

# *The role of urban green space in alleviating the urban heat island effect*

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**Keywords:** Urban green space; urban construction; ecology; landscape

**Abstract:** Under the background of the rapid development of urbanization in China, urban greening is of great significance to relieve the urban pressure, improve the ecological environment and improve the living quality of residents. This paper systematically studies the urban green space system from four aspects: ecology, landscape, culture and society. The research shows that urban greening plays an important role in reducing heat island, reducing noise and improving residents' health. At the same time, it can also provide people with leisure and leisure places, strengthen the cohesion of the community, so as to promote the sustainable development of the city. In the future urban construction, we should pay more attention to the planning and construction of urban green space system, order to ensure that its function in easing the burden of urban development can be fully realized, it is essential to implement a series of effective strategies. These may include encouraging sustainable urban planning and design, promoting the use of green spaces and public transportation, implementing policies that support mixed-use development, and fostering strong community engagement and participation. By doing so, we can create cities that are not only and environmentally friendly, but also economically vibrant and socially inclusive. This will require the cooperation and effort of all stakeholders, including government officials, urban planners, architects, developers, residents, and businesses. Only by working together can we build the resilient and sustainable cities of the future.

## **1. Introduction**

In the contemporary urban construction, with the rapid development of economy and the continuous growth of population, the city is facing a lot of pressures, such as environmental deterioration, ecological imbalance, and the decline of residents' quality of life. In order to deal with these problems, the urban green space, as an important part of the urban ecosystem, has gradually received more and more attention. Urban green space not only has the function of improving the ecological environment and beautifying the urban landscape, but also plays an important role in relieving the pressure of urban construction and improving the living quality of residents. This paper will deeply explore the role of urban green space in alleviating urban construction, in order to provide theoretical basis and practical guidance for the future urban planning and construction.

## 2. Ecological function of urban green space

### 2.1 Alleviate the urban heat island effect

The urban heat island effect means that the temperature of the city is higher than that of the surrounding countryside. Along with the speeding up of urbanization, the city heat island effect is getting worse day by day. Urban greenbelt, as an important component of city ecological system, has a significant effect on reducing the heat island effect of city.

Firstly, the city greenbelt can decrease the ground and air temperature by the plant transpiration and shade. Vegetation releases water by transpiration to increase the humidity of the atmosphere, and by shielding the sun from the sun, it reduces the absorption of heat from the ground. All of these effects can decrease the temperature in the city and alleviate the heat island effect in cities.

Secondly, the city greenbelt can improve the micro-climate of the city and improve the living quality of the residents. Urban greenbelt can improve the city green cover ratio and improve the city environment quality. Meanwhile, the vegetation can absorb CO<sub>2</sub>, particles and other pollutants in the air to reduce the noise and air pollution, and provide the residents with clean air and peaceful living environment.

Moreover, urban green space planning and construction is also an important method to mitigate the heat island effect. It is necessary to properly plan the distribution of greenbelt and plant species, and to increase the green quantity and water area, and to improve the ecological efficiency and environment efficiency. Meanwhile, it is also an effective approach to reduce the heat island effect by strengthening the construction and management of the city green, increasing the coverage ratio and greening quality.

### 2.2 Reduce noise and air pollution

Along with the rapid development of urbanization, the city's noise and air pollution has become more and more serious, which has brought about negative influence on the living and health of the residents. As an important component of city ecological system, urban green space has great effect on reducing noise and air pollution.

First, the city green space can reduce the noise pollution. Urban noise originates primarily from traffic, industry and business<sup>[1]</sup>. The lush green space can absorb and disperse the sound, and reduce the transmission and impact of noise. The plant's leaves and branches can absorb the sound and transform it into heat or some other form of energy to reduce the noise. Moreover, the trees and bushes in the greenbelt can also be used as a sound barrier to block the transmission path of the noise, which will further reduce the influence of the noise on the life of the residents.

Second, the city green space can improve the air quality and reduce the air pollution. The main sources of urban air pollution are industrial emissions, exhaust gases from transport and building sites<sup>[2]</sup>. The vegetation in the city green area can absorb the harmful substances in the air, such as CO<sub>2</sub>, particles, and so on. Moreover, the greenbelt can also decrease the velocity of the wind, decrease the diffusion and transfer of pollutants in the air, and reduce the level of air pollution.

Apart from the ecological function, the city green landscape and culture function is also an effective way to ease the pressure of city. The city green space can provide the citizens with beautiful scenery and recreational places, and strengthen their sense of belonging and pride in the city. Meanwhile casing its history and culture can also serve as a source of inspiration and motivation for future generations. By immersing themselves in the city's rich past, citizens can gain a deeper appreciation for their community and develop a stronger sense of belonging. Moreover, exposure to diverse cultural experiences can broaden their horizons and foster a more open-minded and tolerant attitude towards different cultures and traditions.

## 2.3 Maintenance of biodiversity

Biodiversity refers to the richness and diversity of biological populations, germplasm, and ecosystems. Urban biodiversity is an important part of urban ecosystem, which is of great significance for urban ecological balance and ecological service function. Urban green space, as an important part of the urban ecosystem, plays an important role in maintaining biodiversity<sup>[3]</sup>.

First, urban green space provides a rich ecological environment and habitat, providing living space for various organisms. Urban expansion and construction often lead to the destruction of natural ecosystems and the loss of biological habitat. The existence of the urban green space provides the habitat and reproduction places for the plants, animals and microorganisms in the city, so that the urban biodiversity can be maintained and protected.

Secondly, urban green space contributes to protecting the stability of endangered species and ecosystems. The change of vegetation type and ecological environment in the urban green space will have an impact on the local species distribution and ecosystem. Therefore, through rational planning and management of urban green space, the stability of endangered species and ecosystems can be protected and urban biodiversity can be maintained.

In addition, the landscape and cultural functions of urban green space are also an important means to maintain biodiversity. The existence of urban green space can provide citizens with beautiful landscape and places for leisure and entertainment, and enhance their sense of belonging and pride to the city. At the same time, the green space can also inherit and display the history and culture of the city, and improve the cultural literacy and aesthetic level of the citizens. The play of these functions can improve the awareness of biodiversity, and further protect and maintain urban biodiversity<sup>[4]</sup>.

To sum up, the city green space has a vital effect on conservation of biodiversity. To protect and preserve the biodiversity of cities, it is necessary to attach great importance to the planning and construction of green space in the future. Meanwhile, it is necessary to enhance the management and maintenance of urban greenbelt to make sure that its ecology, landscape, culture and society function can be exerted continuously.

## 3. Landscape function of urban green space

### 3.1 Beautify the urban environment

Urban environmental beautification is an important component of city construction, it is significant to enhance the city's image and quality, and to improve the living quality of residents. Urban greenbelt, as an important component of city ecological system, has great effect on the beautification of city environment.

Firstly, the city greenbelt can improve the city's green cover rate and improve the city's ecological environment. Green plants absorb CO<sub>2</sub> by photosynthesis, release oxygen, clean air, adjust the microclimate of city, and decrease the heat island effect of city. Green plants can also absorb noise, reduce air pollution, and provide people with clean air and peaceful living conditions<sup>[5]</sup>.

Secondly, the city green space can offer beautiful scenery effect and enhance the city's image and taste. The colors, shapes and seasons of green plants can be used to create beautiful scenery, which will make the city more vibrant and lively. Meanwhile, the architecture, sculpture, water and other elements in the city green space can also form a unique landscape feature, and improve the city's image and taste.

Moreover, the city green space can also provide recreational and recreational space, which can strengthen the sense of belonging and pride of the city. The city green space offers the chance for

the citizens to approach the natural environment, and provides many places for walking, exercise and recreation. Not only can these places help to ease the stress of working and living, but also increase the sense of community and pride in the city<sup>[6]</sup>.

Generally speaking, the city green space has the vital effect on the city environment. To enhance the city's image and quality, we should attach great importance to the planning and construction of green space in the future, so as to enhance the urban green coverage and quality. Meanwhile, it is necessary to enhance the management and maintenance of urban greenbelt to make sure that its ecology, landscape, culture and society function can be exerted continuously.

### **3.2 Provide leisure and entertainment space**

The city green space has the vital function to provide the recreational and recreational space. Along with the speeding up of city life, people's demand for leisure and recreation is growing. Urban greenbelt, as an important component of city ecological system, is a place where citizens can approach nature and relax.

Firstly, the city green space offers a wide range of recreational and recreational activities. Parks, squares, gardens, etc., have been turned into walking, running, exercising, dancing and so on. These activities help people to enjoy their physical and psychological health and to improve their physical fitness, as well as to offer social and social interaction opportunities<sup>[7]</sup>.

Second, the city green space contributes to the improvement of people's quality of life. In the fast pace of city life, the citizen is always confronted with the pressure of work and life. The city green space provides a place for people to relax and release their stress. Walking in the green area, looking at the view of the scenery and the outdoor exercise will help to reduce the stress and improve the quality of life.

Moreover, the city green space can also strengthen the sense of belonging and pride of the citizens. The planning and management level of the city's green space has always been an important index to measure the city's quality. Citizens will be proud and satisfied when they see their own city with beautiful green space and abundant recreational space. Their sense of belonging to the city will also be strengthened.

Generally speaking, the city green space has the important function of providing recreational and recreational space. In order to satisfy the citizen's demand for leisure and recreation and to improve the quality of life, it is necessary to lay stress on the planning and construction of green space in the future, so as to provide more quality recreational and recreational space. Meanwhile, it is necessary to enhance the management and maintenance of urban greenbelt in order to make sure that its ecology, landscape, culture and society function can be exerted continuously.

### **4. The cultural function of the urban green space**

The cultural function of urban green space refers to its role in inheriting, displaying and carrying forward urban culture. As an important part of urban ecosystem, urban green space is not only the carrier of ecology and landscape, but also the inheritor and exhibitor of urban culture<sup>[8]</sup>.

First of all, urban green space is the carrier of urban culture. Parks, squares, gardens and other green spaces in the city are often closely linked with the history and culture of the city. These green spaces are integrated into the urban history, folk customs, art and other cultural elements, and become the carrier of urban culture. Citizens can play, enjoy and relax in the green space, and they can feel the unique charm and profound heritage of the city culture.

Secondly, the urban green space is the display window of the urban culture. Through landscape design, sculpture, architecture and other forms, the urban green space can show the characteristic culture of the city. For example, some cities display their historical events or celebrity stories

through the landscape design of the green space, allowing citizens and tourists to have a deeper understanding of the history and culture of the city. In addition, the plant configuration of urban green space, garden road design and design of water features can also reflect the characteristic culture of the city and shape the image and brand of the city<sup>[9]</sup>.

In addition, urban green space can also promote cultural exchange and interaction. The openness and publicity of urban green space provide a platform for citizens to communicate and interact. Here, people from different cultural backgrounds can communicate with each other, share their own cultural traditions and values, and promote cultural diversity and inclusiveness. At the same time, the urban green space can also become a venue for cultural activities, such as concerts, art exhibitions, cultural festivals, etc., to enrich the cultural life of the citizens and improve the cultural quality of the city<sup>[10]</sup>.

To sum up, the cultural function of urban green space plays an important role in inheriting, displaying and carrying forward urban culture. In order to give full play to the cultural function of urban green space, the future urban construction should pay more attention to the cultural connotation and characteristics of green space, and integrate it with the urban history, folk customs, art and other cultural elements. At the same time, the management and maintenance of urban green space should also be strengthened to ensure the sustainable play of its ecological, landscape, cultural and social functions.

## 5. Conclusion

Urban greenbelt has many functions in alleviating urban construction, not only in ecology, landscape and culture, but also in social and economic impact. Urban greenbelt has an irreplaceable role in improving urban environment and ecological conditions. The construction of green space can alleviate the urban heat island effect, reduce the noise and air pollution, and provide the residents with clean air and quiet living environment. In addition, it can protect biodiversity and maintain the stability of endangered species and ecosystems. In terms of social and economic aspects, urban greenbelt also plays an important role in urban construction. The construction and management of greenbelt requires a large amount of manpower, material and financial resources, which can promote related industries' development and increase employment opportunities. Furthermore, the openness and openness of the green space can enhance the interaction and interaction among the residents and enhance the cohesion of the community. The function of urban greenbelt is diverse, for example, to improve the ecological environment, to enhance the image of the city, to pass on the historic culture, and to promote social interaction. To fully utilize these functions, we should pay more attention to the planning, construction and management of greenbelt, and fully utilize its ecological, landscape, cultural and social functions. At the same time, it is necessary to enhance policy and financial support, to enhance the consciousness of greening and environmental protection, and to make concerted efforts to promote the sustainable development of the city.

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