

Green Roofs: For or Against ?

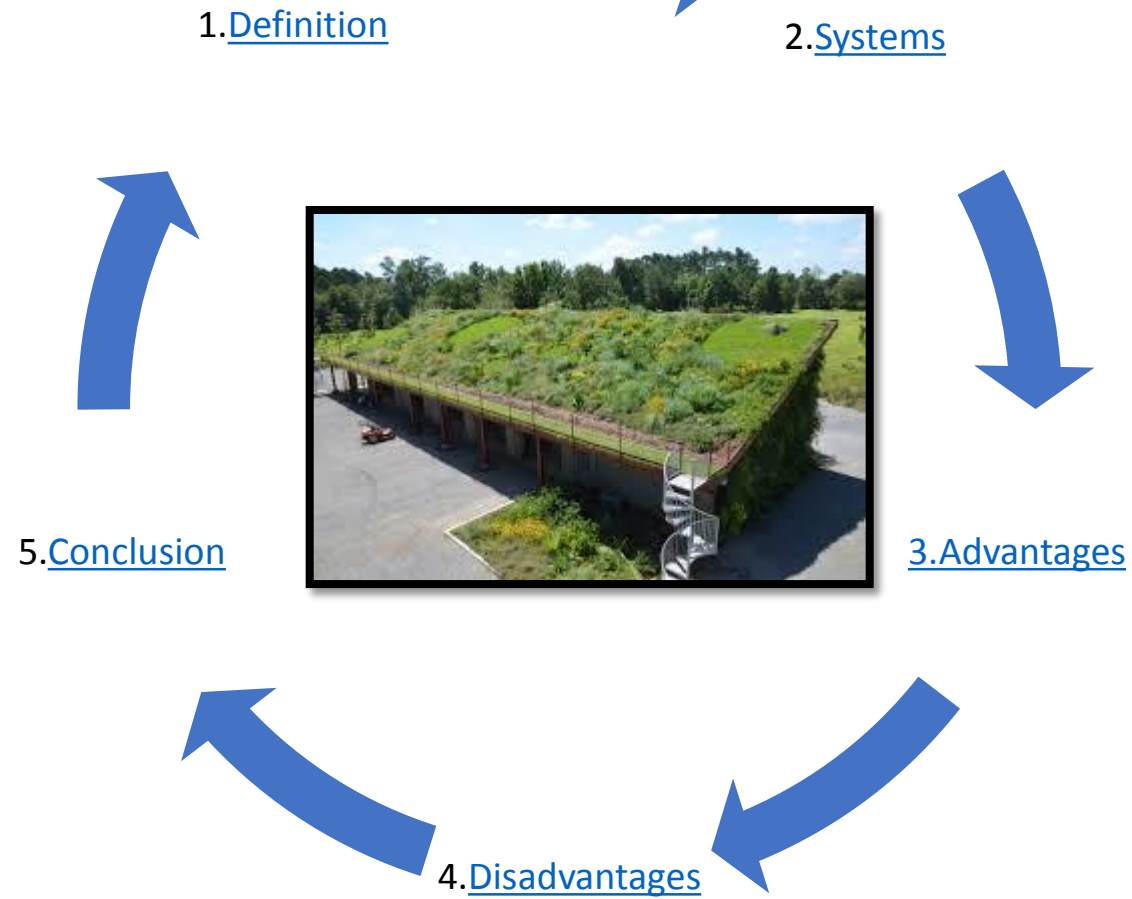
Jacopo M., Isaia P., Emanuele S.

5°B

I.I.S G. Garibaldi

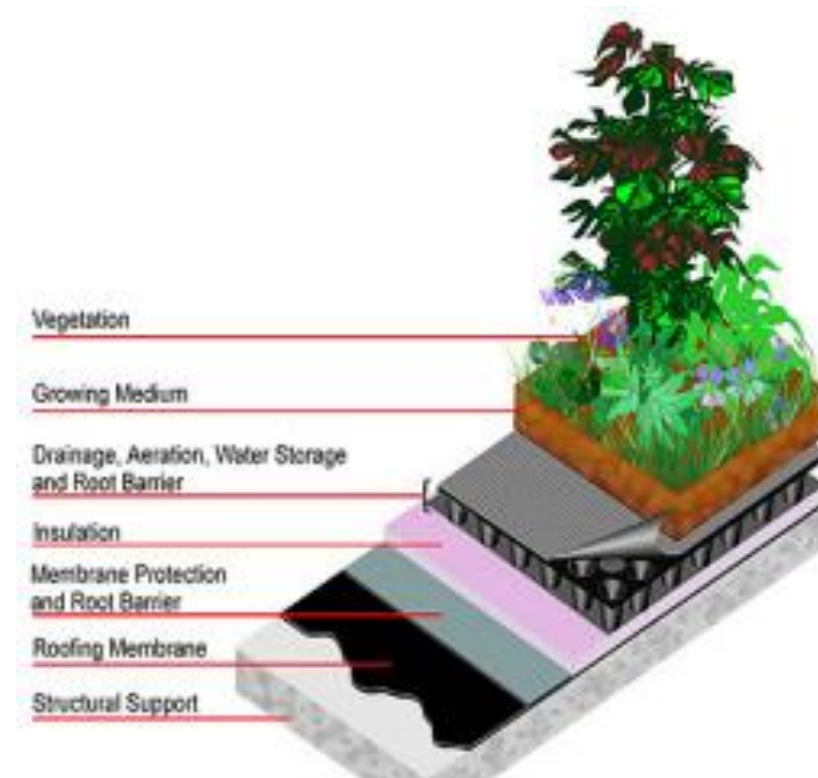


Map



Definition: What is a Green Roof?

- Green (or living) roofs are known as roofs that are purposely fitted or cultivated with vegetation.
- There are different types of green roof and it is important to understand that they provide different habitats, affect storm water runoff to varying degrees, and impact on energy usage and thermal performance differently.
- They can also look very different and present different challenges during installation.
- They can be extensive (planted with simple plants such as sedum, or allowed to seed naturally, where they are called biodiverse roofs), or intensive (planted with shrubs and even trees). At present there are no specific British Standards relating to green roofs.



Section of a green roof



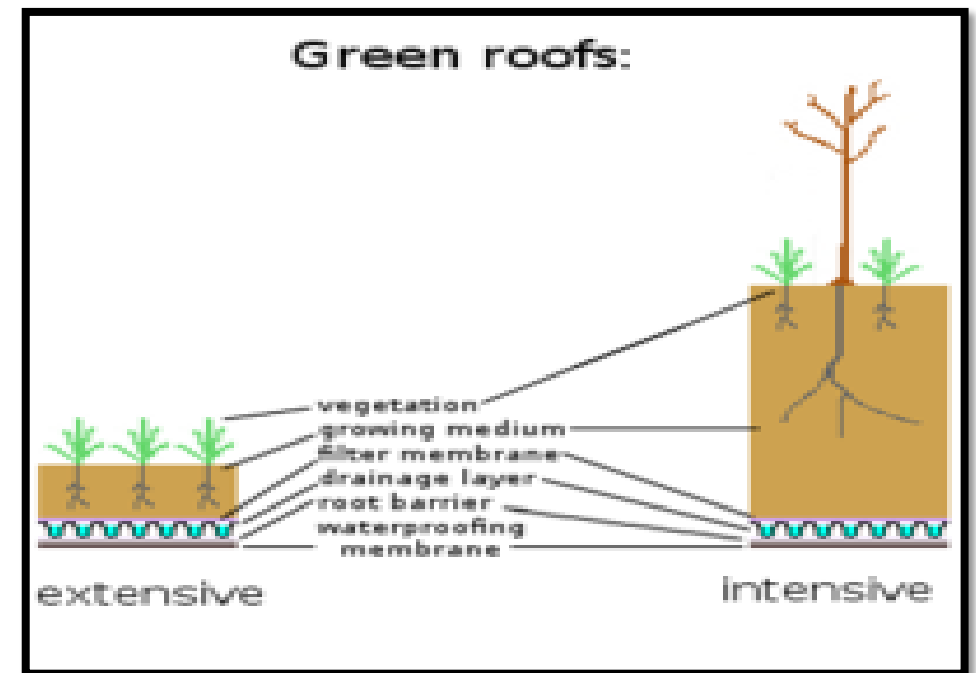
An example of
a green roof on
a cowshed



Two types of systems:

INTENSIVE

EXTENSIVE



A view from outside of the systems

A vertical section of the two systems

Intensive system:

Thin growing medium (2-6inch),
little or
no irrigation, stressful plant
conditions
(drought tolerant), low plant
diversity,
usually less aesthetic

ADVANTAGES

1. Lightweight, usually no roof
2. Reinforcement needed
3. Suitable for large areas
4. Low maintenance & long life giving
5. Cost advantage
6. Usually no requirement for irrigation & specialized drainage
7. Less technical expertise required
8. Usually can be retrofitted
9. Vegetation can grow spontaneously
10. Relatively low capital cost



DISADVANTAGES

1. Less energy efficiency benefits
2. Less storm water retention benefits
3. Limited plant choice
4. Usually no access for other use i.e.
5. Recreation
6. Not aesthetic to some, (still better than normal roof though)
7. High short term cost



Extensive system: →

Deep growing medium
(usually soil, >6inch),
favorable plant conditions,
high plant diversity, often
accessible, more aesthetic

ADVANTAGES



1. Greater diversity of plant & habitats
2. Good insulation properties
3. Can simulate wildlife garden on roof
4. Very good aesthetics (if managed properly)
5. Often accessible, more diverse utilisation of roof space i.e. for recreation, growing food, as open space, allotments.
6. Greater energy efficiency
7. Greater storm water retention
8. Long membrane life

DISADVANTAGES



1. High weight loading on roof
2. Need for irrigation & drainage
3. System, requiring energy, water, minerals
4. Higher capital and maintenance cost than the extensive one
5. More complex system and expertise needed



Smart Ecological Advantages

- **Creating a natural habitat for flora and fauna**; a living roof can create a local ecology in which the vegetation will establish and provide a home for smaller elements of wildlife as well as insects and invertebrates.
- **Aiding biodiversity**; the provision of a healthy habitat in a place that could otherwise be empty provides support for the natural colonization of locally arising plants, birds and small animals, encouraging a wider spread of species in the area.



Flowers and bees

Environmental Advantages

- **Improving air quality**: the vegetation assists in reducing both gaseous pollutants and dust particles by removing a proportion of them from the immediate environment. Additionally, the natural evaporation of water from the plants and soil helps to cool and humidify the air, so lowering the ambient temperature and reducing the heat island effect.



Financial and Technical Advantages

- **Reducing carbon footprint** through lowering building running costs – the thermal insulation on the building is improved providing a more balanced temperature within. This eases heating costs in the winter and air conditioning expenses during the summer.
- **Noise reduction for the building** – green roofs have excellent acoustic qualities for both external sound (up to 3dB) and internal noise (up to 8dB). This can prove to be beneficial when used on structures close to airports or industrial developments.



Disadvantages:

Installation and Maintenance Costs:

- Installing a green roof can cost up to twice as much as installing a conventional roof.
- According to Green Roofs for Healthy Cities, an extensive green roof generally costs between \$10 to \$24 per square foot.
- Homeowners can reduce costs by weeding, fertilizing and watering plants themselves instead of hiring a profession to maintain the green roof, and by growing their own plants from seeds rather than buying seedling plugs or mats.



Installation of a green roof



Disadvantages: Limited Choice of Plants

- The thick growing medium of intensive green roofs can support the growth of a wide range of plants, including shrubs and small trees. The thinner, extensive green roofs, however, can typically only accommodate a small selection of drought-tolerant plants with shallow root systems.
- Sedums, lichens, mosses and low-growing grasses are common choices for extensive roofs.
- They look less lush, leafy, and, to some, less attractive than the plants grown in deeper soil. Less robust plants may also have trouble surviving the strong winds common on high rooftops.



Best Plants for a Green Roof

Succulents



Sedums



Lavender



Wildflowers

Aster



Yarrow



Sea Thrift



Aromatic Herbs
Oregano



Thyme



Rosemary



Alpine

Dianthus



Armeria



Sempervivum



Biodiversity Plants

1- [Succulents](#)

2- [Sedums](#)

3- [Lavender](#)

4- [Aster](#)

5- [Yarrow](#)

6- [Sea thrift](#)

7- [Oregano](#)

8- [Thyme](#)

9- [Rosemary](#)

10- [Dianthus](#)

11- [Armeria](#)

12- [Sempervivum](#)



Disadvantages: Structural Limitations

- The roof and load-bearing walls of many buildings may not be strong enough to support the added weight of a green roof.
- Thin, lightweight systems, known as "extensive" green roofs typically have a planting media measuring 2 to 6 inches deep, while heavier, thicker varieties are known as "intensive" green roofs and range in thickness from 6 to 18 inches or deeper.



Green Roof on the top of a building

Conclusion: which one is the best system for the green roof of the cowshed in our school farm?

- We think that in the case of the school's cow shed it will be good the extensive type of green roof because it use a great diversity of small plants and we think that not very high plants are better for a roof;
- The extensive type also use less quantity of soil ;
- It also has good insulation properties;
- It has a greater water and storm retention and a long membrane life



Bibliography

- <https://greenroofs.org/about-green-roofs/>
- <https://commons.bcit.ca/greenroof/faq/why-green-roofs-benefits/>
- <http://www.greenroofers.co.uk/green-roofing-guides/advantages-disadvantages-green-roofs/>
- <http://www.greenroofplan.com/intensive-vs-extensive-green-roofs/>
- Last access on February 2018.



Products:

- A digital work about the topic we choose;
- A final diary with our opinions and self-evaluation;
- An infographic made by us;
- A timeline of the main dates of our project.





THANK YOU FOR YOUR ATTENTION