Research on Planning and Design of Mountainous B&B Based on Geographic Information System

Yanlei Shi \(^{1,a}\), Yonggang An \(^{1,2,3,4,b}\), Pengfei Huo \(^{4,c}\) and Lisheng Zhang \(^{1,d}\)

1 The School of Landscape Architecture, Beijing University of Agriculture
2 Beijing Engineering Research Center of rural landscape planning and design
3 Beijing Laboratory of Urban and Rural Ecological Environment
4 Beijing Collaborative Innovation Center for Eco-environmental Improvement with Forestry and Fruittree
Email: \(^{a}1963286627@qq.com\), \(^{b}7491832@qq.com\), \(^{c}41295870@qq.com\) and \(^{d}2824002589@qq.com\)

Abstract. In recent years, the rise of homestay tourism has brought great benefits to the tourism industry, and the tourism of the hotel has come to a new stage. At present, many mountainous areas in China have abundant natural resources and free houses, which are suitable for the development of B&B tourism. However, there are few studies on the planning and design of mountain-type B&Bs. Based on the spatial information system analysis of a mountainous area in China, this paper combines resource evaluation to design and provide a scientific basis for the planning and design of mountain-type B&B.

1. Research Background
With the implementation of the Rural Revitalization Strategy and the growth of rural tourism industry, home stay tourism(B&B) as an important pillar of rural tourism has a broad prospect. Homestay is an important part of rural tourism. It is a relatively easy way to develop, achieve quick results and get rid of poverty. The development of homestay tourism has become an important way for farmers to increase their income and become a new model for poverty alleviation [1]. The increase of demand drives the real estate developers. In addition, the change of local residents' awareness also makes local residents renovate and repair on the basis of the original buildings [2]. Homestay tourism can not only promote the local economy, but also reflect the regional characteristics through residential buildings, and become the carrier of regional culture. At the same time, as a typical mountainous country, mountainous areas account for more than 2/3 of the country's land area, and the resident population accounts for about half of the country's total population. It can be seen that it will be a valuable research topic to plan and design in combination with the mountainous terrain and to build a livable mountain type homestay.

2. Analysis on the Safety Factors of Mountain Homestay
In mountainous terrain, a qualified accommodation should take safety as the most basic condition, and the height and slope of the accommodation area as the safety factor also directly determines the experience of tourists. Therefore, whether the height and slope of the residential area is suitable or not will become an important premise of the whole planning and design.

2.1. Elevation Analysis
The altitude of the accommodation should not be too high or too low. If the altitude is too high, the...
tourists will have altitude reaction. The research shows that the incidence of altitude reaction is related to altitude, living time and physical fitness. As a long-term way of tourism, the influence of altitude on the body should be considered. If the altitude is too high, in case of emergency, the evacuation time will be extension. The height of the accommodation should not be too low, so it is difficult to reflect the advantages of the geographical location of the mountain, the visual experience is not good enough, and the tourism interest and freshness will be greatly reduced.

Figure 1. Elevation Analysis (Source: Self-drawn)

Figure 1 is a mountainous area in China. The elevation analysis is carried out by GIS software. The elevation of Zhongshan area is about 500-600m. This elevation area is suitable for residential accommodation, which will not affect the body of tourists, but also has a good visual experience area, so that the negative emotions such as fatigue accumulated by tourists during their stay can be released by enjoying the broad visual landscape.

2.2. Slope Analysis
The size of terrain slope often affects land use and building layout, so slope often becomes a necessary factor for land selection and evaluation [3]. The slope factor of mountainous area is often linked with the feasibility of the reconstruction of residential buildings and the accessibility of traffic roads. Under the condition of geological conditions, it is generally suitable for the area with slope ≥ 30% to be scattered with small plot ratio. It is recommended to carry out safety transformation measures on the basis of the original building, and it is not recommended to build a new building, because the increase of slope will increase the difficulty of the project. In the area with a slope of less than 30%, it is suitable to develop scattered or large-scale residential accommodation with a large volume ratio. And, a small slope will reduce the impact of natural geological disasters, and has advantages in people flow, logistics and accessibility.
Figure 2. Slope Analysis (Source: Self-drawn)

Figure 2 is a mountainous area in the same region of China. Through the slope analysis of GIS software, it can be seen that there is a large area of gentle zone on the top of the mountain in the region. The slope below 20 degrees can be selected as the residential area, and there are many gentle slopes in the valley, which can be used for other infrastructure construction.

3. Planning and Design Principles of Mountain Type Homestay

3.1. People Oriented, Respect for Nature
The planning and design of mountain type homestay should take the safety of human as the premise and the experience of living as the core, but it must not be at the expense of natural landscape and ecological environment, and adhere to the harmonious coexistence of human and nature.

3.2. Transformation is the Main Part, New Construction is the Auxiliary
The idle houses in the mountain area shall be upgraded and utilized, and new houses shall not be built or minimized, so as to improve the utilization rate of resources and avoid unnecessary development.

3.3. Combine Resources and Reflect Characteristics
Due to the terrain, the resources of mountain type residential buildings are less. The planning and design should be combined with the resource evaluation. The residential buildings should not be the same. They should reflect the local cultural characteristics and become the carrier of disseminating the local culture.

4. Planning and Design of Mountainous B&B

4.1. Spatial Location and Resource Evaluation
In addition to the above-mentioned factors such as height and slope, the location of mountain type homestay should also be considered in combination with the resource richness. Resources can be divided into two categories: natural resources and human resources. Natural resources can be subdivided into forest ecological resources, water resources, wild animal and plant resources, human resources can be subdivided into human landscape resources, national cultural resources, historical and
cultural relics resources, etc. Each resource type can be divided into three options: less rich (1 point), general rich (2 points), and relatively rich. In general, when the score exceeds 60% of the full score, the resource status is basically qualified.

4.2. Outdoor Planning and Design
The courtyard of mountain type homestay should not be too large due to the terrain reasons. The design should tend to be small and delicate, so that visitors can see the light in front of them on the way of climbing. Although the courtyard is small, its functions cannot be missed, as shown in Figure 3. In general, the courtyard can be divided into traffic space, recreation space, residential space, etc. Traffic space can be set up in two ways: one is based on the integrity of the center of the courtyard, which is arranged on both sides of the courtyard to achieve axial symmetry; the other is arranged in the center of the courtyard when making private space on the edge of the courtyard. However, no matter what, the integrity of the space should be ensured in the process of transformation, and the occurrence of splitting should be avoided [4]. At the same time, the recreation space of mountain type homestay should be mainly for recreation, supplemented by recreation, in the mountain forest, with good visual experience, not too many near scenes in the courtyard, and mainly for appreciation of the distant scenery. The layout of residential space should ensure quiet environment experience and good accessibility. Finally, Lighting and viewing functions are also essential.

![Figure 3. Outdoor planning (Source: Self-drawn)](image)

4.3. Interior Planning and Design
The original intention of the tourists to choose the homestay is to experience the simple folk living environment, so the decoration should not be too luxurious, so as not to appear out of place. Traditional houses are usually made of local materials, and their styles vary according to geographical environment and climatic conditions. Therefore, since ancient times, buildings have obvious regional characteristics [5]. For example, the cave in Shaanxi Province is a unique form of Han people's residence on the Loess Plateau in northern China, which is divided into earth cave, stone cave, brick cave, etc. The "pole and fence style" in Guangxi, China, is also very special. This kind of building is suitable for places with more wet rainfall. Now it is mainly popular in the remote areas where Zhuang people live, including the central and Western Guangxi, Southeast Yunnan, Southwest Guizhou and North Vietnam. The arrangement and layout of furniture in the house should be simple and reasonable, and the interior decoration style should be similar to the local folk custom style. In addition, through the development of folk goods display, featured catering, ethnic custom experience and other forms, we can conduct in-depth excavation of the homestay, so that the folk custom can really be integrated
into the homestay, but we need to pay attention to that the experience items should not be too many and miscellaneous, so as to avoid the phenomenon of unclear primary and secondary.

5. Epilogue
In the planning and design of mountain area, we should not only pay attention to the influence of terrain on the B&B, but also on the basis of retaining the architectural features and customs of the original residence, it is the key to design the B&B that conforms to the aesthetic and taste of tourists in the present era.

6. Acknowledgement
The work was supported by grants from the Beijing Municipal Education Commission (CEFF-PXM2019_014207_000024), the Beijing Engineering Research Center of rural landscape planning and design (kf2019064) and Research and training program for college students of Beijing Agricultural College.

7. Reference
[1] Zhang Di. On the development of homestay industry in Guizhou [J]. Journal of Guizhou Radio & Television University, 2018, 26(2):31-34.
[2] Yu Hao; Jin Rixue. Study on the architectural appearance and mountain characteristics in mountain architectural space [J]. Planning and design, 2018.
[3] Xu Sishu; Xu Jian. Theory and practice of mountain town planning and design [M]. 2012:2.
[4] Tian Junyi. Analysis of the renovation and design of homestay in traditional dwellings[J]. Design, 2017:152-153.
[5] Xu Ruzhen. Environment and folk custom: the mountain features of Yimeng folk custom[J]. Humanistic world, 2015:60-66.