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NATURALISTIC DESIGN – LIMITED SUSTAINABILITY OR LAST CHANCE ACTION

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ABSTRACT
Greenery designed around buildings gives us the opportunity to shift the local biodiversity, especially if the building is expected to gain sustainable certification, which could be achieved by applying various methods, taking the BREEAM method as an example. This paper demonstrates three designs created by the present author in accordance with the demands of the BREEAM method. The designs were prepared for buildings in three Polish cities – Katowice, Krakow and Lodz. In each case, the approach adopted was affected by the different local conditions, for instance, a postindustrial place with a number of local species will differ from a city centre with lawns and impervious surfaces. However, it seems to be possible to bring the local native species to such areas, and thus support the local wild life there. The choice of plants was made as a result of the analysis of the typical plant communities present in the region and the examination of nurseries with accessible species. The plants selected for the designs represented the species typical for the local dry grasslands – if possible, or included their ornamental forms. Such use of local plants in the design may give rise to questions relating to the design ethics – Will the use of ornamental forms still support biodiversity? What influence might be thus exerted on the local plant communities? When is it worth trying to find native species for the design? Is the whole idea of implementing such designs honest or rather deceiving on the part of the investor towards nature and society? With regard to the problem, a more detailed discussion should be taken, especially as the aesthetic value of greenery designed in this way is comparable to that created with cosmopolitan ornamental plants.

INTRODUCTION

Sustainability is a popular slogan which supports a sensitive approach to the environment. At the same time, however, this could be misleading the technical implementation seems to be more important. The more human expectations are considered, the less natural habitat is achieved. In our civilization the race is on to reach new technological achievements. An artificial environment created in this way will imitate certain natural features but with inadequate structural interaction with the natural environment. Nature shows that adaptation and balanced interaction will give durable existence. Ian McHarg proves that the principle also applies to urban planning (McHarg, 1969). Almost half a century later we have not made any progress, in spite of all the sustainable development programs and environmental protection plans. The protection itself is not sufficient any longer to preserve the environment for future generations. The overwhelming loss of biodiversity needs taking adequate action to restore it to our landscape to the largest possible extent. The term “adequate” means “compatible with the conditions”; it does not mean “tending to achieve the original state”. Sustainable development gives the chance to people and nature. In order to increase the endangered biodiversity one can apply the program of ecosystem services providing both measurable parameters and usefulness for human health (Fisher at al., 2009). It is hard to convince investors to spend money on the greenery corresponding to the local biodiversity, since such green elements are usually less ornamental than a typical nursery offer. However, the solution here seems to be the promotional system of the European investment certifications called BREEAM (BREEAM, 2013). The sustainable approach to greenery design needs a review to reveal what corresponds with biodiversity protection and what raises objections.

NATURE VERSUS HUMAN HABITAT

An economic approach to nature could be debatable. We are aware that nature should not be treated only as a "uniform commodity" with measures of size compared to a unit of population and the cost of land and expenses on development (McHarg, 1969). In spite of a large number of regulations and directives supporting biodiversity nature still appears to be perceived as mass with no individual form. The main interest is energy saving solutions and CO_2 reduction facilities. Nature is a living structure, able to choose a better solution, change under pressure, and survive in spite of human creative ideas. If only we could create a self-sufficient greenery. The immediate answer seems to be is aesthetics. We need clean and tidy parks with no weeds, insects or bacteria, providing safety for our children, comfort for rest and fun, and plenty of colours. It is a paradox is not generally noticed, but the more artificial the environment is, the more effort and money are needed to maintain it. Generally, beauty is a valuable target and not always synonymous with health. People create their own environment with convenient paths, comfortable beds and antibiotics, detergents etc. It is difficult to say now what is better to us – the stuffy comfort we are used to or the wilderness bringing allergy, dust and microbes. The answer is not obvious. On the one hand, experts mention some advantages of the air quality, positive psychical and physical response owing to physical activity and social contacts (Sjerp de Vries, 2010). But we must often stay in our cubic work and home spaces and go for walks in the cubic and regular spaces of streets and modern parks. I wonder if it is proper that we prefer to live in the same kind of space – legible, easily-oriented, and understandable. Taking into consideration the recreation of our bodies, I would suggest considering the influences of affordances overfilling the space around us (Rostanski, 2012). Our minds are gripped with them all the time in city life. The situation, however, changes when we enter a wild forest. There is almost nothing to tell us about its functionality or usefulness. We are not obliged to respond immediately to any element of the landscape. We do not have a sense of direction, but it does not matter as we are not in a hurry. We can take a rest, at last.

If there are some measurable benefits from nature and if there are elements of designed greenery comparable to them exerting a positive influence on us, it is worth assessing their compatibility. The pragmatic approach leads to three issues in design work. The first is the demand of the biotope or the green area factor. The second is the ecosystem services – the gate for the economic approach in landscape planning and design. The third is the investment certification system which supports biodiversity by means of measurable facts.

GREEN AREA FACTORS

It is easy to find some detailed information about green area factors used in Berlin (BAF Biotope Area Factor), where ecologically effective surfaces are referred to the total investment area. Another similar example is the Green Space Factor used in Malmö. Although in both cases the native species are disregarded, the idea of providing water permeable surfaces and promoting greenery surrounding houses is praiseworthy. Only in Seattle (Green Space Factor) the use of native plants is additionally privileged, but the plants can be replaced with drought-tolerant species with any provenience. It is difficult to say how the green area factor is applied in other countries. In Poland, for instance, the values of native plants are not considered in regulations concerning the investment area plant cover.

ECOSYSTEM SERVICES

The concept of ecosystem services attempts to link the functioning of natural elements to human welfare. The definitions of ecosystem services are not compatible, and thus the very idea is open to interpretation (Fisher at all.2009). Taking into account biodiversity issues, the most appropriate definition states that ecosystem services are conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life (Daily, 1997). According to Fisher's definition, ecosystem services are rather the aspects of ecosystems utilized (actively or passively) to produce human well-being. They are ecological phenomena that do not have to be directly utilized. The impact of nature is complex and the benefits obtained from ecosystems and connected with biodiversity include the following: medicinal resources, pollination, biological control, habitats for species, habitat stability, genetic storage (TEEB, 2011, Fisher at al., 2009). Besides, people may benefit also from landscape with the diversity of ecological components, plant communities, such as woods of different kinds and meadows with various aspects. It is up to the local authorities to emphasize specific services in the local regulations. Given this, it may be concluded that supporting biodiversity depends on people's engagement and their determination to work against the loss of diversity.

CERTIFICATION METHODS WITHIN THE SCOPE OF SUSTAINABLE DEVELOPMENT

With the development of the idea of sustainability there have appeared several methods of investment assessment encouraging solutions and technology which support sustainability. The LEED certification (Leadership in Energy and Environmental Design) developed by The Green Building Council in the USA is compatible with the above-mentioned Green Space Factor from Seattle. The assessment entails the local conditions and the influence caused by the investment, as well as the water management, the greenhouse gases emissions, the use of materials, particularly the local ones, the quality of the environment inside and outside the object and, finally, the innovations. Although biodiversity is of marginal significance here and may not be mentioned at all, the assessment score could be quite high owing to the dwelling technological solutions. The same holds true for the French HQE (High Environmental Quality) elaborated at the Centre et Technique du

Bâtiment (CTSB – Center for Scientific and Technical Building) as well as for the Green Star, described by The Green Building Council of Australia (GBCA) in 2002.

These important assessment systems support the development of ecological technology. However, the best promotion of biodiversity is offered by the BREEAM (BRE Environmental Assessment Method) elaborated by The Building Research Establishment (BRE) in Great Britain. The criteria applied are as follows: the used technology and materials, implementation process, maintaining after implementations, use of media, energy, transport, recycling and neutralization of contaminations, people's welfare, nature protection and innovations. They clearly promote the convergence with sustainable development, which becomes the proof of the design quality. The precision of the requirements applied should have a positive influence on biodiversity protection or even its increase. Before the actual construction starts the site should be assessed with regard to the presence and quality of the natural habitats, of the native plants and of the environmental support for the native animal species, which proves that a positive change has been made in the state of the environment in connection with the investment implementation. It is also suggested that the shifting biodiversity should be maintained by preparing a special program for several years after the actual implementation to provide stability of the new ecosystem elements. The ability of the created habitats to survive even without a watering system might be achieved with the use of native plants. It is good practice to examine the local natural communities and choose plants typical of them. Besides, it is important to adjust the created habitats to the local conditions. Basically, the BREEAM assessment refers to the number of native species. The exception could be introduced plants serving as food for native animals. Sometimes introduced plants may create a valuable ecological niche, a habitat encouraging wild animals to settle within the construction area. Thus, extra points could be received for the ecological profit for the animals. The construction process in relation to greenery must be supervised by an experienced ecologist and designer. Even if all the demands are hard to implement, the more of them will be met, the more points will be gained. The BREEAM certification seems to be the most useful instrument to make investors more aware of the problems related to biodiversity loss. A high score gained gives not only prestige, but also opens up possibilities for sources of financial support for further investments, which is a clear profit indeed.

CASE STUDIES

There were chosen three examples of BREEAM implementation. They were designed by the author of the paper. Designs are different according natural context. First refers to urbanized postindustrial area with existing plant cover, mostly ruderal but native and 72 species were added. Second refers to urbanized area with only ornamental plants on highly limited land and 36 species were added. Last refers to urbanized area with number of ruderals on highly limited land too and 115 species were added. The first office building in Poland to receive the BREEAM Outstanding Certificate is called the GPP Business Park and was built in Katowice in 2012. Its location had characteristic features of a postindustrial place. The area used to belong to a zinc smelter and the soil was so contaminated that the number of the local species was not impressive. The ruderal species found on the construction area did not represent any valuable natural community. The office building has a limited area with vegetation on the ground, mainly the car park, roads and the building itself. Most of the vegetation was planned on the roofs and walls. The roof of the building was covered with extended sedum species plantations. An open recreational space was designed between the buildings on the garage roof. Lawns and flowerbeds were created with a mixture of native and introduced plants. The green walls have the form of gabions and the cheapest solution was to plant climbers there. The design work started with a review of potential flora and natural plant communities in the

Figure 1: GPP Business Park, Katowice. Flowerbed with native plants and lawn. Illustrations: author – K.M.Rostanski

Figure 2: GPP Business Park, Katowice. Initial composition with native plants. Illustrations: author – K.M.Rostanski

Figure 3: GPP Business Park, Katowice. Gravel accented planes with dry grasslands plants. Illustrations: author – K.M.Rostanski

Figure 4: GPP Business Park, Katowice. Composition with native plants and lawn. Illustrations: author – K.M.Rostanski

region. Whereas the construction area was impossible to afforest, it was possible to create habitats similar to those found in the border zone of the local form of beech forest (*Luzulo pilosae-Fagetum*) and oak-hornbeam forest (*Tilio cordatae-Carpinetum betuli*) (Matuszkiewicz, 2008). These syntaxa are not the only ones in the region but they seem to be related to the most proper biotopes on the conditions created in the construction area. Their localities could be indicated within the distance of a few kilometers. Hornbeam (*Carpinus betulus L.*), elderberry (*Sambucus nigra L.*), mountain ash (*Sorbus aucuparia L.*), yew (*Taxus baccata L.*) and birch (*Betula pendula Roth.*) are the local species common in the above-mentioned communities. On completing the construction, the area will be exposed to the sunshine like a natural meadow, only partly shaded at certain times, so most of the perennials selected for the flowerbeds come from the nearby meadow communities and green cover of limestone rocks found within the aforementioned distance. It was difficult to find a nursery with common plants. The solution was to examine nursery offers and select species naturally occurring in the region, according to the key for the determination of Polish native plants (Rutkowski, 2006). The rules of nature conservation in natural locations require the use of plants from the local gene bank. This condition is unrealistic in our situation as nurseries mostly offer ornamental forms of native plants and probably never those of the local genotype. Some local species accepted to the project are as follows: Ajuga reptans 'Uciekinier', Briza media, Carex flacca, Deschampsia caespitosa, Festuca ovina, Thymus serpyllum and Veronica spicata.

A similar approach was adopted in the design for Krakow's BUMA Five Office Building, located at the city center. After a review of the local plant communities, the choice of plants to be used was affected by a very limited green area and lack of possibility of planting trees caused by the fire regulations. As a result, it was decided to use perennials common to the meadow communities and dry grasslands from the Polish southern uplands.

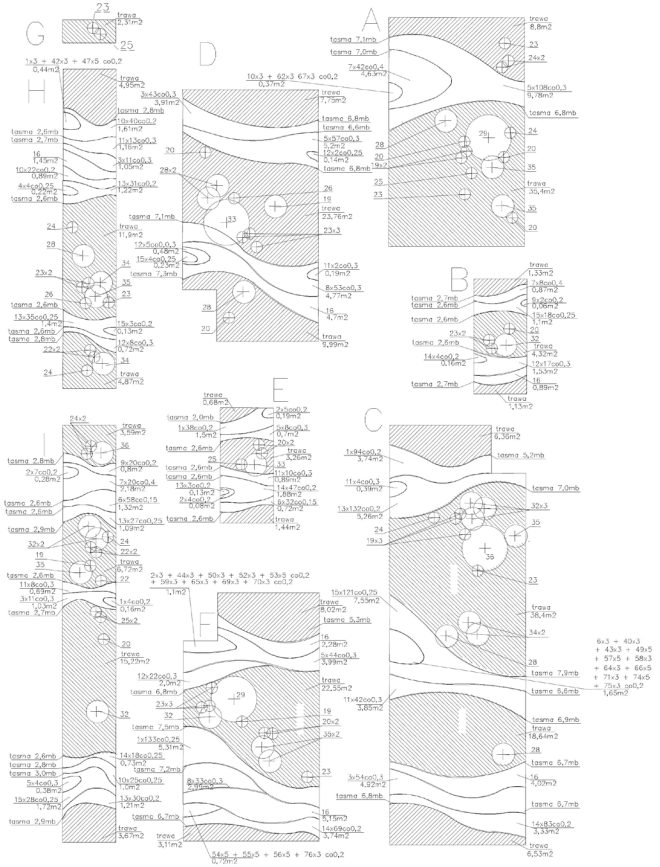

Figure 5: GPP Business Park, Katowice. Plantation design on the car park roof. Illustrations: author – K.M.Rostanski

A few forms of ornamental local species were selected from the local nurseries. An important value of the existing greenery was the introduced shrubs of Buddleja davidii Franch, which in the warmer parts of Europe are invasive but in Poland suffer from too cold a climate. As the shrubs provide an important source of nectar for butterflies in the autumn, maintaining butterflies in the

area, some of which are quite rare, was one of the targets of the construction process. The greenery designed has enriched a number of native plants suitable for butterflies. The pattern adopted followed the natural mixture of plants on the meadow or on the forest floor. The reason behind was not only aesthetic but also protecting the composition from possible drought or disease. Thus, even if certain species prove weaker, all the composition form will be preserved. Artificial habitat on the area allowed to use small number of designed plants.

In the third case of a shopping mall in Łódź the location is also in the city center. Complying with the demands of the local authorities and the fire department, a decision was made to plant the spherical form of *Acer platanoides* 'Globosum' along the street. The trees need, however, special root barriers to protect the underground utilities. On the roof and on the ground floor there are designed flowerbeds with mixed patterns of perennials and grasses. As local plants, with their special appearance, are less ornamental than typical garden flowers, in order to make them more acceptable to the users, some introduced plants were added there as accents. To reach good score there were needed over 100 species for design.

CONCLUSIONS

To sum up, some scientists seem to disregard a variety of habitats as a reason to protect native plant communities and, as a consequence, to protect biodiversity. Thinking of biodiversity as a variety of any plants or animals without relating them to their home region will lead to homogeneity of natural elements across the whole climate zone around the world, which does not mean, however, the same level of variety. Many of the introduced ornamental plants behave like invaders and diminish the variety by destroying natural communities and reducing their number. All methods supporting the local biodiversity shift seem to be worth employing. Even in city centers, depending on the situation, local species could be preferred in designs, with introduced ones serving only as accents.

On the other hand, such an attitude might be disputable. Does the use of ornamental forms of native plants still support biodiversity? How could they influence the local plant communities? They could mix with them, thus changing the local bank of genes. Even the typical species forms are mostly of strange provenience. Under what conditions is it worth trying to find the native species for a design? The local conditions and social expectations may vary depending on the place in the urban structure. Finally, building greenery with ornamental forms of native species and creating reduced communities with very little chance to become self-controlled ecosystems might be a mistake and even a fraud towards the investor and society. The issues mentioned above are open to discussion.

All things considered, the truth is that greenery designed with local plants does have a comparable aesthetic value to that made with cosmopolitan ornamental plants. Besides, compositions with local plants can provide the "final touch" in a building design responding to the local identity and thus demonstrate the regional uniqueness – variety crowned with biodiversity. To mention a few other benefits from variety, with a naturalistic composition it can be free from everyday affordances, and provide us with much complete rest in this speeding up world. Also, it does co-operate with the local nature system. And finally, by bringing us tangible profit, variety gains its right place in the free market society.

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