

Ecological Engineering and Botanical Gardens

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Botanical Gardens have an important role to play in the field of education about sustainable development.

Beside the important role of botanical gardens to show the importance of plant conservation and sustainable use of plants a more integrated ecosystem approach will be shown during the presentation. It will give suggestions how ecosystem services as well as the production of ecosystem goods can be combined as much as possible. It will stress the ways of incorporation of the natural and the cultural environment for the benefit of nature as man at the same time, as well as using art as a mean of communication.

This theme will be illustrated and discussed in the form of the presentation of some case studies, which can easily be transformed for use in botanical gardens.

The examples will show a wide range of possibilities:

- The importance of small scale constructed wetlands for waste water treatment. In practice this could be made for cleansing the run off water from the car park. In this situation helophyte plant species can be shown, their usefulness as well as their aesthetics.
- The way vegetated roofs as well as vegetated walls can play an ecological role as well as serving human needs for reducing fine dust and other kinds of air pollution. This can be implemented in buildings of botanical gardens. Different types of vegetation could be developed showing the variety of possibilities to increase biodiversity as well.
- A vegetated surface of walls of buildings can stimulate use of this type in cities. It will function for increase in local biodiversity as well as filtering fine dust.
- Other examples which will illustrate the usefulness of integration of ecological engineering will deal with different kinds of noise barriers which will service human needs as well as ecological values. A full integration of different functions is possible.



Figure 1. Noise barrier (design Krijn Giezen; photo: Bohemen)

Art plays an important role in society. Objects of art and artists can play a role in promoting the public's involvement in planning and design processes. The arts can serve as a catalyst for research and development proposing and testing new ideas and stimulate broadening the palette of solutions. An example is Krijn Giezen's noise barrier consisted of construction waste.

The presentation will conclude with a small set of ecological engineering principles:

- Self design of ecosystems (self organisation)
- Focus on biological systems (living systems)
- Consider a human intervention in the landscape in an ecological context at all levels of scale now and in the future
- The characteristics of the site (the genius locus) should be respected.
- Make (changes in) ecological patterns and processes as visible, perceptible and if possible experienceable as possible.
- Saving of non-renewable resources
- Conservation ethic of ecosystem conservation
- Integrated instead of reductive approach

During the design and construction process the following steps can be of help to reach no net loss as well as restoration of ecological values and functions:

- Prevention
- Minimizing
- Mitigation
- Compensation

Reference

Bohemen, H.D. van, 2005. *Ecological Engineering, Bridging between Ecology and Civil Engineering*. Aeneas Publishers in Boxtel, The Netherlands.