODS



Policy recommendation IV: Monitor and take care of the implementation, maintenance and overall evolution of the nature-based & climate-adaptive schoolyard

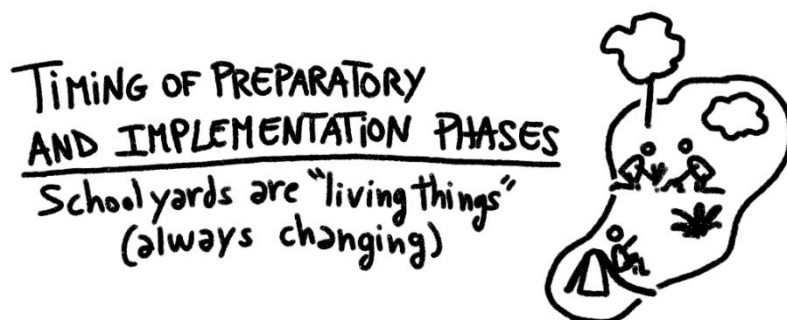
The implementation phase requires careful balancing between rushed and protracted timing:

- All project phases require continuous evaluation (by school community and/or public administration) along the lines of the previously set objectives (e.g., around diversifying play, outdoor learning, climate adaptation, naturalization).
- In terms of the implementation phase, while strategies differ across cities, with most of the transformation works taking place during the summer break (as in the cases of Barcelona and Paris), it could be educationally rewarding to carry out some part of the actual development works during the schoolyear.
- Implementation shall not be rushed as that would impede the continuous feedback of children, parents, and teachers. Speeded implementation could lead to an eventual misalignment with initially set goals and design proposals. This said, implementation needs to comply with the planning and administrative horizons of funders and companies. Likewise, from the children perspective, finishing the schoolyard three years after the initial participative designs is not advisable, or encouraging either. Hence, while good planning and clear implementation agenda is needed, space for unexpected changes and certain degree of flexibility is important.



Green schoolyards require maintenance plans with safeguards clauses ensuring continuous and common engagement by the school community, even when school leadership changes.

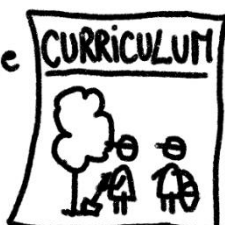
- o Schoolyards should be seen as 'living entities' in need of continuous care.



- o The maintenance plan needs to be developed and agreed upon by the school community early on. Formulas for management vary between teacher rotation, support from public gardening service or civil society/neighbourhood organizations, including those working with vulnerable populations. On some occasions, schools hire a gardener for more specialized maintenance and design once every two weeks. In these cases, gardeners undertake the bigger works, and children and staff - the smaller and simpler maintenance.
- o This said, teachers shall not bear the brunt of the schoolyards' maintenance.
- o The involvement of students and other members of the school community in taking care of new green areas as a curriculum-based activity is needed to ensure the long-term maintenance of the schoolyard. Children can observe and investigate the type of ecological processes taking place in their schoolyards and then interrogate themselves what is to be kept alive, what do they need to do.
- o Students can be also involved during the after-school hours, by turning maintenance into "fun" activities, especially around gardening.

CHILDREN INVOLVEMENT

Maintenance should be part of the



Consider different perspectives on Risk and Dirtyness



Maintenance needs to stem from the perspectives of ecology, and the practice of creative play and outdoor education

- Wild and seemingly messy natural spaces, with multiple loose pieces (e.g., leaves, weeds or branches), provide multiple exploratory learning and play opportunities. Maintenance thus needs to take place in the framework of ecology, and implemented by individuals with knowledge of creative play, wilderness, biodiversity, loose parts, and nature-based pedagogy.
- Removing all weeds and branches shall thus be re-considered or avoided altogether. This said, the understanding of nature differs. While Mediterranean nature is not green in the summer, its brown and dry facets could also be a learning resource.

MAINTENANCE THAT STEM FROM ECOLOGY, EDUCATION AND PERMACULTURE

Children should
investigate and wonder
about the living
organisms



Green is not
always green



The maintenance of vegetated areas needs public funding and guidance:

- Sub-contracting external companies for maintenance works in the schoolyards by public institutions has not been an effective option, mostly due to the lack of accountability.
- Municipalities or regional governments need to guarantee and oversee the maintenance of green areas (through public enterprises or the provision of funding for schools' selection of a gardener). Public support through small lots of funding for annual maintenance (e.g., between 1500 and 2000 euros/year for Barcelona), would be crucial for schools to successfully maintain, expand and diversify vegetation.



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