ATLANTIS PRESS
Advances in Engineering Research, volume 63
5th International Conference on Sustainable Energy and Environment Engineering (ICSEEE 2016)

Regional Characteristics and Modernization of Botanical Garden--- Design of Anshun Huangpu Ecological Botanical Garden

Yi Yang[1,a], Xiao Xu[2,b] and Muran Yang[3,c]

[1]Huazhong University of Science and Technology, Wuhan, Hubei, China

[2]Huazhong University of Science and Technology, Wuhan, Hubei, China

[3]Southeast University, Nanjing, Jiangsu, China

[a]email: 273842965@qq.com, [b]email:935190437@qq.com,[c]email: mr9499@qq.com

Keywords: botanical garden; regional feature; modernization; planning and design

Abstract. With the example of Anshun Huangpu Ecological Botanical Garden Planning, this paper discusses how the contemporary botanical garden creates the space with regional characteristics and conforms to the development of the times by introducing the concept and design method of this project planning.

Introduction

March 17, 2016, Anshun City organized a meeting to promote the creation of national garden city. According to the "Grading Standards of Eco-garden City" putted out by Ministry of Housing and Urban-Rural Development of the People's Republic of China, having a botanical garden with an area of more than 40 hectares is one of the requirements to meet the assessment criteria for the city. Furthermore, Anshun is on the list of "National Demonstration Area of All-Region Tourism" which was published on February first. However, there are just a few tourist attractions well-known outside in Anshun such as the Huangguoshu Falls and the Dragon Palace. Therefore, the construction of Anshun Botanical Garden is the necessary step to improve the global tourism system.

The base of the project is about 8km away from the west side of downtown of Anshun. Anshun Ring Expressway to the west, some proposed projects such as Sanhe Wetland Park, an amusement park, residential buildings, and resettlement residential area to the east and a 500KV substation to the south are around the base. As a result, five 500KV high voltage transmission lines and eleven 110-220KV high pressure lines cross from the substation to our base. This causes adverse effects on the landscape molding and landscape interface on the west. The overall topography of the base is flat, with a small amount of tiny hill. There is a reservoir named Dachong in the northeast corner of the base which is used for irrigation and agriculture currently. The water quality of the reservoir is so good that we can use it as the landscape water body in the process of project construction.

Conception

Two future phases are planned, for a total of 214 acres. The occupation of the first part of the garden is 107 acres and the second part is 112 acres. It is divided into six areas which are the service area entrance of the botanical garden, the area of exotic plants, the viewing area of local territory plants, the area of economic plants, the area of wild plants and the area of the introduced plants, respectively. In the planning process of the project, we take the followings into thoughtful consideration.

How to preserve the ecological pattern of the base? The use of the original terrain shape, respect for the existing terrain conditions, organization of environmental landscape by conforming to the terrain, are important principles for planning and design of a botanical garden. In the planning and designing stage, we utilize the existing mound and reservoir to shape the landscape to preserve the topography of the base and implement the concept of ecological priority, as the entrance building which is shown in Fig.1. It is an earth-sheltered building combining with the terrain which has perfect advantages in economy and ecology. At the same time, considering that construction of infrastructures will damage the ecological connectivity of the region and threaten the local biodiversity, we intend to

guarantee the ecological corridor of plants by construction of the green ecological corridor which is shown in Fig.2. The corridor can also help to solve the traffic problem brought by the crossing of Second Ring Road and make the Botanical Garden connect with Sanhe Wetland Park effectively.

Fig. 1 Entrance building

Fig. 2 Ecological corridor

How to build a composite full time botanical garden? In this project, we present a new concept, Night Operation. So that visitors can experience the different plant landscape. The concept breaks the traditional model that people can visit the botanical garden only during the day. Meanwhile, the garden provides a variety of recreational modes such as science education, shopping, visiting, outdoor camping and so on which are shown in Fig.3 to create a composite full time botanical garden.

How to avoid the visual interference caused by high voltage corridors? A number of high voltage corridors which have been mentioned in the survey may adversely affect the visitors' experience at the base. So we plan to use high-altitude bridges, roof viewing platforms and hydrophilic platforms to create multi-level space experience. In this way, visual pressure from the high pressure corridor in the base will be eliminated and visual hierarchy of tourists can be richer.

How to preserve the regional context? Anshun is a multi-ethnic area with rich national culture. The project displays the culture of the indigenous Miao, Dong, Buyi and other ethnic groups through the architectural forms, tourism formats and landscapes within the base to achieve the purpose of effective transmission and protection of national culture.

Fig. 3 Master plan

Characteristics of regional space

The Shaping of urban personality has attracted more and more attention of the whole society. Botanical gardens are essential symbols of urban civilization. It becomes an important topic for discussion that how to create a landscape with its own characteristics and advantages according to the regional characteristics. Anshun is a famous historical and cultural city in Guizhou with a long history and profound culture. It has unique historical and cultural relics such as Chuangdong culture, Yelang culture, Zangke culture and Tunbao culture. Therefore, the creation of space with regional cultural characteristic in Anshun Botanical Garden is very important.

Natural conditions of the site. In the botanical garden, landform is one of the most basic natural elements in the formation of natural landscapes. The landform forms the skeleton of the landscape, determines the type of the landscape, and is also the landscape formation condition of other natural landscape elements, creates the basis for the performance of the regional natural scenery. Anshun is located in the division of Wujiang River Basin of the Yangtze River and the watershed of the Beipanjiang River in the Pearl River Basin. It is a typical karst landform concentrated area in the world. So we design the landscape according to the original terrain. To make landform of the project unique and be the landmark of the scenic spot, we take the naked rocky mounds in the central part of the basement as the visual focus, and Huangla Big Slope with prosperous plants on the northern side of the base as the main landscape background.

Water has the basic function of providing water source and moderating regional climate. It is also the element which embodies regional features of the landscape that has the value to attract tourists. Besides, since people hope to get close to water, waterscape is usually the visual focus and action center of the whole garden. Dachong Reservoir is one of the most important eye-catcher in the project, and will be a main element of the landscape shaping for future activities.

Plants. Vegetation bears different characters concerning different regions since it directly resulted by interactions of kinds of natural environmental elements within a certain region. GuiZhou is a resourceful area of various plants. Local characteristic plants Camellia kweichouensis, azalea, roxburgh rose, blue glass and etc. are intended to be planted in the arboretum. Humid climate, luxuriant vegetation, abounding with beeswax and blue grass, the key raw material of indigo, facilitates the production of batik in GuiZhou. Anshun, one city in GuiZhou, is honored as ‘the greatest batik of the East’ and ‘the land of batik’. A lot of batik workshops, factories and artisans as Fuyuan Hong emerged here.

Architectural style. As representative objects to reflect the regional characteristics, architectures make up a little share in the arboretum, including exhibition halls, landscape sketches, commercial streets and service facilities. The form of viewing deck on the hilltop is enlightened by drum-towers. The design of wind and rain trestle absorbs the elements of Dong's Wind and Rain Bridge and forms as ‘seven stars surrounding the moon’ which connect each area of the arboretum. The moon occupies a significant status in Anshun’s ethnical culture all the time. ‘Love in the moonlight’ is one of the ten ethnic customs of Miao in Anshun. It is a unique social custom for the young at night, hence the name ‘Love in the moonlight’. The form of trestle absorbs local customs in its design concept which is one of the effective methods to show regional characteristics of the arboretum. The form of the commercial street is the same as local traditional architectures. Commercial activities such as selling batik clothing, batik decorations, plant essential oil etc. and providing the services like scented tea, herbal cuisine, plant SPA and so on are closely related to local batik technology.

Modern Development of Botanical Garden

Diversified classifications of plants, rare flowers and uncommon trees and distinctive landscapes are the most basic conditions to attract the public for a botanical garden. Moreover, with the development of information technology, the construction and management of the botanical garden should be more and more modern.

Flora of Economic plants. In addition to the economic value, economic plants create a lovely visual effect also. They include medicinal plants, fiber plants, oil plants, spices plants, etc. Many kinds of economic plants will be planted in Anshun Botanical Garden such as Damascus Rose, Cuckoo, Lavender and Bluegrass. Development and utilization of by-products of this kind of plants are also feasible. Setting up floras of economic plants in the botanical garden areas benefits a lot. It can not only bring economic benefits, but also provide popular science education for the tourists.

Open at night. The model of night opening for botanical gardens was creatively put forward by us. 'Night botanical garden' includes a firefly-themed party, an oxygen bar of nocturnal plants, theaters with plants, lawns for camping, plant museums, the Avenue of Stars, lighted rose gardens, fluorescent botanical gardens and other regions. During the night tour of the botanical garden, tourists will have a completely different experience comparing with the day because of the light dark, weakening vision, relative enhancement of other senses such as smell, hearing and touching. In addition, the best viewing time of some kind of animals and plants is evening. Tourists can see some natural phenomena which cannot be seen during the day. It is more like an adventure game. At the same time, a novel concept "Fluorescent Botanical Garden" is introduced in this project. Fluorescent plants have been studied for nearly half a century. We plan to plant fluorescence plants to attract more visitors.

Management with intelligence. The Botanical Garden will be covered with all-round, three-dimensional, networking, intelligent monitoring and protection system to provide more efficient management. Also it can provide visitors with more convenient services. The aim is to lay the groundwork for the realization of intelligent tourism. LED electronic panels are also erected at the gate for visitors to browse the relevant information. In addition, the park will implement intellectual management on ticketing detection system, GIS geographic information systems and applications on a cloud platform. It will provide the general public with a different travel experience.

Conclusions

The concept and function of the botanical garden should be developed and enriched along with the progress of society and the changes of requirements in people's life. During the process of the design, the natural elements of the site should be used to create the botanical garden space with local characteristics and site characteristics. Moreover, we ought to explore the cultural connotation of the site, combine cultural landscape with plant landscape, with the introduction of modern technology to serve the public. Only designed by this way can the botanical gardens constantly enrich their own functions and connotation with the development of society and give people a more comfortable natural experience.

References

[1] Weiyuan Fang: Chinese Landscape Architecture. 2006(10): 64-69, In Chinese

[2] Wensong Su: *How to Mold Regional Characteristic of the Botanic Garden in Planning and Design.* Nanjing: Nanjing Forestry University, 2008:57, In Chinese

[3] Yonghong Li, Qian Yang: Chinese Landscape Architecture. 2010(7): 31-35, In Chinese

[4] Xiaofeng Chen: *The Planning and Designing for Botanical Gardens in Fujian—Taking Fuzhou Botanical Garden and Shunchang Botanical Garden as the Cases.* Beijing: Chinese Academy of Forestry, 2015:10, In Chinese