

URBAN ROOFTOP GARDEN DEVELOPMENT AND UTILIZATION IN THE PERSPECTIVE OF HEALING LANDSCAPE - TAKING MACAU AS AN EXAMPLE

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Abstract

Commonalities of fast-paced life and huge pressure now jostling for attention of people of all ages, amid the rapid advance of modern cities. This paper conducts research and analysis on the current situation of the development and utilization of roof space in Macau, and combines the theoretical thinking of healing landscape to guide the design of urban roof gardens, so that the elderly, youth and children in high-density cities have different views on roof green space. Perception, so as to achieve the effect of healing. And provide optimization suggestions for the future development of roof gardens in Macau residential areas.

Keywords: rooftop garden; healing landscape; Macau.

1 RELEVANT REVIEW

1.1 Concept Elaboration

1.1.1 Healing Landscape

Healing landscape, also known as wellness landscape, generally refers to the landscape environment based on the natural environment, with natural elements as the main component, and physiological, psychological treatment and rehabilitation as the main purpose (Ding & Liao, 2020). Using the method of ecological environment restoration to make urban residents go to contact with nature, so that residents can relieve fatigue and relax.

1.1.2 Rooftop Garden

Rooftop garden refers to the construction of an environment for people to rest on the roof of a building through plants, landscape structures and other facilities, forming an urban open space that integrates green space functions and sightseeing and leisure functions (Gao, 2021). Taking Macau as an example, due to the high-density development of the city and the lack of land resources, it is impossible to increase the green space on the ground. It is necessary to rationally use the urban roof space to benefit the residents.

1.2 Role of Integrating Healing Landscapes into Urban Rooftop Gardens

In the context of high-density cities, the elderly enjoys no spacious shade space for playing chess and resting outside the dense forest-like building. As they age, their bodily functions gradually decline, and they need to be brought to life by the vitality of the landscape; for young people, who work under high pressure for

a long time in high-rise buildings, they need a space for self-regulation and relaxation. Green landscape plants can make their hearts happy, relieve their physical and mental fatigue, and help improve follow-up work efficiency; for children, long-term addiction to electronic products will lead to problems such as decreased vision, less communication with others, and self-isolation. A dynamic space for movement. Roof gardens with diverse plant configurations can popularize knowledge about biodiversity and communicate more with others.

2 CURRENT DEVELOPMENTS AND UTILIZATION OF ROOF SPACE IN MACAU

2.1 Small Green Space and Poor Leisure Space

"2020 Macau Yearbook" revealed that population density of Macau has exceeded 20,000 people per square kilometer, but the green area per capita in Macau is only 16.7 m² (IBGMSAR, 2021). The current situation of the Macau Peninsula, the buildings are highly dense, the green space is scarce and scattered, and the recreational green space in the blocks is seriously insufficient. Macau is narrow and densely populated, and it is very difficult and challenging to insert greenery in the limited space. According to the newly revised "Macau Urban Green Space Classification Standard" (2015), the urban green space area of Macau in 2015 was about 10.8 square kilometers, accounting for about 35.6% of the total land area of Macau at that time. The per capita urban green space area was about 16.7 square meters, of which Most of them are managed by the Landscaping and Greening Department of the Municipal Affairs Bureau; while about 50% of the green space in Macau is located in Coloane, it can be seen that the distribution is uneven (MSAR, 2020, May 06).

2.2 Relevant Laws and Regulations Fail to Regulate Utilization of Roof Space

Macau has not yet promulgated a complete urban master plan, and the Municipal Affairs Bureau has no corresponding regulations on the detailed planning of the urban roof. Buildings used for residential purposes in the urban area of Macau are mainly divided into three categories: the first type is the older stair building, which has no elevator and is five stories high. The roof is generally occupied by the owners living on the top floor to plant flowers, place sundries or illegally cover. The second type is a residential building of about 15-30 years old. The management company has a looser management of the building. The owners usually dry food, clothes and solar panels on the roof. The third type is a new residential building. Due to stricter property management, The owner is not allowed to enter the roof without permission, and the roof is generally a free space that has not been developed and utilized (Fig.1 & 2). Due to legal gaps, some residents illegally occupy roof space, while other owners do not realize that roof space is in the common interest of each owner.



Fig.1 & 2: Current situation of roof in Macau (Image source: Photos by the author)

3 OPTIMIZATION STRATEGY OF URBAN ROOFTOP GARDEN HEALING LANDSCAPE

3.1 Design a "Multi-Sensory" Healing Space

"Five senses" healing is based on various elements in the environment (plants, water bodies, animals, etc.) as the carrier, through a series of targeted designs, through the eyes, ears, mouth, nose, tongue and other

senses to stimulate the human body, And then achieve the purpose of relieving stress and promoting physical and mental health . Humans perceive their surroundings through vision, hearing, taste, smell and touch, and analyze the surrounding environment through the "five senses".

When designing a roof garden, the designed landscape form allows residents to "see, touch, and smell". For example, the choice of plant colors has a distinct impact on the residents' vision in four seasons; choose materials with unique tactile perception in the design of road paving or landscape structures; increase the diversity of plants, attract birds and other animals to fly, and simulate the sounds of nature ; Use the smell and taste of plants to stimulate the user's senses, so as to relieve stress and relax the body and mind, etc. (Du, 2021).

3.2 Design a "Multi-Level" Healing Space

The design of the roof garden should be based on the physical and mental needs of different groups of people. When designing to meet different groups of the elderly, youth and children, it should not only meet the functional needs, but also meet the common needs of physiology, spirit and psychology. Combined with the actual site, with different landscape elements or plants to divide the area to meet the multi-level landscape needs.

Chronic activity area is designed for the elderly who are physically inconvenient or can only move slowly; some elderly people have no relatives around and need to communicate and interact with other elderly people, and design a quiet rest space.

Busy work and tedious life pressure make young people's bodies gradually enter a sub-healthy state. The leisure and entertainment area is designed to allow young people to exercise in their spare time at work or at home to restore their physical and mental health.

Addiction to electronic devices and academic pressures keep children away from necessary communication with others. In that case, it is highly recommended to set up specific activity area for children, thus to fully provide them with interactive space; design a landscape science area to expound diversity of native plants. So that children can grow up in a healthy and green environment.

3.3 Design A Multiple "Natural" Healing Space

High-density cities with disturbing scenes keep bothering the dwellers. "Natural" healing refers to restoring original ecological environment. Plant configuration and selection of landscape elements in the design process of the roof garden base ecology. Nature has created human beings, who in turn destroyed the ecological environment amid the urbanization. Rooftop gardens expand urban ecological environment, restore the beautiful nature, and offer quiet and shaded leisure space for residents to better psychological state, and restore physical and mental pleasure.

4 CONCLUSION

Surging pressures suffered by the elderly, youth and children are now jostling for attention in society. How to aid people recover their mental health and reduce stress through limited urban space will constantly perplex future urban planning. Urban landscape offers the most approachable way for residents to access to the nature, and urban rooftop garden gathers common interests of every householder.

This paper attempts to offer citizens a public place to relax and relieve stress through adding rooftop green space in Macau making use of landscape healing techniques, thus to better physical and mental health of urban residents, and provide a reference for local urban planning and design.

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