

# On the urban green space system planning of small cities in mountains regions

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**Abstract.** Although research on urban green space system has grown steadily, little research has focused on the urban green space system planning of small cities in mountains regions. The planning and management of urban green space system of small cities in mountains regions is very important to the well-being of both the environment and its inhabitants. This article sheds light on a few fundamental principles should be followed during the planning of urban green space system of small cities in mountains regions. These principles include people oriented principle, systemic principle, balanced principle, and integrated principle.

## Introduction

Green spaces are a significant and increasingly valuable component of the urban environment. The provision and administration of high quality green spaces in cities and towns contribute to human well-being by providing ecosystem services such as climate regulation, capture of pollutants or flood regulation; they also tied to social justice, promote the encounter of neighbors and community integration, deliver a favorable place for health, relaxation and nature contemplation, and provide opportunities for a variety of physical activity behaviors such as recreational walking and playing sports. Urban green space system(UGSS) comprises all green spaces within a city, including urban forest, green belt, protective green spaces, public parks, plants nurseries, community gardens, attached green spaces, residential gardens, waterfront green spaces, and street trees[1,2,3]. They may be open to public access or privately owned. It plays a crucial role in supporting urban ecological and social systems such as enhancing urban quality of life, contribution to achieve sustainability of cities, promoting city brand. People have strong ties to UGSS and use it in various ways. Its importance has been recognized through fundamental part of sustainable urban development,

In China, the UGSS planning is an indispensable part of the urban planning. However, due to lack of sound planning theories and methods, ignorant of urban nature spaces and nature process, a number of problems existed in the UGSS planning practices. Problems include the green space quantity is emphasized but its layout is often ignored, great importance is attached to the green spaces in the built area of city but the green spaces in surrounding areas of the city is unnoticed, the green space system is limited by the administrative zoning but loses its integrity and rationality in spatial patterns. Some costly flagship eco-city UGSS projects without seriously considering the everyday needs of residents are socially and ecologically unsustainable. [3,4]

Recent studies regarding the relationship between the UGSS and the physical, psychological and social health of urban inhabitants are increasing. The green space system of small cities in mountains regions(SCMR), however, has received less attention. Combining the UGSS planning guidelines of Changting county town as an example, this paper provides: (1)a broader understanding of the tenets must be followed during the UGSS planning and designing of SCMR, (2)explores the relationship between UGSS and its components and environment, (3)some principles must be followed to fulfill those tenets.

## Main issues in the UGSS planning of SCMR

As a background, this section provides a brief context on issues in the UGSS of SCMR after a brief introduction of the study area.

**Study area.** Changting county, one of the 3<sup>rd</sup> group national historic cities, is located in the western Fujian Province of southeastern China. With a population of 520,000 and an area of 3,099 square kilometers, it is the fifth largest county in province. This county belongs to subtropical zone, enjoys abundant precipitation. Ting River (whose English name is the Hakka River) drains 83.9% of the land area of it. It was established in 736 during Tang Dynasty, had been where prefectural level administration (named as Tingzhou) were located, and been the political, economic, cultural, and transportation hub of western Fujian for more than 1200 years. The county town sits on the upper Ting River, consists of Tingzhou Town and some regions of Datong Town. With around 200,000 resident population, the urban planning area is 33 square kilometers, but its built-up area is far less than that [5]. The population density of traditional downtown is more than 16,600 inhabitants per square kilometer, the center part is more than 18,200 [6]. Its urban green spaces such as urban parks, urban squares, and street greens locate dispersedly all over the built-up area. A few hills such as Wolong Hill, Nanpin Hill embrace the traditional downtown. Significant steps to improve the quantity, quality, and safety of green spaces has being taken in the recent decades.

**Issues in the UGSS planning of SCMR.** Due to its special physical environments, construction lands, and layout frameworks, the area calculation of the green spaces of the hills in the UGSS planning of SCMR and its reasonable planning and utilization, its street greens planning and designation, and its detailed design of UGSS are very different from other cities. As a result, the tenets and principles must be followed by its planners cannot be transplant from other cities directly.

## Results and Discussion

**Give prominence to the concept of people oriented.** UGSS should be designed for ordinary individuals not for collective “people”. Urban green spaces are places of experience, the experience of ordinary people in ordinary places, it should be designed for improvement the quality of people’s lives not for exhibition nor for showing. Public participation and giving first rank to function reflect the orientation.

**Encouraging public participation.** Public participation in social affairs related to community is an integral part of sustainable development and good governance in modern society. Public participation in the UGSS planning can draw residents to establish a sense of attachment that may lead to community maintaining the system. The UGSS planning processes must be transparent and be abundant in opportunities for the involvement of dwellers. Across multiple phases of UGSS planning, development and management, people or groups who regularly or potentially visit and interact with special green space should be encouraged to take part in discussion even design and management processes. Potential accessibility to special urban green space is not the same as usability; therefore, it is extremely important to consider user preference, perceptions, and potential barriers to access special planning urban green space during planning and designation stage. Through participation, complementary information about activities and behavior as well as perceptions by users and/or potential users can be collected to better understand both accessibility and usability of green space and to enhance the usability effective of green spaces. To achieve effective public participation, the channel and method for the public to express their interest and participate in the formulation of plans should be established and improved.

**Taking functions into paramount consideration.** It is the functions rather than the layout of the green space system should be considered firstly during UGSS planning. The requirement of park green space to meet the outdoor recreational needs of residents, the hygiene protection of green space to meet the requirement for ecological protection, transportation strip separation and urban clusters protection should be given first priority. To assure the UGSS can function effectively, it is necessary to take all varieties of green spaces, maintenance into consideration in advance.

Different scale urban green spaces fulfill different functions with increasing size and distance from the house. Large-scale green spaces might have high health-influencing capacity and is accessible to more communities. The largest green space offers the most diverse functions needed by the citizens. However large green areas are a limited resource and many people live in city areas where the distance to larger green areas reduces the possibility for frequent use. Small-scale green spaces might only suitable for recreational use rather than carrying overall ecological and environmental functions, but easier accessible to the community near it. However it might contribute to satisfy the need for everyday experiences of outdoor areas. They are important asset in citizen's everyday lives[7]. The combination of various scales green spaces are crucial to strengthen the effectiveness of ecosystem services provided to citizens. On the one hand, green spaces as public goods which allow free access to all citizens and represent pockets of nature for all residents. On the other hand, green spaces including private gardens, institutional gardens as estate owned by special person or institution are restricted access. The larger of the size, the greater of the magnitude and diversity of ecosystem services provided. For cultural services, larger green spaces allow various activities and thereby facilitate the simultaneous presence of different users (e.g. children, youth and adults), favoring social interactions. The small and near to the resident districts improve the accessibility to green space of the urban habitats.

The benefits of UGSS can only be realized through appropriate management strategies. With poor management, green spaces' capacity to meet the basic physical, mental, and security needs of citizen can be reduce or even lost. The relatively low-cost daily maintenance work should be give top priority during the UGSS planning and designation in SCMR such as Changting county town for the shortage of maintenance staff and charge. To reach this goal, the coordination of designers and maintainers should be established and improved. Through the coordination, the lay-out of UGSS and its recreational facilities, regular monitoring of their condition, and their maintenance are carried out to benefit the citizens and at the same time reduce the cost of daily maintenance.

Planning for UGSS is just one of the many facets that urban planners must consider. Planners are often required to balance it with other potentially competing goals, such as affordable housing, transportation, and other regional or local priorities. To accomplish these goals, a few integrated principles should be followed when possible.

**Coexistence with surrounding greens.** Urban green space can be comprised of both human-modified outdoor spaces as well as vegetated natural spaces. The effectiveness of UGSS in providing benefits to people depends on its species composition, diversity, age, and location with respect to people and other elements in the landscape. Changting county town has extensive green spaces with adjacent hills and rivers so that urban residents can get access to common green land conveniently. Take those vegetated natural spaces into consideration during UGSS planning and designation can not only make the most of the natural environment but give prominence to the townscape feature.

**Symbiosis with wetlands system.** Like green spaces, urban water bodies are key sites for building urban sustainability, promoting social, economic, and environmental objectives and influencing human well-being. Water-related elements have been identified as playing an important role in the human-nature experience resulting in psychological benefits. As shallow-water systems, wetlands include rivers, lakes, pools, marshes, bogs, and swamps etc. provide significant ecological services for urban regions in terms of water supply, wastewater treatment, flood storage, drought resistance, etc., are among people's most preferred places for restoration and relaxation. Exposed to green space with the presence of water, the perception of thermal discomfort in summer could be alleviated greatly. Wetlands is the most important planning element which is comfort of human physical and psychological. Streamside areas of cities offer some of the most attractive sites for parks. Longtan Park and Hakka Source Square of Changting county town are located at riverside of Ting River and acted as important outdoor playing field of local citizens. It is critical to consider the riverside of Ting River as an integral part of the whole UGSS and make it both physically and visually accessible for locals and tourists of all ages and income at any time.

**Harmonization with relics conservation.** It should be noted that some urban green spaces have specific features or historical backgrounds, for example some heritage architectures, relics and archaic trees, should be taken much count of and should be fully explored. In response to achieving maximum system benefits, the UGSS planning branches and the relics conservation branches should not work separately. Integrating UGSS planning and designation of SCMR into the heritage and relics conservation framework is beneficial to both parties. The archaic trees in the range of relics are not only the important components of relics but also key compositions of urban green space system. The first step of the subsystem planning surrounding relics such as the double cypress of the Tingzhou examination hall is to take archaic trees as determinants. On the basis of it, measurements to bring them into harmony with the UGSS should be tried to take. As a national historic city, Changting possesses a great number of cultural relics related to capital of Hakka, economical capital of Chinese Soviet Republic[8]. Its UGSS planning and designation should view relics conservation as a priority.

**Communion with tourism planning.** Among UGSS, some components such as public parks, archaic trees, waterfront green spaces play an indispensable role in improving urban quality of life and attracting both domestic recreational users and inbound visitors. Local residents are the major users of those green spaces, without whom it would be very difficult to exist. At the same time, visitors can take them as tourism destinations. The tourism authorities can promote some of the parks, waterfront green spaces to eco-tourists as destination. Utilizing some components of UGSS for a mix of citizen recreational activities with tourism uses is one feasibly used development strategy in SCMR. During the planning and design of some green spaces such as Longtan Park and Wolong Hill, it is a win-win choice to give concurrent consideration to dwellers and tourists interests.

## Conclusions

Depending on the practical situation of SCMR by accurate assessment, take UGSS as a subsystem of urban, pay attention to the balance between UGSS and the other physical, and cultural elements, adopt effective measures to integrate UGSS with economic development, the UGSS planning and designation of SCMR can make the most of its physical, and cultural elements, and achieve the goals to meet the increasingly urban dwelling environment demands of the people.

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