School Green Areas

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Rise Up Against Climate Change!
A school-centered educational initiative
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Rise Up

Against Climate Change

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Modules in the Toolkit

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Rise Up
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The World Health Organization says that all cities and towns should have a minimum of 9 square meters (m^2) of green space per person. In Latin America there are 3.5 m^2 per capita. What is it like in your town?

Why do schools need green spaces?

How often do you take a look at your surroundings, whether at school or on your way there? Have you thought about the nonhuman companions that you live with every day?

Many types of plants, insects, and birds are probably your neighbors, both at school and at home. What do you know about them? Do you know how much you depend on them or how much they depend on you? Do you know what risks they face? Do your actions heighten these risks?

The topic of this section is biodiversity, in particular the condition of the plant ecosystems that surround your school. Small green spaces—the gardens, vegetable gardens, or rooftop gardens that some schools have on their grounds—increase a school's biodiversity. Does your school have any of these spaces? Would you like to plan, build, or improve one?

The ecosystems that surround the planet's cities and towns have been disturbed by human activity. Some have been affected more than others, yet all exhibit our traces. Today's challenge is to seek ways to reduce these traces and to restore and integrate the spaces where we live into the natural ecosystems that surround them. It has unfortunately taken a long time to realize that inaction adversely affects us.

There are practical reasons why we need to work on improving the environmental conditions of the spaces we live in. Maintaining and restoring plants in schools and communities helps to:

- Retain moisture and allow rainwater to filter into the subsoil to produce healthy aquifers and potential drinking water.

- Retain the soil in ecosystems, which provides the conditions for plants and animals that serve as food and medicine to grow and live.

- Capture carbon dioxide and other gases and particles, thus providing clean air for breathing.

- Provide a quiet space in which humans can enjoy peace and tranquility, which are crucial to mental and physical health and to stimulating learning.

- Reduce noise, wind, and dust.

- Provide shaded areas for rest and leisure, which is crucial at schools. For example, isn't it better to wait for the bus or eat lunch under the shade of a tree?

- Maintain a better climate in towns. In towns and cities where pavement and cement have replaced vegetation, or areas where there is a lack of vegetation, people commonly suffer from more frequent and more intense heat strokes.

- Provide temporary habitat or shelter for regional wildlife, allowing humans to observe and learn about the cycles of nature and the relationships between organisms.

Box 1.
Deforestation Generates Emissions of CO_2

Deforestation accounts for a larger share of global CO_2 emissions than does transportation (17.4 percent vs. 13.2 percent).

Moreover, it is alarming that over the past two decades most of this deforestation has occurred in developing countries such as those of Latin America.

Source: IPCC 2007.

Greening your your school: diagnosis

You may ask, "How do I change my city or my town when it has so many problems?" With help and a clear vision of your goal, you can do it little by little. Your school is an ideal place to involve people who want to work toward a better world.
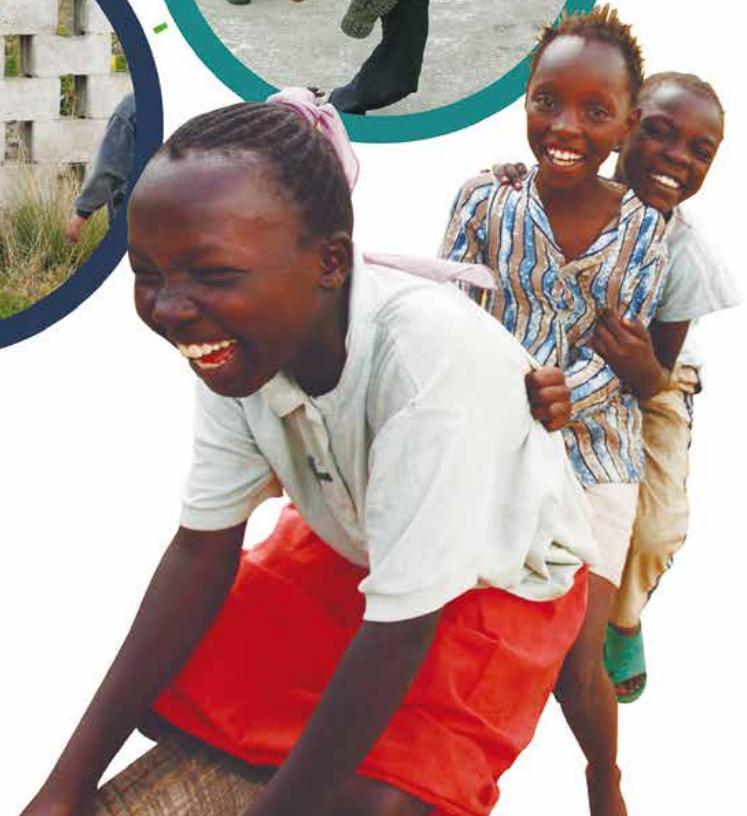
- The first step toward transforming your school and integrating it into the natural ecosystem is to carry out a survey of what lies inside and outside the school.

- The second step is to plan what potential changes need to be made and how to carry them out.

- Finally, you may also consider spaces beyond the school. Identify projects to improve the community that can be realized in participation with the school.

This module offers ideas on how to improve the condition of the vegetation at your school as well as how to motivate and help you to carry out projects that will improve the environment in your community.

You can use any or all of the exercises presented below to diagnose and plan improvements to the gardens or yards at your school. Although all the exercises will help you make good decisions, the first two are key. It is especially important to invite the staff that takes care of the school garden or yards to participate. Invite them to join you! Their knowledge and experience will be invaluable. The exercises include:

- Assessing the school's current green spaces

- Collecting opinions about the school grounds
- Calculating the ratio of the school's green areas to its built areas
- Conducting an inventory of trees and plants on school grounds
- Reviewing how to care for green areas

Assessing your school's green spaces (table 1)

Question	Answer	Specific comments on the answer
Are there any gardens at the school?		What is the garden like? (Describe the garden using your senses.) Are all plants nonnative? Is the garden infested with any pests? (Ask the gardener or other informed person about the characteristics of the school garden.)
If no, is there a schoolyard?		What is its size? Is the soil covered or uncovered?
Number of hours of sunlight the yard receives		
What types of plants are in the garden?		Number of trees
		Number and types of shrubs
		Grass (square feet and type)
		Size of uncovered soil areas
What percentage of the plants are native to the region?		Trees
		Shrubs
What type of soil is used and what are its characteristics?		Note whether the soil is sandy and therefore will not retain water, is very hard and impermeable and will create puddles, or is shallow, and so on.
Discuss weather conditions		Note such factors as temperature, duration and time of rainy season, and amount of water that falls during the season.
What are the students' ages?		This is an important factor to consider, since students of different ages have different leisure and security needs to consider.
What are the students' favorite games?		Note whether they play in the schoolyard, and what specific features the schoolyard currently has or could have to foster more play.
Does the school have a fence or wall separating it from the other buildings?		
Create a map showing the dimensions of all areas.		

Collecting opinions about the school grounds

This survey may be administered to only a few students and teachers. It is not necessary to involve the entire school community. If all teachers and students at your school do in fact participate, the survey can be carried out during class, by verbally soliciting opinions during a class session.

Before administering the survey, it is important to conduct a small motivational exercise in which you explain the importance of choosing gardens that suit the ecosystem of your region to protecting the biodiversity of the area.

We suggest that you lead a small tour around the school before conducting the motivational exercise. Although you may walk around the school every day, you may not stop to really look at it and realize what you like or dislike about it. Ask your colleagues or students to close their eyes and smell, ask them to open their eyes and look closely, then ask questions about those sensations. Remember to do the exercise yourself, if you can, a few days before the group tour.

If you conduct the survey in written form, consider having the students do it in small teams.

Questions that can be posed in a classroom discussion or in a brief written survey are:

- What would you like your schoolyard or garden to be like?

- What kinds of plants would you like to see in the green space?

- Would you be interested in working to build or improve the schoolyard or garden?

- Would you like each class or group to be responsible for a specific area or for certain types of plants?

- Are you allergic to any plants?

Calculating the ratio of the school's green areas to its built areas

With your fellow teachers or groups of students, you can calculate the proportion of green areas to built areas. The results can be checked against the recommendations of international health organizations or national regulations.
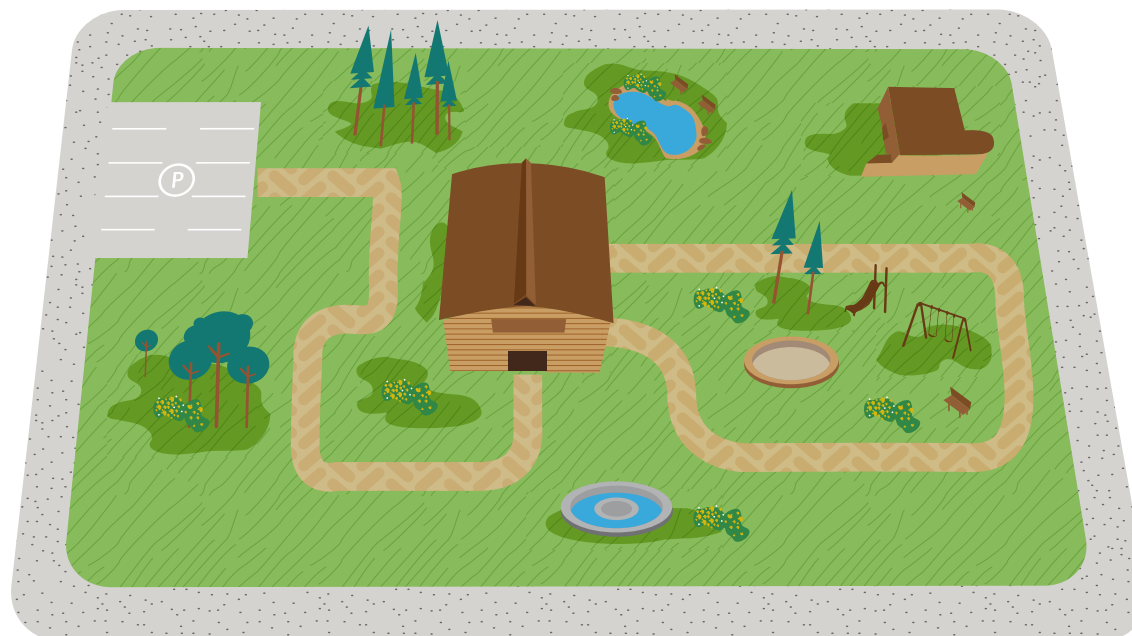
Steps to take:

- If possible, get a copy of your school's blueprint. You can make your own, if this is not easily available. You will need graph paper, pencils, rulers, and measuring tape to calculate the area that your school covers, including that of the building(s) and the schoolyard.

- Measure the total surface area of the school, including the areas with buildings, and the total area of the schoolyard, quantifying how much of the schoolyard is taken up by plants and how much has no vegetation.

- Draw up a table with the results showing the ratio of green areas to built areas (example in table 2).

Table 2. The school's built and green areas

School zone or area	Total surface area of the school grounds	Schoolyards (if there are several, they may be measured and recorded separately)			Areas with buildings (as with the yard, these may be differentiated by use: office, classroom, workshop classroom, lab, restroom, and so on)
		With uncovered ground	With gardens or vegetation	With cement floor	
Size					
Percentage of total size of school grounds	100%				Percentage of built area
		Total percentage of school grounds			

Figure 1. School map

Box 2.

Natural control of pests

The use of chemicals to control weeds and other pests is a problem in green areas. The alternative to chemicals is manual labor, which, though intensive, can be carried out by students. Your school can divide up and assign each class to do this work using alternative natural substances. Garlic that has been chopped and diluted in water yields good results, for example, in deterring pests.

Conducting an inventory of trees and plants on school grounds

Making an inventory of all the trees and plants at your school is both useful to planning improvements to the garden and is engaging and fun for student groups. Once an inventory has been made, each plant or tree may be assigned to someone who will be responsible for raising awareness about its care and maintenance.

For this project, the support of a gardener or other person who knows about gardening or botany can be of great help, as can guides on the region's most common plants.
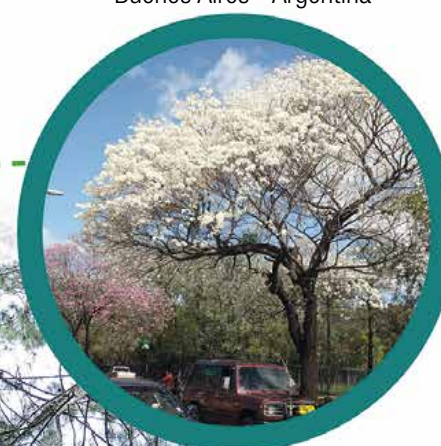
Yellow Lapacho
Curitiba - Brazil

White Lapacho
Buenos Aires - Argentina

Pink Lapacho
Asuncion - Paraguay

Pine
Tegucigalpa - Honduras
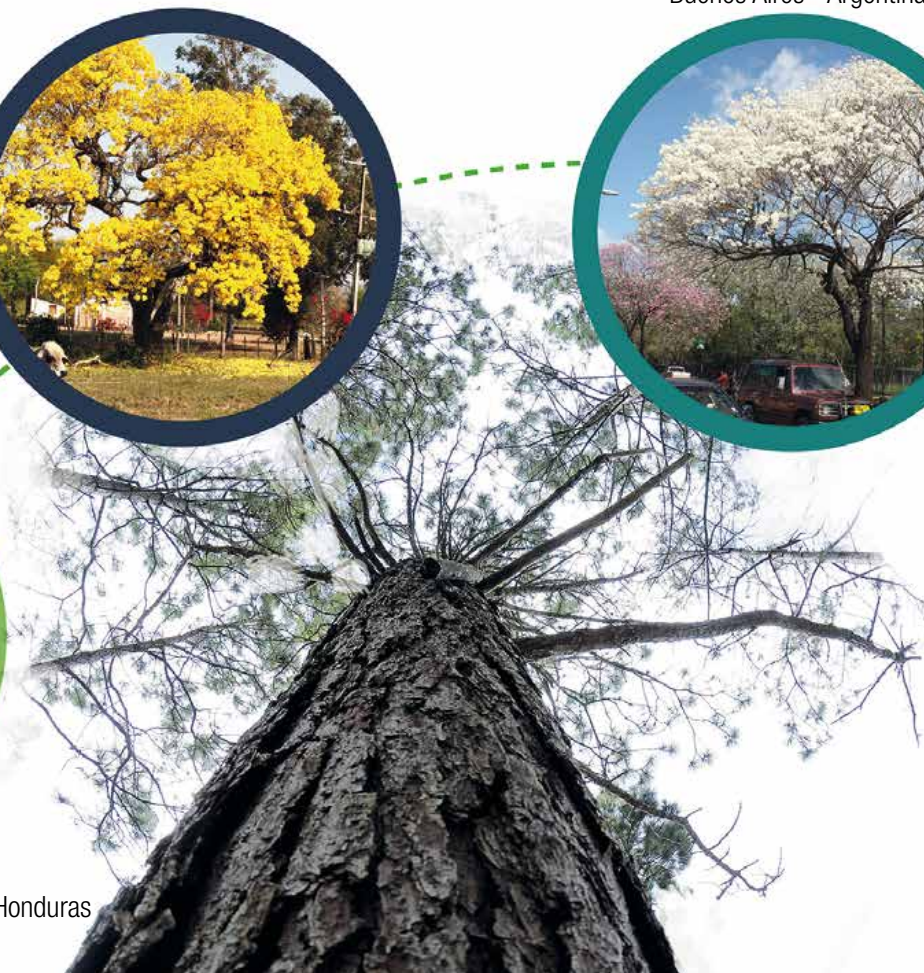
Table 3. Sample inventory of the school's vegetation

Scientific or common name of the plant	Location	Size	Health status	Origin of the plant	Use	Additional comments
Jacaranda mimosifolia	Next to restrooms.	9 meters	It has an initial mistletoe disease.	Native	Shades the yard's play area.	Its roots are affecting the wall of the restrooms.
Red eucalyptus (1)	At the corner of the south fence.	9 meters	Healthy	Foreign	Shades and protects against the wind.	It is not native to the region. We may replace it at some point, though it is healthy and very beautiful.
Red eucalyptus (2)	Next to that above.	8 meterst	Healthy	Foreign	Shades and protects against the wind.	Same condition as that above.
Red eucalyptus (3)	Next to that above.	8 meters	Healthy	Foreign	Shades and protects against the wind.	Same condition as that above.
Plum tree	In front of the principal's office.	4 meters	Healthy	Foreign	Shades and provides seasonal fruit.	Provides fruit every year.

How to care for green areas

Figure 2. Gardening tools

Watering can

Shovel

Pruners

Gloves

Pot

Rake

Clippers

Trowel

Learning about the condition of the infrastructure and equipment (such as the irrigation system, gardening warehouse, and gardening tools) needed for the care of your school's green areas will help you plan for their maintenance.

Your school may already have a full irrigation system or some other instruments needed to maintain green areas, including: water containers, pipes, hoses, sprinklers or drip terminals, pumps, valves, and so on. We advise you to discuss the condition of these items with the person in charge of gardens and yards to ensure that they are in proper working condition.

Warehouses and gardening tools are useful additional resources in the management of green areas. Find out their status and availability to determine how you will be able to obtain access to tools and whether you will have to adapt a space at school for storage.

Table 4 provides an example of how to inventory the tools and fixtures used to maintain school gardens and yards.

Table 4. Sample inventory of structures and tools for maintaining green areas

Structure and/or tool	Current condition	Actions to be taken	Comments
Irrigation system	It exists and works.	Determine whether the system is adequate to handle the project to be developed. Establish an irrigation schedule appropriate to the type of plants.	
	It exists and does not work.	If possible, repair and establish a risk schedule; if not, determine an alternate method of irrigation.	
	There is none.	Establish an alternate method of irrigation and a schedule.	*We may gradually build a drip irrigation system, so as not to waste water.*
Warehouse	One exists.	Evaluate its suitability to store tools and materials.	
	One does not exist.	Establish and adapt a space at the school to be used as a warehouse.	
Tools (such as shovels, rakes, picks and hoes, cultivators, rollers, brooms, hedge clippers, wheelbarrows, lawnmowers, and so on)	Count and study their current condition.		

Greening your school:
Recommendations

The planning of your schoolyard and garden green space will depend on the outcome of your diagnosis. If you intend to construct a new building, planning will also depend on the options presented by the grounds, the resources available, and the characteristics of the ecosystem where you live.

We make the following general recommendations for your plan:

- It is best to choose plants native to your region. Planting native species has these advantages:
  - They naturally adapt to soil conditions, averting fertilization expenses or special soil preparation.
  - They are adapted to the insects and parasites that attack them; their maintenance therefore does not require the expense and use of chemical pollutants.
  - They attract and offer shelter to wildlife such as birds and butterflies.
  - Their water needs are consistent with the climate of the region, which decreases watering time and cost.
  - They are complementary and do not displace natural species; on the contrary, they offer additional space to retain more of the region's biodiversity.

- Consider the characteristics of plant growth so that the development of root and branch systems is compatible with the infrastructure of the school.

- Avoid toxic plants, particularly at schools with small children.

- Consider that vegetation may also be used to isolate infrastructure and offer better conditions for learning and for the health of teachers and students. For example, in warmer areas, plantings on walls may receive more sun exposure, reducing the walls' heat absorption and, thereby, the need for artificial air-conditioning systems. Likewise, in cold areas, trees can protect against the winter wind and permit the use of backyards during winter months.

- If the facilities so allow and resources exist, a mix of different of types of garden spaces would permit recreation for the entire school staff. The gardens are for practical uses and leisure and enjoyment, not only to beautify the school.

- Promote the participation of the entire school community in the construction and maintenance of schoolyards and gardens. Someone may already be in charge of gardening, however, a project like the one you are going to undertake will require the involvement of more people. Carefully gauge these needs as you maximize the collaboration of students, teachers, and parents. Invite them!

- Be certain to set up a maintenance plan for all the green areas along with your garden design.

- Many of the tools and materials needed to build the garden can be sourced from recycling materials at school or at students' and teachers' homes. Also, the Internet can provide numerous ideas. Use your imagination freely! Your classes might also brainstorm about new uses for recycled materials.

Box 3.
Building small corners in the garden

- Recreational and play spaces can be created in the school garden from rocks and logs that have been shaped into seats and placed in shaded areas. They may be used for reading, conversation, and even outdoor work sessions.

- Students can design board games as part of the garden.

- Schools with extensive school yards may transform their gardens into nature trails equipped with bird troughs and sites that allow students to observe and meditate.

Figure 3. School map with a garden plan

Green space

Green space

Classroom

Classroom

Classroom

Garden

P

Park

Green space
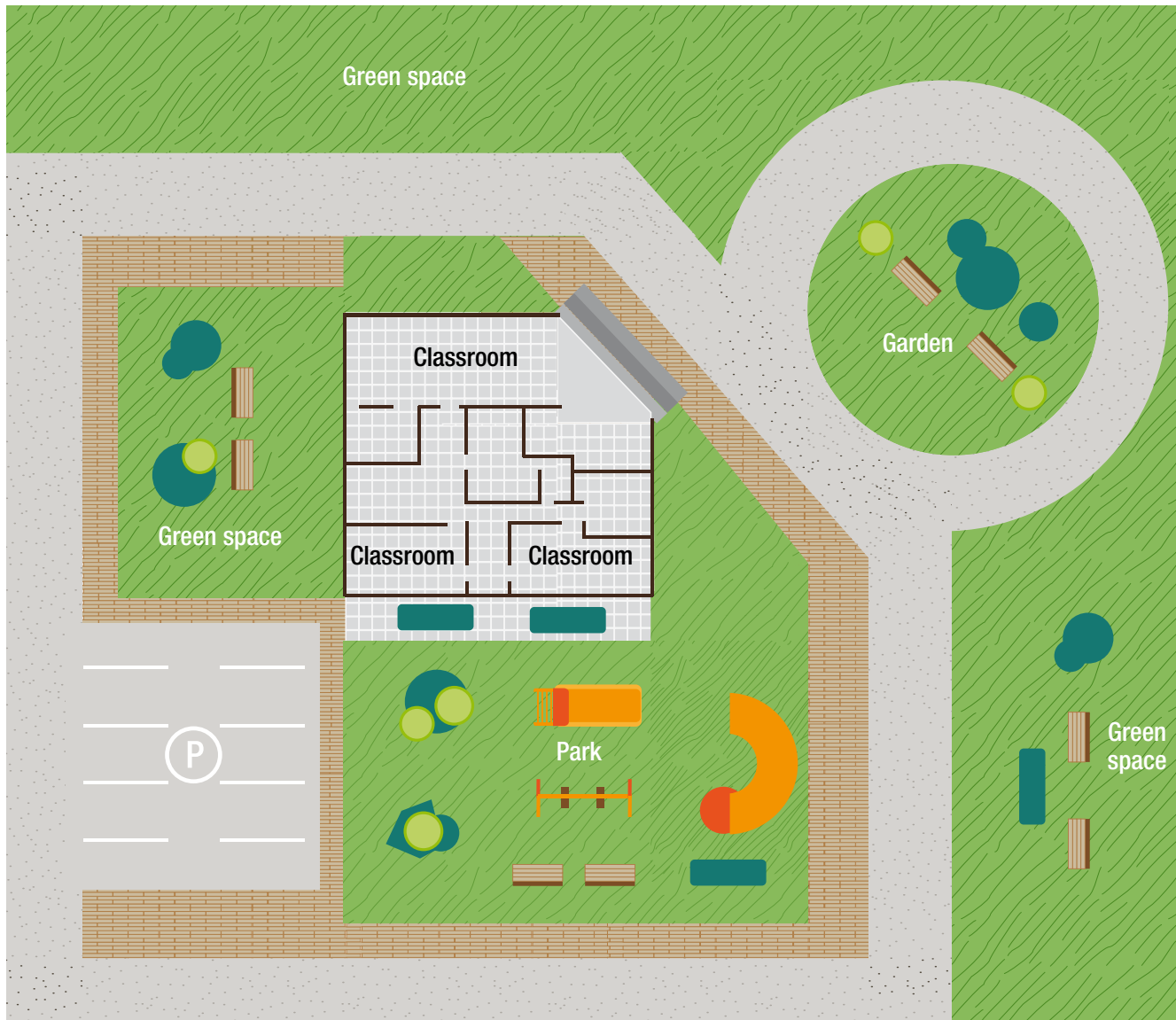
Garden styles are as unlimited as the human imagination. We suggest several possibilities below:

- Horizontal vegetable gardens
- Vertical gardens
- Rain gardens
- Rooftop nature gardens

Horizontal vegetable gardens

In addition to creating green spaces, school vegetable gardens are also a very useful resource for classes, fostering cooperation and responsibility. They allow students to directly observe the cycles of life and to enjoy the results of their work at harvest time. Moreover, it is possible to offer the vegetables as small gifts to the families of the young people enrolled and, in that way, to gradually get them more involved in the school community. Vegetables from the garden can also be used in the school kitchen or for a salad festival celebrating the harvest.

Your school vegetable garden can be composed of different types of plants, including vegetables, medicinal herbs, or a combination of these. If schoolyard grounds are extensive, the garden can be built horizontally; if not, a vertical vegetable garden can be created.

To create a horizontal vegetable garden:

- Remove weeds, rocks, sticks, and any foreign objects from the ground. Set aside those objects that can be used as ornaments or as borders.

- Assess soil characteristics for potential treatment through fertilization, decontamination, and so on.

- Irrigate the area one day before planting so the soil is slightly moist.

- Till the soil using picks, shovels, hoes, and other available tools—as intensively as is required by the plants and vegetables.

- Remove all roots, stolons, and bulbs of weeds that sprout when soil is removed.

- Once the land is tilled and cleaned, spread a two- to three-inch layer of organic fertilizer—either manure or compost. If you don't know how to prepare the fertilizer, go over the information on compost in module 6. Make furrows.

- Sow seeds or seedlings sprouted in seedbeds beforehand.

- Irrigate and clean out extraneous weeds.

- Enjoy the garden and harvest vegetables once they are ready or once herbs and medicinal plants have fully grown.

Vertical gardens

If the school does not have enough space for a horizontal garden, you can always look upward to find space. Vertical gardens have become common in many cities worldwide; their design and ability to make walls beautiful are truly amazing. In fact, vertical gardens are tourist attractions in cities all over the world.

There are many ways to create a vertical garden. The simplest consist of plantings placed directly on the ground, next to a wall, or in flowerpots or potted vines that climb along walls. The most sophisticated have a structure that is completed with an irrigation system and that requires a special or commercial hydroponic substrate to nourish and maintain the plants. You will find the simplest ones here. If your school has the potential to build a more elaborate system, look for technical advice from environmental conservation offices in your town, on the Internet, and by searching for organizations or companies working on the construction of similar projects.

Note that walls also provide an advantage for trees, as they provide heat. In cold climates, the advantage is that walls can help trees grow and enable you to harvest seasonal fruits ahead of time.

To create a simple vertical garden:

- Once the school's diagnosis activity is finished, choose the walls where you wish to plant. It is convenient to choose walls that are more exposed to the sun in localities with very warm weather or those that get colder in cold weather (either because they are not waterproof or the wind whips them directly).

- Learn about vines that grow naturally in your region or those that, though introduced there, have adapted well to the weather conditions in the region without requiring too many special

conditions or resources for growth. You may also choose woody plants (not vines) that can be reshaped and made to grow flush against the wall. These plants are normally used for hedges and fences or are made to take on shapes. Check with local gardens to see which plants are used for that purpose and ask about their characteristics and care needs. By mixing types of plants, you will create a wall with many shades of green or one that has different colors.

- In the case of bare soil or where you are able remove part of the cement covering schoolyards, prepare holes for planting.

Vertical garden

- If the floor is made of cement and partial removal is not advised, place containers next to walls. Large containers can be placed on the floor, small ones hung on the walls. They may be made of diverse materials (clay, PET, cans, or wood), depending on the school's financial resources or on the level of creativity you wish to bring to this project. You can find a wide range of examples on the Internet just by searching for the phrase "how to make a vertical garden."

- In either case, fill pots or holes with soil, compost, and your plant. If you are planting a vine, it will probably initially require a clip to keep it stuck to the wall. A fragile plant may require a stake or stick to help keep it upright.

- Water regularly and remove any pests (weeds or insects). Remember to fertilize the soil periodically and to use natural products to fertilize and control pests.

Vines and climbers
Vertical gardens can be ornamental, edible, or medicinal

Rain gardens

A rain garden is basically a planted area with the capacity to retain water that then filters into the ground. Once vegetation is well established, the area becomes more moist, and plants may grow and develop without additional irrigation systems.

Another key feature of these gardens is their use of native vegetation, which helps protect and restore natural resources. This characteristic qualifies them as sustainable since the plants are native, are adapted to climate cycles typical of the region, and require no additional irrigation or fertilization.

These gardens have additional advantages. They help control problems caused by flooding by lowering the volume and intensity of runoff, while retaining pollutants and sediments; in this way, they allow water to be cleaned as it seeps into the subsoil.

Virtually any green area can be turned into (or contain) a rain garden. Read below to see how you can create one.

How to build a rain garden:

- Once the inventory of the green areas around the school has been completed, select the areas where you are able and wish to install rain gardens. It is necessary to consider the following:
    - Leave a minimum of 33 feet between the site and any building.
    - Leave at least 5 feet between the site and trees already in the area.
    - Locate the underground infrastructure of the school (drainage pipes, drinking water or irrigation pipes, electrical installations, septic tank, among others) to avoid damage.
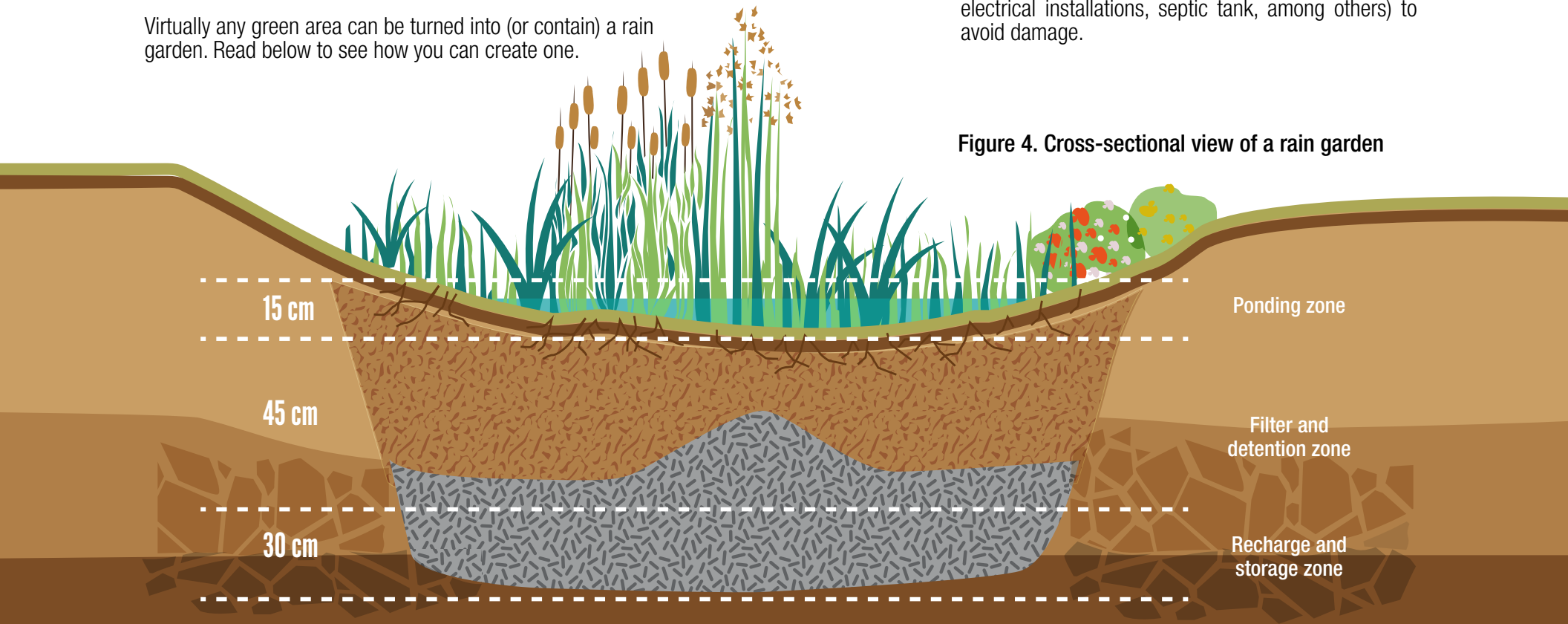
Figure 4. Cross-sectional view of a rain garden

15 cm — Ponding zone

45 cm — Filter and detention zone

30 cm — Recharge and storage zone

- Draw up a plan—based on the general plan of the school—that specifies the size and shape of the rain garden.

- Dig down 24 to 35 inches in the area selected to become a rain garden.

- Create what is called a "recharge area" with stone materials such as stone, gravel, or debris. This area may be 8 to 15 inches deep—the deeper the layer, the more its water retention capacity.

- Place a geotextile or insulating layer that makes it possible to separate the filtering area from the recharge area. It is also possible to use a nylon mesh fabric similar to that used to provide shade in gardens and greenhouses. In some localities, this material is known as mesh-shade.

- Shape the filtering area by placing a layer of garden soil improved with compost or organic matter (30-40 percent organic matter and 60-70 percent soil obtained from the excavation). This layer can be 12-18 inches thick.

Figure 5. Cross-sectional view of a rain garden, specifying materials and thicknesses
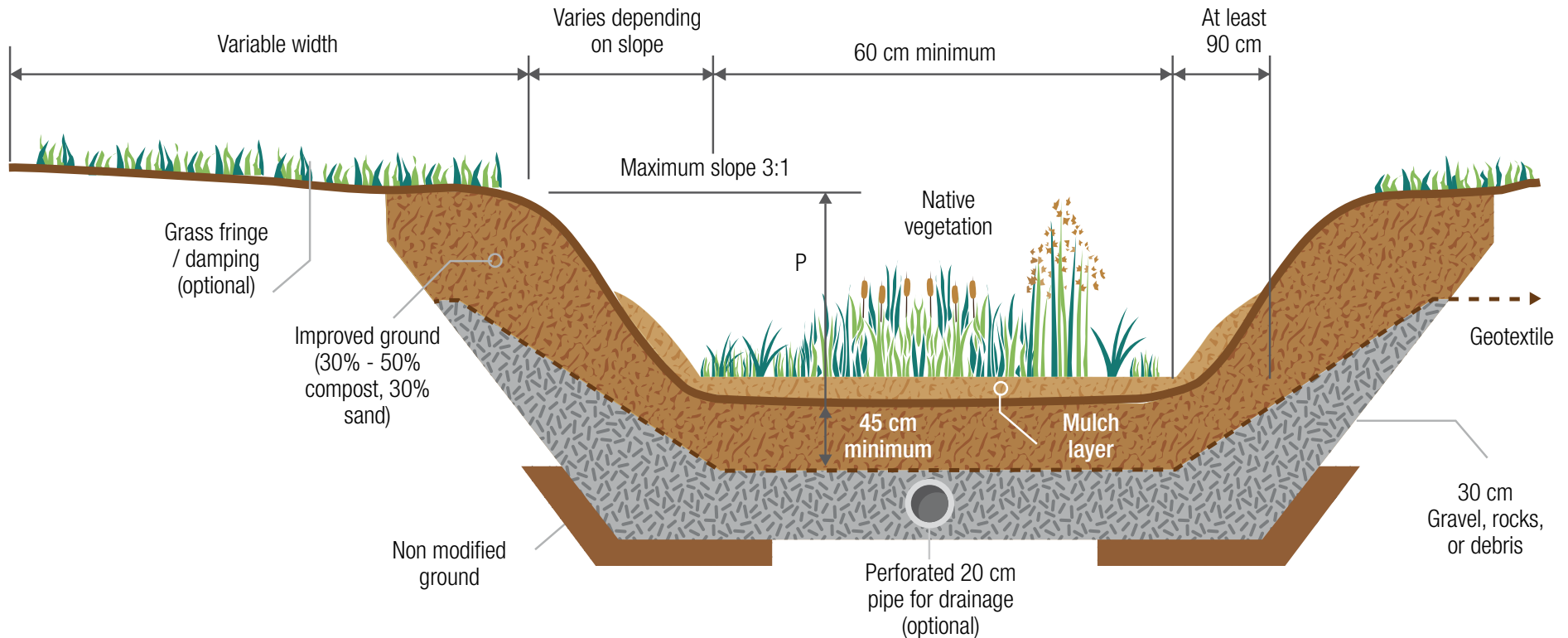
- Plant the plants that will reside in the rain garden. Try to cover the entire area, or most of it, with native flora. The planting design can integrate trees, shrubs, herbs, and different types of grass. It is advantageous to use flowering vegetation that attracts butterflies and hummingbirds.

- Finally, put down a layer of padding or mulch roughly 2 inches thick. This padding is usually composed of wood or crushed gravel. Its purpose is to maintain good drainage in the upper part of the soil while preventing the growth of fungi and decomposition of stems and loss of water from evaporation.

Before

Rain garden
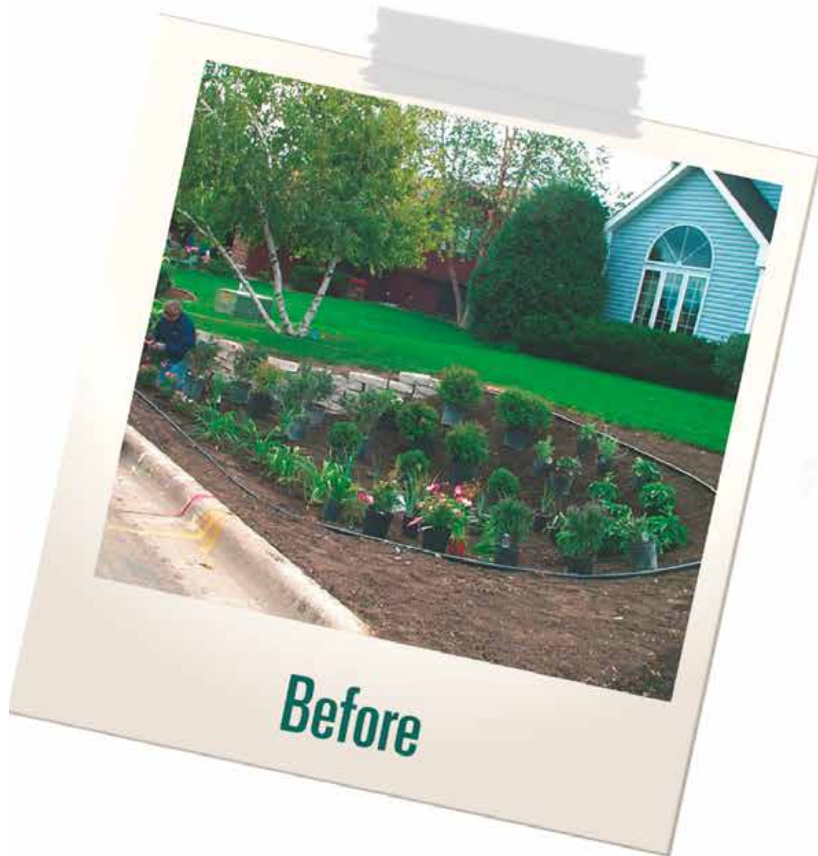
Photos: burnsville.org

After

Rooftop gardens

Growing vegetation on rooftops is a way of insulating buildings (mainly in extreme climates—that is, very hot or very cold) and enriching communities where there is no space for a conventional garden. It is also used to improve air quality in communities affected by pollution, caused either by suspended particles or gas emissions. But these benefits come with added concerns. Among these are the additional costs of reconstructing the roof (reinforcing the structure, isolating the surface so it is not damaged by roots or filtering water, installing drainage systems, and so on), as well as maintaining the garden. There is also the cost of regular or eventual roof maintenance, which augments the costs of removing and replacing the garden.

In general, any type of roof is suitable to becoming a green roof if it can withstand a load of approximately 242 pounds per square meter. To find this out, we suggest that you seek advice from an architect or engineer.

You may need to look for some financing for this project. See the section on "Tips for finding financial support" at the end of this module.

Although it is possible for the school community to participate in some stages of the project, getting the advice of a professional is recommended.

Several groups also provide advice.
In general, the steps toward building a green rooftop include the following:

- Assess whether the rooftop can become a garden.

- Carry out the gardening plan with the advice of a specialist. Get help calculating costs, selecting materials and plant species (remember native species are always most highly recommended), and setting up a work plan for the consulting team and the school community (including those who will work during the construction and maintenance phases).

- Adapt the surface of the rooftop. You must pitch the roof to maintain a slope favorable to water drainage, and prepare the surface for special waterproofing.

- Waterproof the ceiling against roots. A bituminous waterproofing membrane with a built-in plastic root inhibitor is used to prevent roots and, of course, water from penetrating the ceiling. Several brands and types of waterproofing are increasingly common in the Latin American market. You can find more information on those available and how to get them on the Internet.

- Install the drain. You must install both drains and the stony material (or porous membrane) that will allow the filtration of excess water and guide it toward the rooftop drains or rain tank (for reuse when irrigating the rooftop or another garden).

- Position the substrate layer where plants will be planted. This layer should have a minimum depth of 10 centimeters (cm), and preferably be between 15 and 20 cm in colder climates. (The deeper it is, the more its water-retention capacity and the greater the likelihood that plants will survive.) It should be made of light and porous materials that retain moisture and provide adequate nutrients to the planted species.

- Plant the selected vegetables.

- Maintain the green rooftop on a daily basis.

Beyond the school

Some schools have no schoolyard to improve but do have an opportunity to work in an area nearby (a low-maintenance park, wasteland, or vacant lot that young people can use for recreation).

Recommendations for working outside the school include:

- Find out the legal status of the area of interest. Who owns or manages it? Why is it in its current condition? Once you know this, evaluate whether this area provides opportunities for the school community to get involved.

- Get written authorization from the institution or person in charge of the area that you are interested in transforming.

- Conduct a diagnosis activity similar to the one described for the school, with some modifications. Please see table 5 for an example.

- Seek out advice from a group of botanists, gardeners, planners, or people that engage in environmental improvement projects. You can discuss your preliminary ideas with them and ask them for recommendations on how to start. You can also take this opportunity to suggest that they become your partners.

- Develop a work plan with a project that includes ideas from all participants (students, teachers, school gardeners, parents, and neighbors), including tasks, how they will be carried out, who will be responsible for each, and how much time and what resources will be needed.

- Look for financing, grants, and additional partners.

- Gradually develop a plan to transform the area.

- Provide ongoing maintenance to the new green area based on the internal organization that you have agreed on at the school and the other organizations that have joined the project.

- At the start and completion of important parts of the project, invite a journalist or radio station to present what you are doing to the community. This can motivate the rest of the population to undertake projects such as yours.

Table 5. Diagnosing an area off school grounds

Topics to research		Answer
Property rights and legal status of the site of interest.		
Name and contact information of the owner or authority responsible for its care or administration.		
Size of the area of interest.		
Nearby structures: shops, offices, houses, other schools or high schools, and so on (identifying these is important because each can become an additional feature of or partner in the project).		
General characteristics. (Does the area have any vegetation? Is the soil bare? Since when has it been vacant?)		
Is it currently being used for any purpose (as an occasional sports field, a parking area on certain dates or times of the day, an occasional circus or carnival site, and so on)?		
If it contains plants, which? Make a list and identify which are native, and their condition (the inventory form can be used).	Number and type of trees	
	Number and type of shrubs	
	Grass (how many square feet and which type)	
	Size of uncovered soil areas	
What percentage of the plants are native to the region?	Trees	
	Shrubs	
Create a map showing the dimensions of the entire area and the areas covered by buildings.		

Monitoring and evaluating progress

Environmental

The best way to monitor and evaluate changes in the reforestation of the school is to maintain a photographic record showing all spaces before and after project implementation. We suggest that you invite students and teachers to contribute photographs and drawings for display on your school bulletin board. You may also place a small suggestion box near the pictures for feedback on the improvements.

Registering new wildlife as they arrive at the gardens is an additional evaluation tool. To facilitate this, lesson plans might include such activities as observing birds, butterflies, lizards, and other small species.

Social

Clearly, increasing school green areas yields very obvious social benefits. Among these are more comfort, a more beautiful landscape, less dust, and more fresh air. To monitor these benefits, you may take the following steps:

- Throughout the project's development, hold meetings to share and document the ways in which agents have participated in the project. How did they feel? What did they enjoy the most? What would they do over? What would they like to adjust?

- Create a school log that compiles the opinions of students and teachers.

- Occasionally feature your school's environmental conditions as the main topic of your school newspaper or bulletin board. Invite students to write about their perceptions, their memories, and their hopes for their school. Include the benefits that are derived from establishing green areas.

- Place a suggestion box for visitors and users of the school's installation that collect their impressions of the benefits of the vegetable gardens and other green areas.

- Promote the creation of a friends' club for each area of the garden to offer suggestions for improvement and follow up on peer proposals.

Economic

In the short run reforestation may not yield economic revenue, yet its environmental and social benefits are well worth the effort.

Happily, it may also result in savings to the school in electricity consumption, as the microclimate of the school is modified. If you sense that this is occurring at your school, compare electric power usage statements and bills from before and after the greening project.

In addition to creating gardens that produce vegetables and medicinal and ornamental plants, you can organize activities to feature your produce in a weekly market at the school where students can barter for school materials, among other possibilities.

Tips for finding
financial support

Many countries provide government support for the construction of rooftop, vertical, and other types of gardens. You may contact the offices that work on environmental issues and urban infrastructure that might provide financial support and other advice.

There are foundations and organizations that offer free technical advice and even support for certain projects. Contact those in your community first. If there are none, explore the Internet by using such words or phrases as:

- *How to obtain financing for a vegetable garden*

- *Agencies supporting reforestation*

- *Funding agencies for rooftop gardens*

- *Funding for vertical gardens*

Include the name of your country in some of your searches.

Bibliography

- Alliance for a Healthier Generation, "How To Start a School Garden. A Toolkit," http://www.healthiergeneration.org/.

- Evergreen School Ground Greening. "Greening School Grounds." http://www.evergreen.ca/our-impact/children/greening-school-grounds/

- FAO (United Nations Food and Agriculture Organization). 2005. "Setting Up and Running a School Garden. A Manual for Teachers, Parents and Communities." Rome. http://www.fao.org/.

- Green Rooftops. Generating life closing cycles. http://www.azoteasverdes.org/

- IPCC (Intergovernmental Panel on Climate Change). 2007. Fourth Assessment Report. Geneva: United Nations.

- Natural Home and Garden. 2012. "Green Gardening; Natural, Organic and Native Gardening Tips. Green Your Life: DIY Repurposed Bird Feeders." http://www.naturalhomeandgarden.com/green-gardening/green-your-life-diy-repurposed-bird-feeders.aspx.

- Rain Gardens. 2012. "Beautiful Solutions for Water Pollution." http://www.Raingardens.Org.

- Square Foot Gardening. 2012. http://www.squarefootgardening.org.

- University of Rhode Island. 2012. "Making a Container Garden." http://www.uri.edu/.

- USDA (United States Department of Agriculture) Natural Resources Conservation Service. 2008. "Rain Gardens; Iowa Rain Garden; Design and Installation Manual." Iowa. http://www.iowaagriculture.gov/.

- Wisconsin Department of Natural Resources. 2003. "Rain Gardens: A How-To Manual for Homeowners." http://learningstore.uwex.edu/.

- Your Guide to Green. 2012. "Recommendations on Using Recycled Materials in the Garden." http://www.yourguidetogreen.com/.

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