L-Università ta' Malta
Institute for Climate Change
& Sustainable Development

Report for EQA Recommendation 12

Recommendation 12: UM could consider increasing the number of green spaces for students.

Report prepared by the Institute for Climate Change and Sustainable Development (ICCSD), University of Malta

December 2024

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Content

Brief

The University of Malta needs to consider increasing the number of green spaces for students. The Institute for Climate Change and Sustainable Development is supporting this action by introducing elements of co-production for Nature-based Solutions (NbSs) into the process. The structure of this report is based on "A practical guide to using co-production for nature-based solutions" (van der Have et al., 2022).

Goal

What is the specific goal for using co-production? What types of knowledge, empowerment, stakeholders, outputs are we striving for?

- Knowledge: what are the needs of children attending Kids on Campus in relation to outdoor areas of the university of Malta Campus?
- Empowerment: How can children be empowered to co-produce NbSs?
- Stakeholders: Children attending Kids on Campus, University of Malta, Malta.
- Outputs: Different Nature-based Solutions proposed around UoM.

The following are the main questions guiding the process:

- How can we make the University of Malta greener?
- How can we make it more people-friendly?

Structure/Context

The Institute for Climate Change and Sustainable Development (ICCSD), through its ***Nature-based Solutions for Urban Resilience Project***, funded by the **HSBC Malta Foundation**, has offered to collaborate with the University of Malta Estate and Works and Kids on Campus to carry out five green walk-shops and five post-walk sessions with pupils of Kids on Campus. The walks were carried out within University of Malta grounds to identify the following:

1. Identify potential areas for greening and invest in specific creeper plants to green walls.
2. Increase picnic tables in strategic locations.
3. Target areas devoid of greenery to explore the possibility of introducing green infrastructure.

These actions aim to address Recommendation 12 of the EQA which requires the University of Malta to consider increasing the number of green spaces for students.

Raffaella Zammit, Research Support Officer II at the ICCSD has facilitated the following - Green walk-shop and post-walk session.

A request to Kids on Campus was accepted and the following cohorts were engaged with:

- 4- to 5-year-olds
- 6- to 7-year-olds
- 8- to 9-year-olds
- 10- to 11-year-olds
- 12- to 13-year-olds

Each group consisted of 18-25 children. Educators accompanied the children.

Activities

Research and co-production with children benefit from a creative approach (Blaisdell et al., 2018; Hickey-Moody et al., 2021; van der Have et al., 2022), hence the ICCSD proposed green walk-shops followed by in-class processing/reflection. Each group covered different routes and spaces around the University grounds. The researcher facilitated the walks and the post-walks sessions, exploring different areas with each group and supported them in co-producing Nature-based Solutions together. The following provides an overview of methodology used, with the session adjusted depending on the age-group.

Group 1

- 4- to 5-year-olds (group of 13)
- Green walk-shop on the 11th of July 9:30 to 10:30
- Post-walk session 12th July 9:30 to 10:30

Green walk-shop

The researcher introduced herself and carried a short icebreaker, asking the children:

- Name
- Do you like to play outside?
- Do you like to walk outside?
- What do you like when you go outside to play or walk?

The aim of the walk was introduced, and the researcher invited the children to be explorers with her, asking them to help find animals, plants, and shade during their walk. The researcher asked the children to use their senses, “We are going to walk with our eyes, ears, nose and fingers!”. The children explored the garden near the old humanities (child-care area) where they played under the trees and collected natural material (Figure 1 and 2).

Figure 1. Children playing in the garden between the Old Humanities and the childcare centre.

Figure 2. The children collected twigs, leaves and other natural materials from their walk.

The walk proceeded to the Water-tower area, here the group stopped and observed. The children were provided with images of flowers, creepers, bees, birds, butterflies and caterpillars. They were encouraged to choose the images they like and place them where they would like to see more nature (Figure 3).

Figure 3. Child affixing images of flowers. Creeping plants, bees and birds on a blank wall in the "Nothing place".

Post-walk session

The children were asked to recall the walk. They described the tree area, and then the area near the water-tower and referred to the latter as the "Nothing Place". The children were grouped into two and given craft resources included the collected natural material. They were asked to use the resources available and create a "Something Place" for them, the birds, the bees and other animals. The "Nothing Place" was a blank sheet of paper.

Figure 4. Children creating "Something Places" using craft and collected materials.

The children spent 30 minutes working together and created seven different "Something Places". The children were supported when they required it. Once ready the children presented their work. The following were ideas generated:

- Trees, shrubs, flowers, and green walls
- Bridges
- Birdbaths, nests for birds, bird houses, bird-feeders, tunnels for animals to find shelter.

Group 2:

- 6- to 7-year-olds (group of 16)
- Green walk-shop on the 15th of July 8:20 to 9:20
- Post-walk session on the 15th of July 9:20 to 10:20

Green walk-shop

The researcher followed the same format as for Group 1. The children explored the corridor between location 22 and 25 on the University Site Plan. The area had some planters, open spaces along the stairwell.

Figure 5. Children used illustrations of different plants, insects and birds to affix in areas they would like to see more greenery.

Post-walk session

The children were asked to work in small groups. The children were asked to draw an outdoor space integrating natural elements and playful areas. Some of the children had difficulty on how to approach this. The RSO provided some support with prompts:

- Imagine you are a bird and looking from above.
- When you go outside what bothers you?
- What would you like more of?
- What would animals need?

During the session a problem arose related to excluding a particular child from the group work. The children were encouraged to work in groups of two or three, however this was proving to be difficult in a particular case. Following discussion with the educator the RSO responded to this situation by changing the method slightly. The children were asked to sit in a circle. The RSO provided a large piece of paper and asked the children to share problems they encounter when outside. The following were identified:

- Too much sun, no shade
- Being thirsty
- Being hungry

The children were asked to propose some solutions to the above problems (they mentioned that these problems were also encountered by animals). The following ideas were shared:

- Water fountain
- Trees for shade
- Plant canopies for shade
- Umbrellas made of plants for shade
- Urban farms - fruit trees
- Bird feeders, nests and baths
- Bee and bug hotels

Group 3:

- 8- to 9-year-olds:
- Green walk-shop on the 16th of July 8:20 to 9:20
- Post-walk session on the 25th of July 9:30 to 10:30

Green walk-shop

The walk was from the Gateway Building to the Monument of Dun Karm Psaila and the Outdoor Gym area (Figure 6). The children spent a good 20 minutes exploring the area, and freely playing. It was still early and there was enough shade to play. The children then gathered and discussed how to introduce more natural elements in the area. The children used the illustrations to indicate areas where nature could be introduced. During the discussion the children mentioned how Bee hotels could be introduced in the Outdoor Gym area, which is surrounded by pines.

Figure 6. Children playing in front of the Dun Karm Psaila monument, which was still shaded in the morning.

Post-walk session

After a warmup and cooling down session to calm down and focus, the children were grouped into three groups of approximately five children each. Each group chose a name for the group. Each group was provided with an assortment of material (cardboard boxes, pinecones, twigs, sticks, pieces of wood, cork, paper, egg cartons). Each group had a workstation. Each group was tasked to create a Bee Hotel in view of the interest shown in the previous session.
The children mostly worked as a group. During the workshop the Researcher noticed a girl was not as involved so she asked her if she would like to make a sign for the bee hotel which she promptly accepted. The crafting lasted around 30 minutes, after which a representative was chosen to present each groups' creation. The Bee Hotels included signs, play areas, and tiny holes to enter the spaces (Figure 7). Children were interested in the life cycle of insects, asking a number of questions. They also were curious as to whether insects play. The children wished that their prototypes would be used at the University, and that the insects would use them. The children also requested that more sessions like this crafting for nature would be held.

Figure 7. The Bee hotels were created by the children using available craft material.

Group 4:

- 10- to 11-year-olds:
- Green walk-shop on the 22nd of July 8:20 to 9:20
- Post-walk session on the 22nd of July 9:20 to 10:20

Green walk-shop

This walk was a bit different. The children were asked to mention university spaces that they are familiar with and which they like to go to, and why. They also know how these areas could be improved. They mentioned the Japanese Garden, the Quad, the area between the Quad and the IT facilities, and the area near the playschool and the Faculty of the Built Environment (area in between areas numbered 8, 9, 11 and 12 on the Site Plan). During the walk the children suggested the following:

- More flower beds/ground cover
- More trees in Quad (the raised bed nearest the library)
- Replanting of trees where there are dead trees
- Use of fields as raised beds for university community (kids on campus, university students, staff) (Figure 8)
- Treehouse
- Better accessibility for all (Figure 10)

Figure 8. The children envisioned raised beds and community urban farming.

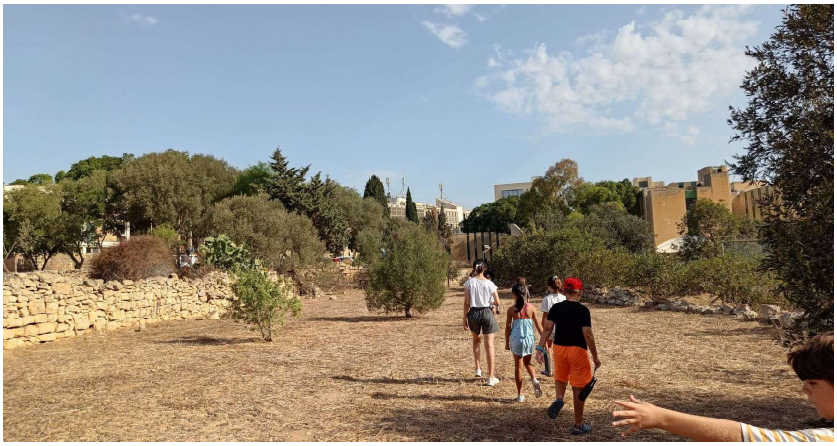

Figure 9. The fields inspired the children, who saw potential in urban farming and nature-based play.

Figure 10. The wooded area near the Faculty of Built Environment is not accessible for all.

Post-walk session

Being older children, a different approach was used during the in-class session.

Group work - the good, the bad and the ideal (20 minutes)
Each group was tasked to indicate the following using sticky notes:

- What's important/good (Pink) (approx 7 minutes)
- What's missing could be better (Yellow) (approx 7 minutes)
- What things would you change? (Green) (approx 7 minutes)

Figure 11. The children worked in teams, responding to three questions.

Figure 12. Each sticky note represented the good, the bad and the ideal.

The following is a recap of the group work:

Quadrangle:
What is important?

- The trees, plants, flowers, soil
- Space for everything (nature, socialising and water activities during summer)
- Clean fountain water

What could be better?

- More plants and flowers
- Birdhouses
- More space for nature
- More water source
- Solar panels
- Irrigation system

What things would you change:

- Introduce more plants, flowers, replace rotten plants

Japanese Garden
What is important?

- Keeping the area clean
- It is our favourite place, nature in the built-up environment
- The sound of birds
- The trees
- The pond

What could be better?

- More plants and colourful flowers

- Some lights/decorations in the trees
- Fish in the pond
- Aquatic plants in the pond
- Area should be cleaner

What things would you change:

- Repaint benches
- Bridge/Pond safer so nobody falls in
- Introduce fresh grass to replace pine needles

Field

What is important?

- There is no rubbish

What could be better?

- More trees
- Water source
- Urban farm
- Raised beds
- Farm animals
- Bird houses and bug hotels
- Bins

What things would you change:

- Footpaths
- Play areas

This was followed by a drawing session where each child was provided with an A4 paper to draw the areas in the future.

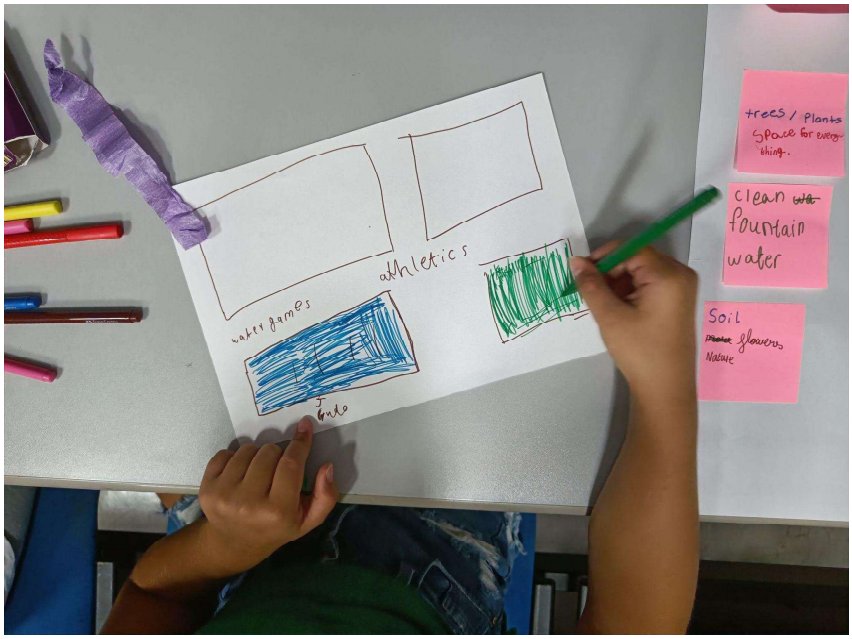

Figure 13. Each child drew their ideal open space based on the areas visited.

Group 5:

- 12- to 13-year-olds:
- Green walk-shop on the 24th of July 8:20 to 9:20
- Post-walk session on the 21st of August 11:10 to 12:00

Green walk-shop

Prior to the walk a brief introduction was given related to Nature-based Solutions. The walks were child-led. The children were asked to split into 3 groups and to each walk the whole group to one area that they would like to see more Nature-based Solutions. Together we went to the following areas:

- Carpark 6
- Assembly point 13
- Area near the Water Tower

The children proposed that these areas should be re-natured/rewilded.

Figure 14. The students wanted to visit the carpark which they referred to as the "Institute of Ugliness"

Post-walk session

The session was divided into three parts as follows:

Group work - the good, the bad and the ideal (20 minutes)

Each group had one of the following areas (in brackets information and tips to support the children)

- Carpark 6 (this was described as the "Institute of Ugliness", too many cars, little to no nature, dead space, approximately 300 parking space)
- Assembly point 13 (in front of Library, exposed to sun and rain, very limited greening)
- Area near the Water Tower (very bare, no green, hot)

Each group was tasked to indicate the following on an A2 paper:

- What's important/good (Pink) (approx. 7 minutes)
- What's missing could be better (Yellow) (approx. 7 minutes)
- What things would you change? (Green) (approx. 7 minutes)

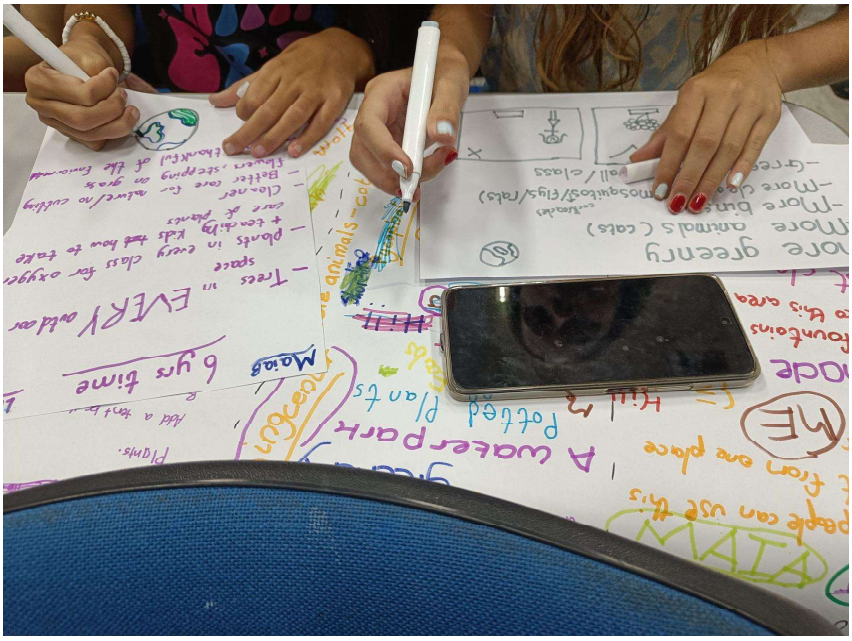

Figure 15. The students worked in groups to assess the area chosen

Group work - drawing our vision (20 minutes)
The group was asked to use supplies to create a drawing/model of how they envision the space in the future to address the challenges and changes they identified.

The groups were supported with some tips, example:
Parallel parking of bicycle 1500mm
⅓ of the space currently used by parked cars can be used by 300 bicycles, with ⅔ freed up.

Figure 16. The students worked in groups to draw their vision

The students then presented their discussions and ideas. The follow is a recap of their work:

Carpark 6
What's important/good:
- It can fit around 300 cars
- It is conveniently located

What's missing could be better
- There are no bicycle racks
- The bus stops are far away

What things would you change?
- Dedicate half of the current car park to nature
- Walking path through nature park and connect with the University
- Charging for e-bikes
- Buses and bicycle racks near the University

Assembly point 13
What's important/good:
- There are some plants and tree
- The area is kept clean
- There is some shade

What's missing could be better:
- Vegetated canopies
- More nature
- More shade

What things would you change?
- More benches
- More bins
- Charging points
- Solar panels
- More art

Area near the Water Tower
What's important/good:
- Connectivity to various areas
- Shade
- Water fountains are located nearby
- Clean
- Vending machines
- Internet access

What's missing could be better:
- Greenery
- More animals
- Playful elements

What things would you change?

- More biodiverse trees, plants and flower
- Vegetated canopies to reduce heat
- Community projects
- Bee/bug hotels

Individual work - drawing/writing my vision (10 minutes)

Following the presentations, the participants were asked to work individually. They were asked to write a letter to themselves, describing their daily routine coming to the University and how it the University could change in the future. This exercise was proposed in response to the discussions that developed throughout the session. All showed an interest in being University students in five to six years, and wondered how University would have changed by then.

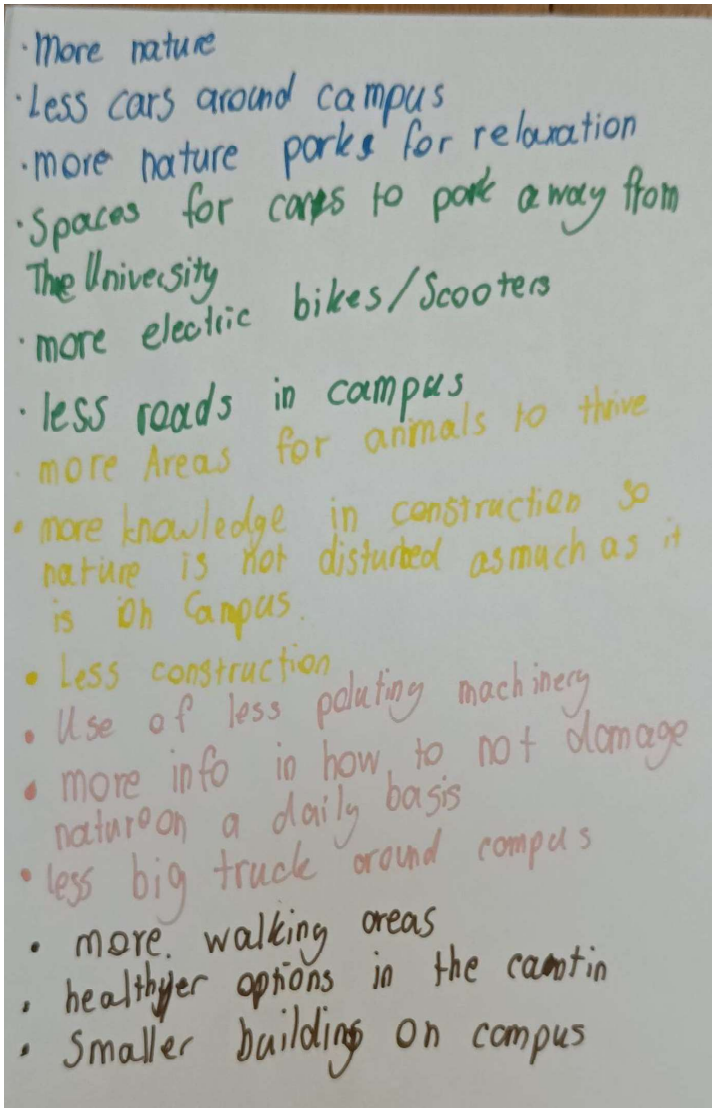

Figure 17. One of the notes written by the students about their individual vision

Reflection

Methodology

Reflecting on the walks and the age groups, some changes for future walk-shops will be considered. Particularly with the older children, ages 8+, having playful mapping games that allowed movement, and exploration may engage the children more. More age specific activities need to be explored, also considering peer pressure.

A variety of resources were needed. During the walk the children could have picked up more natural material to be used in class. A presentation of Nature-based Solutions could have possibly helped the children visualise current solutions and integrate them into their discussions, visions and ideas.

Areas

The green walk-shops covered 14 areas around the University, of which seven were pre-determined by the researcher (with the younger children) and the other half were child-led. The areas varied in terms of location, context and size. The areas explored cover approximately 29,600 square metres. Seven of the areas are at ground level. While the rest are terraces, lying atop underground buildings. Eight of the areas were soft-landscaped areas, whereas the rest were either hard-landscaped or a carpark. The following map provides information about the areas explored:

https://www.google.com/maps/d/edit?mid=1_FGRVZFav2B-Wxv_TRU_G4qvLe5Udsk&usp=sharing

Figure 18. Map of areas explored with the children (grey = hard surfaces and no greenery, green = soil and/or greenery present).

Recommendations

The goals of the EQ Recommendations 12 were as follows:

1. Identify potential areas for greening and invest in specific creeper plants to green walls.
2. Increase picnic tables in strategic locations.
3. Target areas devoid of greenery to explore the possibility of introducing green infrastructure.

Recommendations by area

The following table provides the collated information derived from the workshops held with students of Kids on Campus for each area we visited.

Table 1: Collated feedback provided by children of Kids on Campus

Area	**Location**	**Area ha**	**Description**	**Recommendations**
Area 1	Garden near Old Humanities, near Tajra Child Edu Care centre	0.031	Garden with trees and soil cover. Artificial turf covered in leaf litter	Bridges Birdbaths, nests for birds, bird houses, birdfeeders, tunnels for animals to find shelter.
Area 2	Area near the Water Tower	0.005	Area near the water-tower and referred to the latter as the “Nothing Place”	Shrubs, flowers, and green walls Birdbaths
Area 3	Area near Dun Mikiel Xerri Lecture Centre	0.001	Masonry planter	Raised beds - fruit trees Bird feeders, nests and bird baths Bee and bug hotels
Area 4	Area near Dun Mikiel Xerri Lecture Centre	0.002	Bare walls and ground	Water fountain Trees for shade Plant canopies for shade Umbrellas made of plants for shade Urban farms - fruit trees Bird feeders, nests and baths Bee and bug hotels
Area 5	Area near Dun Mikiel Xerri Lecture Centre	0.001	Masonry planter	Raised beds - fruit trees Bird feeders, nests and baths Bee and bug hotels
Area 6	Area in front of Dun Karm monument	0.013	Artificial lawn Shaded in the morning Exposed later morning and afternoon	Bee hotels Bug hotels Bird houses removal of artificial turf, replace with natural cover

Area 7	Wooded area with outdoor gym	0.191	Wooded area with outdoor gym	Introducing undergrowth: *Ruscus hypophyllum*, which is very rare; *Rhamnus alaternus*; *Iris foetidissima*,; *Scilla clusii* which is possibly endemic; *Kundmannia sicula*; and various other orchids. Collaboration with Nature Trust could be discussed
Area 8	Japanese Garden	0.044	Japanese garden - this is a favourite spot, they like that it has trees, it is quiet, there's the bridge and the pond. Children like spending time here when they can.	A sanctuary for adults, children and animals More plants and colourful flowers Introduce fresh grass to replace pine needles Aquatic plants in the pond Fish in the pond Keeping the area clean Repaint benches Bridge/Pond safer so nobody falls in Decorations in the trees
Area 9	The Quadrangle	0.272	The quad is another favourite spot for the children, and they associate it with water games. They like it mostly because of the games they play and the tree canopy	Multifunctional space: The trees, plants, flowers, soil Space for everything (nature, socialising and water activities during summer) Clean fountain water More plants and flowers Birdhouses More space for nature More water source Solar panels Irrigation system
Area 10	Fields	1.04	The children liked this area and expressed a lot of positive feelings towards it, and ideas to introduce nature. Accessibility also needed improvement	There is no rubbish More trees Water source Urban farm Raised beds Farm animals Bird houses and bug hotels Bins Footpaths Play areas

Area 11	Wooded area between Architecture and Gateway building	0.252	This area is another favourite spot for the children, it is a raised area with mature trees and used as a picnic area, especially with the children at the University child-educare services	This was not included in the exercise since we only had 3 groups. However, these were the recommendations on site: it is not accessible for all, and is a bit run down with bins needing replacement. Introducing undergrowth: *Ruscus hypophyllum*, which is very rare; *Rhamnus alaternus*; *Iris foetidissima,*; *Scilla clusii* which is possibly endemic; *Kundmannia sicula*; and various other orchids. Collaboration with Nature Trust could be discussed
Area 12	Carpark 6	0.943	Carpark 6 this was described as the "Institute of Ugliness", too many cars, little to no nature, dead space, approximately 300 parking space	More bicycle racks and charging for e-bikes near university Bus stops nearer university Dedicate half of the current car park to nature Walking path through nature park and connect with the University
Area 13	Assembly Point 13	0.145	Piazza Costaguti/Assembly point 13 (in front of Library, exposed to sun and rain, very limited greening)	Greenwalls Vegetated canopies More nature More shade More benches More bins Charging points Solar panels More art
Area 14	Area along Water tower and FEMA Faculty of Media and Knowledge Sciences	0.02	Area near the Water Tower (very bare, no green, hot)	Greenery More animals Playful elements More biodiverse trees, plants and flower Vegetated canopies to reduce heat Community projects Bee/bug hotels Signs about bees (to be careful of stings)

Nature-based Solutions

Based on the above, the following are recommendations in relation to Nature-based Solutions that could be implemented at the University of Malta:

Table 2: Recommended Nature-based Solutions per area

Area	**Location**	**Area ha**	**Recommended NBS**
Area 1	Garden near Old Humanities, near Tajra Childcare centre	0.031	**Urban Park/parklet** Remove artificial turf and introduce wood chips, potentially a sandpit area for the preschool children on campus. Introduce more shrubs and undergrowth. Suggested shrubs: 1. *Rhamnus alaternus* (full sun to part shade); 2. *Myrtus communis* (full sun to part shade); 3. *Rosmarinus officinalis (*full sun needs at least 6 hours of sun) Suggested undergrowth vegetation: 1. *Kundmannia sicula;* 2. *Centranthus ruber*. **Birdhouses and Bug/Bee/Insect hotels** Providing bird houses, bee hotels and bug hotels to increase urban biodiversity as well as aesthetic value. Potentially to work with Kids on Campus and other Faculties, Institutes and Centres to develop these during summer 2025.
Area 2	Area near the Water Tower	0.005	***Green walls:*** Vertically vegetated garden, there are two types: Traditional vegetated walls with creepers directly attached to walls, or use of support structure to create an air gap between the wall. Can be planted directly to the ground or when this is not possible the use of plant boxes/raised beds is recommended. Full sun to partial shade: 1. *Bougainvillea sp.;* 2. *Capparis orientalis;* 3. *Cheirolophus crassifolius;* 4. *Clematis cirrhosa;* 5. *Hedera helix;* 6. *Jasminum nudiflorum;* 7. *Lonicera implexa.* Indirect sunlight: 1. *Clematis cirrhosa;*

			2. *Hedera helix;* 3. *Stephanotis floribunda.* ***Green roofs*** Rooftop vegetated gardens that provide water filtration, insulation, ecological stepping stones, increase biodiversity, mitigate urban heat island effect. Reference to LifeMedGreenRoof Project (2024) should be made, particularly in relation to species used and growing media selection. The following species were grown successfully in test trays as part of the Life MedGreen Roof Project (LifeMedGreenRoof Project, n.d.): 1. *Antirryinum tortuosum* Greater snapdragon 2. *Cistus creticus* Hoary Rock-Rose 3. *Coronilla valentina* Mediterranean Crown Vetch 4. *Crithmum maritimum* Rock samphire 5. *Darniella melitensis* Maltese Salt-tree 6. *Hypericum aegypticum* Shrubby St. John's Wort 7. *Inula critmoides* Golden samphire 8. *Lavandula multifida* Egyptian lavender 9. *Lobularia maritma* Sweet Alison 10. *Palaeocyanus crassifolius* Maltese Rock-Centaury 11. *Phagnalon graecum* Eastern Phagnalon 12. *Phlomis fruticosum* Jerusalem sage 13. *Prasium majus* White Hedge-Nettle 14. *Rosmarinus officinalis* Rosemary 15. *Ruta chaelepensis* Fringed rue 16. *Sedum sediforme* Pale Stonecrop 17. *Senecio bicolor* Silver Ragwort 18. *Teucrium flavum* Yellow Germander 19. *Thymbra capitata* Thyme ***Birdhouses and Bug/Bee/Insect hotels*** Providing bird houses, bee hotels and bug hotels to increase urban biodiversity as well as aesthetic value. Potentially to work with Kids on Campus and other

			Faculties, Institutes and Centres to develop these during summer 2025.
Area 3, 4 and 5	Area near Dun Mikiel Xerri Lecture Centre	0.004	***Urban Park/parklet*** Introduce more trees/shrubs and undergrowth. Suggested trees/shrubs: 1. *Crataegus* Spp.; 2. *Malus* spp.; 3. *Punica granatum;* 4. *Pistacia lentiscus*; 5. *Morus alba;* 6. *Morus nigra.* Suggested undergrowth vegetation: 1. *Rhamnus alaternus;* 2. *Kundmannia sicula;* 3. *Centranthus ruber.* ***Birdhouses and Bug/Bee/Insect hotels*** Providing bird houses, bee hotels and bug hotels to increase urban biodiversity as well as aesthetic value. Potentially to work with Kids on Campus and other Faculties, Institutes and Centres to develop these during summer 2025. ***Green walls:*** Full sun to partial shade: 1. *Bougainvillea sp.;* 2. *Capparis orientalis;*

			3. *Clematis cirrhosa;* 4. *Hedera helix;* 5. *Jasminum nudiflorum;* 6. *Lonicera implexa.* Indirect sunlight: 1. *Stephanotis floribunda*; 2. *Hedera helix;* 3. *Clematis cirrhosa.* ***Vegetated canopies:*** Canopies that are vegetated, providing shade to pedestrians and which attract pollinator species. These are a new system and would ideally be tested as part of an EU funded project. More information from https://www.singulargreen.com/en/green-shades-valladolid/ (Singular Green, 2024)
Area 6	Area in front of Dun Karm monument	0.013	***Urban Park/parklet*** The area in front of the monument is most likely a reservoir. The removal of artificial turf and site preparation for a green roof type should be explored, including: ● surface treatment, ● stormwater-runoff, ● growing medium, ● planting of perennial, annual plants and other green roof type plants The following list of species are of significance since they are referred to in Dun Karm's poems and prose: 1. *Matthiola incana subsp. Melitensis* - flowering March – May 2. *Matthiola tricuspidata* - flowering March – June 3. *Epilobium tetragonum* - flowering April to October 4. *Sulla coronaria* - flowering in May 5. *Verbascum sinuatum* - flowering May to August 6. *Diplotaxis erucoides* - flowering October to May 7. *Borago officinalis* - flowering December to May

			8. *Glebionis coronaria* - flowering in January – May Reference to LifeMedGreenRoof Project (2024) should be made, particularly in relation to species used and growing media selection. The following species were grown successfully in test trays as part of the Life MedGreen Roof Project (LifeMedGreenRoof Project, n.d.): 1. *Antirryinum tortuosum* Greater snapdragon 2. *Cistus creticus* Hoary Rock-Rose 3. *Coronilla valentina* Mediterranean Crown Vetch 4. *Crithmum maritimum* Rock samphire 5. *Darniella melitensis* Maltese Salt-tree 6. *Hypericum aegypticum* Shrubby St. John's Wort 7. *Inula critmoides* Golden samphire 8. *Lavandula multifida* Egyptian lavender 9. *Lobularia maritma* Sweet Alison 10. *Palaeocyanus crassifolius* Maltese Rock-Centaury 11. *Phagnalon graecum* Eastern Phagnalon 12. *Phlomis fruticosum* Jerusalem sage 13. *Prasium majus* White Hedge-Nettle 14. *Rosmarinus officinalis* Rosemary 15. *Ruta chaelepensis* Fringed rue 16. *Sedum sediforme* Pale Stonecrop 17. *Senecio bicolor* Silver Ragwort 18. *Teucrium flavum* Yellow Germander 19. *Thymbra capitata* Thyme In view of the significance of this monument to Dun Karm Psaila, a discussion with academics studying his life's works is recommended. ***Birdhouses and Bug/Bee/Insect hotels*** Providing bird houses, bee hotels and bug hotels to increase urban biodiversity as well as aesthetic value. Potentially to work with Kids on Campus and other

			Faculties, Institutes and Centres to develop these during summer 2025.
Area 7	Wooded area with outdoor gym	0.191	***Urban Park/parklet*** The pine needles make undergrowth difficult to take root unless specifically introduced. Introduce more trees/shrubs and undergrowth. Suggested trees/shrubs: 1. *Crataegus* Spp.; 2. *Malus* spp.; 3. *Punica granatum;* 4. *Pistacia lentiscus*; 5. *Morus alba;* 6. *Morus nigra.* 7. *Olea europaea* Suggested undergrowth vegetation: 1. *Andrachne telephioides* 2. *Clematis cirrhosa* 3. *Ranunculus ficaria L.* 4. *Rhamnus alaternus*; 5. *Kundmannia sicula*, 6. *Centranthus ruber* 7. *Lathyrus sphaericus* Collaboration with an e-NGO (example Nature Trust, Friends of the Earth, ACT, Grow 10 Trees etc) could be discussed ***Birdhouses and Bug/Bee/Insect hotels*** Providing bird houses, bee hotels and bug hotels to increase urban biodiversity as well as aesthetic value. Potentially to work with Kids on Campus and other Faculties, Institutes and Centres to develop these during summer 2025.

Area 8	Japanese Garden	0.044	***Urban Park/parklet*** Introduce more trees/shrubs and undergrowth. Suggested undergrowth vegetation: 1. *Rhamnus alaternus* (full sun to part shade); 2. *Myrtus communis* (full sun to part shade); 3. *Rosmarinus officinalis (*full sun needs at least 6 hours of sun) 4. *Kundmannia sicula*, *5. Centranthus ruber* *6. Vitex agnus castus* The following plant are suggested to be planted around the pond area since they prefer damp ground: 1. *Arundo plinii* Turra *2. Plantago major* 3. *Ranunculus muricatus* - damp ground 4. *Ranunculus bulbosus* - damp ground *5. Rumex conglomeratus* *6. Potentilla reptans* *7. Lythrum junceum* Collaboration with Nature Trust could be discussed to collect seeds from Wied Għollieqa. ***Birdhouses and Bug/Bee/Insect hotels*** Providing bird houses, bee hotels and bug hotels to increase urban biodiversity as well as aesthetic value. Potentially to work with Kids on Campus and other Faculties, Institutes and Centres to develop these during summer 2025.
Area 9	The Quadrangle	0.272	**Urban Park/parklet** Introduce more trees/shrubs and undergrowth. Suggested trees/shrubs: 1. *Crataegus* Spp.; 2. *Malus* spp.; 3. *Punica granatum;* 4. *Pistacia lentiscus*; *5. Morus alba;*

			6. *Morus nigra.* Suggested undergrowth vegetation: 1. *Rhamnus alaternus* (full sun to part shade); 2. *Myrtus communis* (full sun to part shade); 3. *Rosmarinus officinalis (*full sun needs at least 6 hours of sun) 4. *Kundmannia sicula*, 5. *Centranthus ruber* 6. *Vitex agnus castus* Collaboration with Nature Trust could be discussed **Birdhouses and Bug/Bee/Insect hotels** Providing bird houses, bee hotels and bug hotels to increase urban biodiversity as well as aesthetic value. Potentially to work with Kids on Campus and other Faculties, Institutes and Centres to develop these during summer 2025.
Area 10	Fields	1.04	***Urban farm:*** Urban farming provides opportunities for community development, employing sustainable farming practices such as organic farming or permaculture. The fields within the University of Malta Campus are an ideal opportunity for community farming. There are opportunities for Institutional and grassroot collaborations (Faculties, Institutes, Centres, Student Associations and local NGOs), including University Canteen offering locally sourced food. Introduce more trees/shrubs and undergrowth. Suggested trees: 1. *Crataegus* Spp.; 2. *Malus* spp.; 3. *Punica granatum;* 4. *Pistacia lentiscus*; 5. *Morus alba;* 6. *Morus nigra.* Suggested undergrowth vegetation: 1. *Rhamnus alaternus* (full sun to part shade);

			2. *Myrtus communis* (full sun to part shade); 3. *Rosmarinus officinalis (*full sun needs at least 6 hours of sun) 4. *Kundmannia sicula*, *5. Centranthus ruber* *6. Vitex agnus castus* *7.* Capparis orientalis (full sun) ***Birdhouses and Bug/Bee/Insect hotels*** Providing bird houses, bee hotels and bug hotels to increase urban biodiversity as well as aesthetic value. Potentially to work with Kids on Campus and other Faculties, Institutes and Centres to develop these during summer 2025.
Area 11	Wooded area between Architecture and Gateway building	0.252	***Urban Park/parklet*** Introduce more trees/shrubs and undergrowth. Suggested trees: 1. *Crataegus* Spp.; 2. *Malus* spp.; 3. *Punica granatum;* 4. *Pistacia lentiscus*; *5. Morus alba;* *6. Morus nigra.* *7. Olea europaea.* Suggested undergrowth vegetation: 1. *Rhamnus alaternus* (full sun to part shade); 2. *Myrtus communis* (full sun to part shade); 3. *Rosmarinus officinalis (*full sun needs at least 6 hours of sun) 4. *Kundmannia sicula*, *5. Centranthus ruber* *6. Vitex agnus castus* 7. Capparis orientalis (full sun) ***Birdhouses and Bug/Bee/Insect hotels*** Providing bird houses, bee hotels and bug hotels to increase urban biodiversity as well as aesthetic value. Potentially to work with Kids on Campus and other Faculties, Institutes and Centres to develop these during summer 2025.

Area 12	Carpark 6	0.943	***Urban Park/parklet*** Consider reduction of car park size and renaturing the area. Introduce more trees/shrubs and undergrowth. Provide more space for bicycles, prioritise active travel and bus patrons. A co-production plan would need to be developed with different stakeholders. ***Birdhouses and Bug/Bee/Insect hotels*** Providing bird houses, bee hotels and bug hotels to increase urban biodiversity as well as aesthetic value. Potentially to work with Kids on Campus and other Faculties, Institutes and Centres to develop these during summer 2025.
Area 13	Assembly Point 13	0.145	***Green walls:*** Vertically vegetated garden, there are two types: Traditional vegetated walls with creepers directly attached to walls, or use of support structure to create an air gap between the wall. Can be planted directly to the ground or when this is not possible the use of plant boxes/raised beds is recommended. Full sun to partial shade: 1. *Bougainvillea sp.;* 2. *Capparis orientalis;* 3. *Cheirolophus crassifolius;* 4. *Clematis cirrhosa;* 5. *Hedera helix;* 6. *Jasminum nudiflorum;* 7. *Lonicera implexa.* Indirect sunlight: 1. *Clematis cirrhosa;* 2. *Hedera helix;* 3. *Stephanotis floribunda.* ***Green roofs*** Rooftop vegetated gardens that provide water filtration, insulation, ecological stepping stones, increase biodiversity, mitigate urban heat island effect. Reference to LifeMedGreenRoof Project (2024) should be made, particularly in relation to species used and growing media selection. The following species were grown successfully in test trays as

			part of the Life MedGreen Roof Project (LifeMedGreenRoof Project, n.d.): 1. *Antirryinum tortuosum* Greater snapdragon 2. *Cistus creticus* Hoary Rock-Rose 3. *Coronilla valentina* Mediterranean Crown Vetch 4. *Crithmum maritimum* Rock samphire 5. *Darniella melitensis* Maltese Salt-tree 6. *Hypericum aegypticum* Shrubby St. John's Wort 7. *Inula critmoides* Golden samphire 8. *Lavandula multifida* Egyptian lavender 9. *Lobularia maritma* Sweet Alison 10. *Palaeocyanus crassifolius* Maltese Rock-Centaury 11. *Phagnalon graecum* Eastern Phagnalon 12. *Phlomis fruticosum* Jerusalem sage 13. *Prasium majus* White Hedge-Nettle 14. *Rosmarinus officinalis* Rosemary 15. *Ruta chaelepensis* Fringed rue 16. *Sedum sediforme* Pale Stonecrop 17. *Senecio bicolor* Silver Ragwort 18. *Teucrium flavum* Yellow Germander 19. *Thymbra capitata* Thyme Introduce more trees/shrubs and undergrowth. Suggested trees/shrubs: 1. *Crataegus* Spp.; 2. *Malus* spp.; 3. *Punica granatum;* 4. *Pistacia lentiscus*; 5. *Morus alba;* 6. *Morus nigra.* Suggested undergrowth vegetation: 1. *Rhamnus alaternus* (full sun to part shade); 2. *Myrtus communis* (full sun to part shade); 3. *Rosmarinus officinalis (*full sun needs at least 6 hours of sun);

			4. *Mentha spicata;* 5. *Kundmannia sicula*; 6. *Centranthus ruber;* 7. *Vitex agnus castus.* ***Birdhouses and Bug/Bee/Insect hotels:*** Providing bird houses, bee hotels and bug hotels to increase urban biodiversity as well as aesthetic value. Potentially to work with Kids on Campus and other Faculties, Institutes and Centres to develop these during summer 2025.
Area 14	Area along Water tower and FEMA Faculty of Media and Knowledge Sciences	0.02	***Green walls:*** Vertically vegetated garden, there are two types: Traditional vegetated walls with creepers directly attached to walls, or use of support structure to create an air gap between the walls. Can be planted directly to the ground or when this is not possible the use of plant boxes/raised beds is recommended. Full sun to partial shade: 1. *Capparis orientalis;* 2. *Cheirolophus crassifolius;* 3. *Clematis cirrhosa;* 4. *Hedera helix;* 5. *Jasminum nudiflorum;* 6. *Lonicera implexa.* Indirect sunlight: 1. *Clematis cirrhosa;* 2. *Hedera helix;* 3. *Stephanotis floribunda.* ***Green roofs/terraces*** Rooftop vegetated gardens that provide water filtration, insulation, ecological stepping stones, increase biodiversity, mitigate urban heat island effect. Reference to LifeMedGreenRoof Project (2024) should be made, particularly in relation to species used and growing media selection. The following species were grown successfully in test trays as part of the Life MedGreen Roof Project (LifeMedGreenRoof Project, n.d.): 1. *Antirryinum tortuosum* Greater snapdragon

			2. *Cistus creticus* Hoary Rock-Rose 3. *Coronilla valentina* Mediterranean Crown Vetch 4. *Crithmum maritimum* Rock samphire 5. *Darniella melitensis* Maltese Salt-tree 6. *Hypericum aegypticum* Shrubby St. John's Wort 7. *Inula critmoides* Golden samphire 8. *Lavandula multifida* Egyptian lavender 9. *Lobularia maritma* Sweet Alison 10. *Palaeocyanus crassifolius* Maltese Rock-Centaury 11. *Phagnalon graecum* Eastern Phagnalon 12. *Phlomis fruticosum* Jerusalem sage 13. *Prasium majus* White Hedge-Nettle 14. *Rosmarinus officinalis* Rosemary 15. *Ruta chaelepensis* Fringed rue 16. *Sedum sediforme* Pale Stonecrop 17. *Senecio bicolor* Silver Ragwort 18. *Teucrium flavum* Yellow Germander 19. *Thymbra capitata* Thyme ***Birdhouses and Bug/Bee/Insect hotels:*** Providing bird houses, bee hotels and bug hotels to increase urban biodiversity as well as aesthetic value. Potentially to work with Kids on Campus and other Faculties, Institutes and Centres to develop these during summer 2025.
Other areas	Corridor from old University entrance (near Chaplaincy) towards Quadrangle and along University Ring Road which should ideally be pedestrianised.		***Vegetated canopies:*** Canopies that are vegetated, providing shade to pedestrians and which attract pollinator species. These are a new system and would ideally be tested as part of an EU funded project. More information here: https://www.singulargreen.com/en/green-shades-valladolid/ ***Urban Park/parklet*** Introduce more trees/shrubs and undergrowth on the sides of the pathway

			to provide more shade for pedestrians, habitat and food source for a variety of species. Suggested trees/shrubs: 1. *Crataegus* Spp.; 2. *Malus* spp.; 3. *Punica granatum;* 4. *Pistacia lentiscus*; 5. *Morus alba;* 6. *Morus nigra;* 7. *Medigago arborea* (cannot grow in shaded areas); 8. *Capparis orientalisRhamnus alaternus* (full sun to part shade). Suggested undergrowth vegetation: 1. *Myrtus communis* (full sun to part shade); 2. *Rosmarinus officinalis (*full sun needs at least 6 hours of sun); 3. *Mentha spicata;* 4. *Kundmannia sicula*; 5. *Centranthus ruber;* 6. *Vitex agnus castus.* ***Pedestrianisation:*** The pathway leading to the Quad is not accessible to all. A ramp should be introduced to ensure access for all. The University Ring Road should be fully or partially pedestrianised, and green infrastructure introduced along the way. A cycling/scooter lane should also be introduced to facilitate travel in between lectures. The University of Malta should seriously consider the potential of EU Funds for Active Mobility and Nature-based Solutions to ensure social, environmental and mobility equity, apart from reaching Climate Change targets and SDG goals.

Other areas	Roofed corridors along the Administration Building, Old Humanities, Library, and Lecture Centre, as well as buildings such as Sir Temi Zammit Hall and the Faculty of Built Environment.		**Green roofs:** Rooftop vegetated gardens that provide water filtration, insulation, ecological stepping stones, increase biodiversity, mitigate urban heat island effect. Reference to LifeMedGreenRoof Project (2024) should be made, particularly in relation to species used and growing media selection. The following species were grown successfully in test trays as part of the Life MedGreen Roof Project (LifeMedGreenRoof Project: List of Plants Cultivated for the Maltese and Italian Green Roofs Actions A1 & A2 LIFE12ENV/MT/000732, n.d.): 1. *Antirryinum tortuosum* Greater snapdragon 2. *Cistus creticus* Hoary Rock-Rose 3. *Coronilla valentina* Mediterranean Crown Vetch 4. *Crithmum maritimum* Rock samphire 5. *Darniella melitensis* Maltese Salt-tree 6. *Hypericum aegypticum* Shrubby St. John's Wort 7. *Inula critmoides* Golden samphire 8. *Lavandula multifida* Egyptian lavender 9. *Lobularia maritma* Sweet Alison 10. *Palaeocyanus crassifolius* Maltese Rock-Centaury 11. *Phagnalon graecum* Eastern Phagnalon 12. *Phlomis fruticosum* Jerusalem sage 13. *Prasium majus* White Hedge-Nettle 14. *Rosmarinus officinalis* Rosemary 15. *Ruta chaelepensis* Fringed rue 16. *Sedum sediforme* Pale Stonecrop 17. *Senecio bicolor* Silver Ragwort 18. *Teucrium flavum* Yellow Germander 19. *Thymbra capitata* Thyme The following link shows suggested locations where green roofs could be potentially explored (Layer: Other suggested areas/Green roof 1 to 9):

			https://www.google.com/maps/d/edit?mid=1_FGRVZFav2B-Wxv_TRU_G4qvLe5Udsk&usp=sharing A total area of 3250 square metres can be potentially dedicated to green roofs.

Information about recommended Nature-based Solutions

Green walls

Vertically vegetated garden, there are two types: Traditional vegetated walls with creepers directly attached to walls, or use of support structure to create an air gap between the wall. Can be planted directly to the ground or when this is not possible the use of plant boxes/raised beds is recommended.

Vegetated canopies

Canopies that are vegetated, providing shade to pedestrians and which attract pollinator species. These are a new system and would ideally be tested as part of an EU funded project. More information on vegetated canopies can be found on the website of Singular Green (2024).

Figure 20: Example of vegetated canopies (Singular Green, 2024)

Green roofs

Rooftop vegetated gardens that provide water filtration, insulation, ecological stepping stones, increase biodiversity, mitigate urban heat island effect. Reference to LifeMedGreenRoof Project (2024) should be made, particularly in relation to species used and growing media selection.

Urban Park/parklet

Urban areas that are dedicated to natural processes through the planting of native and indigenous vegetation. Species use should be considered based on site context (amount of direct sunlight, soil type, humidity, other plant species present, proximity to protected areas, and access by children)

Urban farming

Urban farming provides opportunities for community development, employing sustainable practices such as organic farming or permaculture. The fields within the University of Malta Campus are an ideal opportunity for community farming. There are opportunities for Institutional and grassroot collaborations (Faculties, Institutes, Centres, Student Associations and local NGOs), including University Canteen offering locally sourced food.

Birdhouses and Bug/Bee/Insect hotels

Providing bird houses, bee hotels and bug hotels to increase urban biodiversity as well as aesthetic value. Potentially to work with Kids on Campus and other Faculties, Institutes and Centres to develop these during summer 2025.

Other recommendations:

Other recommendations based on the feedback received from the children of Kids on Campus are the following:

1. Waste separation bins to be introduce around Campus
2. Solar charging points
3. More bicycle racks, inverted U type racks
4. Renaturing all or part of Car Park 6
5. Introducing benches particularly in Area 11.
6. A University wide EU project could be developed to co-produce Nature-based Solutions and explore intersection with active travel on Campus.

Workshop resources

The following resources were used as part of the workshops:

- A2 Paper
- Post it notes (Pink, Yellow, Green)
- Colours
- Sticks, wigs and other collected natural materials
- Cotton wool
- String
- Glue
- University of Malta map
- Markers
- Illustrations of trees, shrubs, bees, butterflies
- Blu Tac
- Cardboard

References

Ak, B., & Parlakci, H. (2009). Pistacia lentiscus in the mediterranean region in Turkey. *Acta Horticulturae*, *818*, 77–82. https://doi.org/10.17660/ActaHortic.2009.818.10

Blaisdell, C., Arnott, L., Wall, K., & Robinson, C. (2018). Look who's talking: Using creative, playful arts-based methods in research with young children. *Journal of Early Childhood Research*, *17*(1), 1476718X1880881. https://doi.org/10.1177/1476718x18808816

Hickey-Moody, A., Horn, C., Willcox, M., & Florence, E. (2021). *Arts-based methods for research with children*. Palgrave Macmillan.

LifeMedGreenRoof Project. (2024). *LifeMedGreenRoof*. LifeMedGreenRoof. https://lifemedgreenroof.org/

LifeMedGreenRoof Project. (n.d.a). *LifeMedGreenRoof Project: Identification of ideal growing media for Malta and Italy Actions A1 & A2 LIFE12ENV/MT/000732*. https://lifemedgreenroof.org/wp-content/docs/growing_media_MT_IT.pdf

LifeMedGreenRoof Project. (n.d.b). *LifeMedGreenRoof Project: List of plants cultivated for the Maltese and Italian green roofs Actions A1 & A2 LIFE12ENV/MT/000732*. https://lifemedgreenroof.org/wp-content/docs/plant_list_MT_IT.pdf

Malta Environment and Planning Authority. (2009). *Common species used for landscaping in the Maltese Islands*. https://era.org.mt/wp-content/uploads/2019/05/SpeciesLandscaping-MalteseIslands-MEPA-2009.pdf

Mifsud, S. (2024a). *Andrachne telephioides (Andrachne)*. Malta Wild Plants. https://www.maltawildplants.com/EUPH/Andrachne_telephioides.php

Mifsud, S. (2024b). *Capparis orientalis (Caper bush)*. Malta Wild Plants. https://maltawildplants.com/CAPP/Capparis_orientalis.php

Mifsud, S. (2024c). *Centranthus ruber*. Malta Wild Plants. https://www.maltawildplants.com/CAPR/Centranthus_ruber.php

Mifsud, S. (2024d). *Cheirolophus crassifolius (Maltese Rock-Centaury)*. Malta Wild Plants. https://www.maltawildplants.com/ASTR/Cheirolophus_crassifolius.php

Mifsud, S. (2024e). *Clematis cirrhosa (Evergreen Traveller's Joy)*. Malta Wild Plants. https://www.maltawildplants.com/RANU/Clematis_cirrhosa.php

Mifsud, S. (2024f). *Crataegus × ruscinonensis (Hybrid Hawthorn)*. Malta Wild Plants. https://www.maltawildplants.com/ROSA/Crataegus_ruscinonensis.php

Mifsud, S. (2024g). *Crataegus monogyna (Common Hawthorn)*. Malta Wild Plants. https://www.maltawildplants.com/ROSA/Crataegus_monogyna.php

Mifsud, S. (2024h). *Hedera helix (Ivy)*. Malta Wild Plants. https://maltawildplants.com/ARLI/Hedera_helix.php

Mifsud, S. (2024i). *Lathyrus sphaericus (Round Pea)*. Malta Wild Plants. https://www.maltawildplants.com/FABC/Lathyrus_sphaericus.php

Mifsud, S. (2024j). *Lonicera implexa (Evergreen Honeysuckle)*. Malta Wild Plants. https://maltawildplants.com/CAPR/Lonicera_implexa.php

Mifsud, S. (2024k). *Ranunculus ficaria (Lesser Celandine)*. Malta Wild Plants. https://www.maltawildplants.com/RANU/Ranunculus_ficaria.php

Mifsud, S. (2024l). *Rosmarinus officinalis (Rosemary)*. Malta Wild Plants. https://maltawildplants.com/LABT/Rosmarinus_officinalis.php

Muhammad, A. M., Huwaishli, N. A., Ali, S. M., & Jabeen, R. (2019). Use of Bougainvillea glabra Plants in Minimizing Vehicular Pollution in Jazan Area of Saudi Arabia. *Bioscience Biotechnology Research Communications*, *12*(3). http://dx.doi.org/10.21786/bbrc/12.3/10

Plants For A Future. (2024). *Rhamnus alaternus—L.* Plants For A Future. https://pfaf.org/user/Plant.aspx?LatinName=Rhamnus+alaternus

RHS. (n.d.). *Growing guide How to grow hawthorn*. RHS. https://www.rhs.org.uk/plants/hawthorn/growing-guide

Sharma, S. C., Srivastava, R., & Roy, R. K. (2005). Role of bougainvilleas in mitigation of environmental pollution. *Journal of Environmental Science & Engineering*, *47*(2), 131–134.

Singular Green. (2024). *Generate shadows without trees: Vegetable awnings, a new way to generate shadows in the city.* Singular Green. https://www.singulargreen.com/en/green-shades-valladolid/

Tabone, T. J. (1992). *Plans for the regeneration of the pond at Wied Għollieqa: Arbor*. Arbor. https://www.um.edu.mt/library/oar/bitstream/123456789/5440/1/Plans%20for%20the%20regeneration%20of%20the%20pond%20at%20wied%20ghollieqa.pdf

Tabone, T. J. (2008). A List Of Records Of Some Rare Vascular Plant Species Occuring [sic] In The Maltese Islands (Central Mediterranean). *The Central Mediterranean Naturalist*, *4*(4), 311–337.

van der Have, C., Hölscher, K., & Lodder, M. (2022). *A practical guide to using co-production for nature-based solutions*. Connecting Nature. https://oppla.eu/product/24697

Vella, K. J. (2021). *Mediterranean Buckthorn*. Il-Majjistral. https://majjistral.org/wp-content/uploads/2021/06/Mediterranean-Buckthorn.pdf

Woodland Trust. (2024). *Hawthorn (Crataegus monogyna)*. Woodland Trust. https://www.woodlandtrust.org.uk/trees-woods-and-wildlife/british-trees/a-z-of-british-trees/hawthorn/

Wróblewska, K., & Jeong, B. R. (n.d.). Effectiveness of plants and green infrastructure utilization in ambient particulate matter removal. *Environmental Sciences Europe*, *33*(1), 110. https://doi.org/10.1186/s12302-021-00547-2