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Reflection on Popular Concepts of Landscape Design

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Abstract Guided by the values of harmonious coexistence between humans and nature, methods and concepts such as "biodiversity", "sponge cities", and "urban agriculture" have become popular. These methods and concepts are indisputable as a value orientation. But if conditional truth is promoted nationwide as unconditional truth, it will inevitably move from one extreme to the other. Starting from specific issues and practical experience, combined with the regional differences in the natural conditions, social customs and climate environment, the four popular viewpoints of "urban agriculture", "biodiversity", "local characteristics", and "sponge cities" are reflected, and their "exclusion" reactions in certain regions are revealed, in order to awaken people's rational thinking about popular concepts.

Keywords Urban agriculture, Sponge city, Native plants, Biodiversity
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In the era of information overflow and discourse power manipulation, some local truths are often amplified into universal truths, and some diachronic measures are often transformed into synchronic general principles; some individual opinions are often translated into official will, and some concepts that come from abroad are often packaged into local wisdom. In the context of global climate warming, maintaining the harmony, healthy and sustainable development of the natural and social environment has become a consensus among humans. The harmonious coexistence between humans and nature has become the main theme of the times, with "biodiversity", "sponge cities", and "urban agriculture" becoming the macro design guiding principles. Like Scheler's value ranking, placing these concepts at the top of the value chain as a macro orientation is not a problem, but promoting them as an official directive nationwide requires caution. China has a vast territory, a large span of north-south latitudes, and a significant difference in terrain elevation between the east and west. There are significant differences in climate conditions and economic development levels between different regions. If these popular methods and concepts are indiscriminately applied as a universal template in different urban landscape designs, they will inevitably eliminate regional differences and spontaneous order, and the ecological effects produced will be half with double the effort. Spontaneous order is a sociological and economic concept proposed by Hayek, which refers to individuals proposing an environmental response strategy based on their own conditions and specific situations. Through long-term interaction and adaptation between subjects, between subjects and the environment, a spontaneous order is generated. Compared to the unified order imposed by external constraints, it has the characteristics of strong pertinence, self-organization, and high efficiency[1].

1 Misunderstanding of "urban agriculture"

"Urban agriculture" is a popular design concept in recent years. Influenced by the urban agricultural landscapes of European and American countries, some designers blindly follow the trend, hype up and show off, and boast about the ecological value of urban crops. If seeking truth from facts and thinking independently, it is not difficult to find that urban agricultural landscapes are not advisable for China's continental monsoon climate environment from three aspects: humanized space creation, ecological benefits, and aesthetic benefits.

From the perspective of humanized space creation and microclimate environment regulation, the low canopy diameter of crops, dense planting density, and exposed soil as the base cannot provide leisure activity space for people. As a herbaceous plant, crops have a small green content and limited ability to regulate the microclimate environment. As crops affect ventilation in summer and cannot block winter winds after harvesting, it may have a negative impact on the microclimate environment. From an ecological perspective, the ecological function of crops is seasonal, with strong vitality in spring and autumn, and decay in winter and autumn, making it impossible to accumulate and increase the ecological function. As the tree age increases, the ecological function of trees and shrubs shows an increasing trend year by year. During the autumn and winter, the ecological function of farmland is basically lost, and the surface is exposed, which can easily cause strong winds and dust, and is not conducive to maintaining air humidity and conserving water sources. Even in spring and summer, its functions of water conservation, rainwater retention, and groundwater compensation are far inferior to those of forests with the same area. In addition, forests and shrubs in winter can still provide shelter and migration corridors for wildlife, while farmland does not have this function. From an aesthetic perspective, the aesthetic value of agricultural landscapes cannot be compared to garden plants, and these effects can be intuitively perceived by everyone. In addition, from an economic perspective, with the development of crop improvement technology to this day, it is not necessary for China to plant crops in urban parks and squares to ensure food security. Nursery technology is widely used, and the price of garden plants is not much higher than that of crop seeds. Moreover, garden plants and seedlings are one-time inputs, while crop planting is multiple inputs.

Urban agriculture is a design concept developed in North America. These countries have vast land resources, sparse populations, and extensive management models. Urban agricultural landscape is a supplement to the tradition of geometric landscape, and it is indisputable from the perspective of cultural diversity. However, once some design concepts from Europe and America are introduced to China, they are often regarded as universally applicable theories due to institutional reasons and are widely promoted nationwide, regardless of regional conditions. Therefore, the harm they cause can also be imagined.

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2 Local plant preference

In landscaping, promoting local plants has basically become a consensus. Native plants have many advantages, such as strong resistance to diseases and pests, strong adaptability to soil, climate, and other environments. Moreover, they carry people's emotions and memories of their hometown. However, when these reasons are promoted nationwide, many problems are found. Native plants are not as perfect as expected, and introduced species also have many advantages and strong regional adaptability. The plants in our living environment are also the result of multiple "ethnic fusion" in the biological world, and are the result of natural selection through "survival of the fittest". However, if you look carefully, it is not difficult to find that many plants and crops are imported from abroad. Because of their long history, they are mistaken for native plants, such as French paulownia, *Platanus acerifolia* (Ait.) Willd, *Platanus occidentalis* Linn., *Populus* × *canadensis* Moench, *Acer rubrum*, *Cedrus deodara*, *Magnolia grandiflora*, *Punica granatum*, *Anoplophora glabripennis* Motsch., and tomato, potato, corn, pepper, peanut, etc. in crops. These plants are not inferior in terms of disease and pest resistance and adaptability to extreme climates compared to native plants. However, some unmodified native plants often breed diseases and pests, such as ulcer disease of *Ulmus pumila*, withes broom of *Paulownia fortunei*, gummosis and aphid disease of *Koelreuteria paniculata*. Therefore, the selection of greenery plants does not necessarily adhere to the bad habit of prioritizing local plants, and practice is used as the test standard. Large tree species with beautiful tree shapes, easy survival, and less pests and diseases are preferred, such as French paulownia, *Aesculus chinensis*, *Celtis julianae*, *Liquidambar formosana*, *Liriodendron chinense*, *Bischofia polycarpa*, *Populusalba* var. *pyramidalis*, etc. Some tree species that are ugly, small in size, and prone to pests and diseases should be eliminated as much as possible, such as *U. pumila*, *P. fortunei*, and *Ailanthus altissima*. Some high-quality local tree species should also be preserved, such as *Styphnolobium japonicum*, *Albizia julibrissin*, *Firmiana simplex*, *Triadica sebifera*, etc. The local tree species are generally small in size, and appropriate close planting methods should be used to create a relatively stable microclimate environment to cope with the extreme climate of winter and summer, which is beneficial for improving the survival rate of plant seedlings. Plants, like humans, are more sensitive to the climate and environment during their early years and have a preference for group heating. Therefore, the survival rate of trees planted in groups or clusters is higher than that of trees planted alone during the seedling stage.

3 Trap of "sponge city"

In the *Fengtu* of Heshi Zhelang, the world climate is divided into three types: monsoon type, desert type, and ranch type[2]. In Hegel's *Philosophy of History*, the world's climate types are divided into plain type, plateau type, and ocean type[3]. Heshi Zhelang analyzed regional landscape differences through climate differences, while Hegel studied ethnic persona-lity differences through geographical types. These knowledge are a supplement to the geography textbook. In the *Fengtu*, the characteristic of monsoon climate mentioned is that the rain and heat are in the same season, and the plant landscape grows crazily without restraint, and the rainfall period is concentrated, and it is easy to form flood peaks. Therefore, it is necessary to build more reservoirs and dams. The ranch type refers to the Mediterranean and oceanic climates mentioned in textbooks. This climate type is characterized by different rainy and hot seasons, namely abundant sunlight and heat and sparse rainfall in summer, and poor sunlight and sufficient rainfall in winter, which limits the crazy growth of plants. It is because that there is no water when there is heat, and no heat when there is water. In a ranch style climate, there is little strong wind, so southern European plants such as *Juniperus chinensis*, *Canarium album*, and *Ficus carica* grow relatively straight. Although winter rainfall lasts for a long time, it is mostly gentle. Rainwater is mostly absorbed by the soil through surface runoff, making it less prone to flood peaks. Therefore, there are not many mountain reservoirs and dams in Europe.

Because China has a monsoon climate, with relatively concentrated rainfall periods and high rainfall intensity, it is different from the marine climate in Europe and the Mediterranean style rainfall pattern of gentle breeze and fine rain. Moreover, many cities are located downstream of rivers, with large catchment runoff and easy to form flood peaks. Additionally, China is a mountainous country, with a terrain high in the west and low in the east, a drop of 4,000 to 5,000 m from east to west. The rivers have large slopes, rapid flow rates, and poor drainage, which can easily lead to flood peaks and waterlogging. This is completely different from the situation of the Amazon, Nile, and Danube rivers. So sponge cities are not suitable for mountainous cities with large terrain height differences. If river embankments are not hardened, it is very easy to cause geological disasters such as landslides and mudslides during the rainy season, and the losses outweigh the ecological benefits.

The shortage of freshwater resources and the decline of groundwater level are also a serious reality for China. The macro policy still needs to regulate and store rainwater and freshwater resources, but this policy needs to be implemented according to local conditions. There is room for promotion in the arid northwest and northeast regions, as well as in the vast rural areas, especially in the upper and middle reaches of rivers, where there is sparse population, loose land conditions, and low agricultural production pressure. A large number of reservoirs can be built to regulate and store rainwater, and coordinate the supply of fresh water in different seasons. Flood control and safety are still the top priority in urban areas of the middle and lower reaches, and some small reservoirs and lakes can be built in the outskirts of cities with conditions. It is reasonable to change the concept of "sponge city" to "sponge land".

4 Biodiversity abuse

When biodiversity maintaining the healthy and sustainable development of the natural environment becomes a common sense, some extreme and provocative design concepts such as building cities in farmland, communities in wetlands, and roads in forests have emerged. However, everything should be treated differently based on the specific environment. Professor Cheng Yuning distinguishes the objects of landscape design into natural environment and built environment, which is very meaningful[4]. For the natural environment, it is sparsely populated, has low contact with human daily life, low intervention in natural and biological processes. The pursuit of biodiversity is the best choice, such as national parks, nature reserve planning, scenic spots, forest parks, geological parks, wet land parks, and other design types. For the constructed artificial environment, which is a gathering place for human life, work, and residential interaction. Especially for urban environments, with high functional integration and frequent human economic activities, if the principle of biodiversity is adopted indiscriminately, it will inevitably cause compression on human living space. Because there is no physical "parallel space" in urban space, living space and ecological space are in an interdependent relationship. The expansion of spatial scope on

the one hand will inevitably come at the cost of space compression on the other hand. Therefore, for built environments, especially for high-density urban built environments, the concept and methods of landscape design should comprehensively consider the humanized needs of the space when pursuing carbon neutrality and biodiversity, and formulate some green design principles for the built environment.

The creation of humanized urban green spaces must consider the styling characteristics and spatial creation functions of different plant types, and combine them with different substrates based on their spatial creation functions. Trees provide spacious activity space under the trees, while hard squares provide a high-strength activity base, and they complement each other. Subtrees and shrubs have low branching points and do not provide space for activities under the trees, and lawns do not provide a high-intensity activity base. The combination of the two can turn decay into magic. Asian trees are mostly flowering tree species, and their placement on lawns can provide effective viewing distances for people. If the opposite approach is taken, shrubs are arranged on a hard square, and the activity space provided by the hard pavement will be offset by shrubs. The large canopy path of shrubs will occupy and waste a large amount of hard pavement ground, which is not conducive to rainwater collection. Circular seats are arranged under shrubs such as *Ilex cornuta* and *Photinia serratifolia*. But due to the lack of space under the trees, the seats have to be left unused for a long time. *Styphnolobium japonicum* is planted on both sides of the garden path. Due to the low space under the tree, people have to detour through the nearby lawn. *Nerium indicum* and *Hibiscus mutabilis* are planted on the green belt of the road. Due to the high elasticity of the branches and the loose canopy, it affects bus traffic, and requires frequent pruning. *Cedrus deodara* and *Prunus persica* are planted in the divided green belt. Due to the low branching points, the branches are overgrown, often scraping the bus windows, and the tree crown has to be trimmed into tree stumps and bonsai. Therefore, green space design is a priority for humanized design. The green space is determined by the different construction functions of various plants and their combination with different substrates.

When choosing green tree species, it is often only considered that plants have the functions of purifying air, absorbing harmful gases, trapping dust, reducing noise, and conserving water sources, but neglects the negative functions of some plants themselves. Some plants also produce harmful gases themselves, and their organs and tissues also contain toxic substances, even breed some harmful insects to the human body. The gases emitted by plants such as *A. altissima*, *Melia azedarach*, *Eucalyptus* spp., *Tetradium daniellii*, and *Rhododendron lutescens* have a strange odor and a small amount of toxicity. And some landscape plants' juices are toxic, such as *N. oleander*, *Papaver* L., *Alocasia macrorrhiza*, *Datura stramonium*, *Toxicodendron vernicifluum*, *Eucalyptus* spp., etc. Due to unique odors, some plants could breed harmful insects, such as stink bug and *Eligma narcissus* on *A. altissima*, *Anoplophora horsfieldi* and *Lycorma delicatula* on *M. azedarach*, aphid and *Aromia bungii* on *K. paniculata*, *Eteoneus angulatus* and *Cryptothela variegat* on *P. fortunei*. These insects are also harmful to human health. When planting greenery, it is advisable to minimize the selection of such tree species. Even if these tree species are selected, they should be arranged in remote places far from the crowd. Some tree species have fewer pests and diseases, but their trunks and branches are covered with needles, which pose a safety hazard to people, such as *Kalopanax septemlobus*, *I. cornuta*, *Gleditsia sinensis*, and *Hovenia acerba*. Such tree species should not be arranged near places where people are active. Tree species with rough bark, such as *Quercus variabilis*, *Quercus aliena*, etc., are not suitable for use as street trees even if their flowers and leaves are beautiful. The above factors are factors that should not be ignored in humanized design.

5 Conclusions

Popular landscape design concepts are often macro guidelines that are more suitable for natural environment planning of macro scale. For urban built-up environments, it is necessary to fully consider human health and psychological needs, as well as the understanding of traditional culture. Based on specific geographical conditions, social and historical development stages, and economic levels, design methods should be tailored to local conditions and times. The above popular concepts cannot be used as a universal template for indiscriminate application in urban built-up environments. Popular concepts are a correction and rebound of problems that have arisen in previous landscape design practices. It does not mean negating everything in reality, but rather supplementing and reconciling extreme phenomena that arise in existing design concepts. The original urban landscape prioritized safety and hygiene as its top priority. Nowadays, people view living environment issues from a broader perspective of time and space, proposing the concept of harmonious coexistence between humans and nature and sustainable development. There is no contradiction between the new concept and the old concept, as the old is contained in the new and the new is inherited from the old. The two are in one continuous line. The promotion process of new methods is often a process of balancing the weight of new and old concepts.

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