

# The Influence of Dai-Traditional Ethnic Culture on Local Bamboo Building Architecture

--Taking Xishuangbanna as an Example

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## Abstract:

By analyzing the overall structure and basic uses of Dai bamboo buildings, the paper discusses the relationship between Dai bamboo buildings and Dai People's Daily life, religious beliefs, family concepts and the relationship with nature, etc., and produces a more in-depth study and exploration of the harmonious coexistence between man and nature. Starting from the structure of the Dai bamboo building, this paper provides basic knowledge of bamboo building from three aspects: building materials, overall structure, and basic functions. Secondly, it discusses in detail from the perspectives of religious belief, family concepts, respect for nature, and social and entertainment. It puts forward that the bamboo tower is the bearer of the specific lifestyle of Dai people in Xishuangbanna and contains their group philosophy. Finally, it is believed that the bamboo tower is the bearer of the Dai people's culture and the result of its unique cultural comprehensive influence.

**Keywords:** Dai; traditional culture; bamboo building architecture

## Formulation of the research question

As the precious heritage of the Dai people, the traditional culture of the ethnic group has had an important impact on all aspects of its historical development, especially in the daily life of this imprint is particularly obvious, the bamboo building architecture that is the epitome of the role of the traditional culture of the Dai people in the life of the Dai people, through the study of the bamboo building, not only can you learn about the Dai people's national culture, but also be able to have a more in-depth observation of the local regional society.

For example, in terms of the building materials of the bamboo building, Li Tianni researched the characteristics and construction problems of the raw bamboo materials with the help of the angle of constructivism and design, explored the unlimited potential of bamboo in the structure, and integrated the different perspectives of landscape designers, architects, and structural designers into the scope of the consideration through the design and analysis, and strived to maximize the potential of the use of the raw bamboo materials for landscape architecture and the advantages of the art; <sup>1</sup>Zheng Yang launched a study on bamboo from the perspective of bamboo structure, analyzed the mechanical properties of bamboo and the advantages and limitations of the development of

bamboo architecture, put forward the structural system suitable for the development of bamboo architecture, summarized the key structural techniques of bamboo construction: bamboo and bamboo (wood) connection, bamboo and metal connection, bamboo, and concrete connection, and summarized the applicability of the different types of nodes, and also divided the performance of bamboo construction into structure, nodes and the three aspects of the skin, and finally analyzed the feasibility of the bamboo building as well as the prospects.<sup>2</sup>

Li Sijia, through the exploration of the innovation of Dai traditional residential bamboo buildings in Xishuangbanna, took the design of "Elegant from the wind SOHO" as an example; while discussing the modernization and design of the Dai traditional residential bamboo buildings, he analyzed the issue of bamboo building renovation in depth from the aspects of the current situation of the design, the design concept, the significance of the design and its impacts;<sup>3</sup>Li Lei, on the other hand, started from the distribution of Dai residential resources and their characteristics within the scope of Yunnan, and from the regional characteristics of the architecture, comprehensively considered several factors,

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2 He Zhengyang. Research on Bamboo Building Construction [D]. Fuzhou University,2018.

3 Li Sijia. Innovation and Exploration of Bamboo Buildings of Dai Traditional Houses in Xishuangbanna [D]. Yunnan University,2022.

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1 Li Tianni. Exploration and Research on Structural Possibility of Original Bamboo Landscape Architecture [D]. North China University of Technology,2023.

differentiated the surrounding geographic climate, ethnic customs, and the influence of the surrounding cultural circle, etc., and discussed the scheme of classifying and protecting typical Dai residences in different regions, and put forward the proposal of implementing sustainable development;<sup>4</sup>Based on the basic characteristics of bamboo buildings in Xishuangbanna, Yang Yuming et al. study the development history of bamboo building culture and analyze and discuss the advantages and disadvantages of new bamboo building architecture; Guan Jinni et al. use the water culture of the Dai ethnic group as an entry point to discuss its important historical roots in reality, and use it to explore the influence of the water culture on the Dai ethnic group's bamboo buildings in terms of structure, selection of materials, and choice of location.<sup>5</sup>Yang Kaiyuan Zhou Hongteng in the design of bamboo buildings to explore the design elements of traditional ethnic minorities to adapt to the local conditions of the design elements; Xishuangbanna Dai bamboo buildings and Lan Yu Yamei underground house are adapted to the two microclimates of the architectural form: the Dai bamboo buildings use the bottom of the elevated floor, the bamboo and wood gaps in the design to achieve the ventilation of the moisture-proof function; the Yamei underground house on the other hand, the cave in the ground, the side of the house to face the wind of the design of an effective way to The design of the underground house of the Yamei is the opposite, the cave-dwelling underground and the side house facing the wind can effectively resist the frequent sea breeze.<sup>6</sup>

On the specific issues mapped by bamboo buildings, Apsari D P; Dewi O C, Faculty of Architecture, University of Indonesia, discusses the issue of bamboo as a structural element for buildings in tropical climates through a review of the theory of bamboo as a structure, the potential of bamboo, the definition of structural elements of buildings in a tropical climate, and a case study of buildings in a tropical climate;<sup>7</sup> Galmarini Bianca, Costa

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4 Li Lei. Research on the Regional Characteristics and Sustainable Development of Dai Folk Houses in Yunnan [D]. Kunming University of Science and Technology, 2007.

5 YANG Yuming, WANG Kanglin, FAI Chaomao, et al. Development of Bamboo Buildings in Xishuangbanna[J]. Journal of Bamboo Research, 2003(04): 75-80.

6 Yang Kaiyuan, Zhou Hongteng. A Comparison of Design Elements of Traditional Minority Houses Adapted to Local Conditions--Taking the Bamboo House of the Dai People in Xishuangbanna and the Underground House of the Yami People in Lanyu as an Example[J]. Journal of Huaihua College, 2019, 38(10): 4-10.

7 Apsari D P, Dewi O C. Bamboo as a structural element

Paolo, and Chiesi Leonardo present several traditional buildings that incorporate bamboo, critically exploring the social and cultural factors that limit the use of bamboo in the contemporary context by investigating housing perceptions and practices in an informal settlement in Colombia.<sup>8</sup>

The above combing shows that although scholars have carried out rich research on related issues, there is still room for exploration. Therefore, this paper takes the bamboo building in the Xishuangbanna area as the main research object and tries to discuss the influence of national traditional culture on the functional zoning of bamboo buildings from the aspects of religious beliefs and social customs by presenting the building materials, basic structures and functions of bamboo buildings.

## The basic structure of Dai bamboo buildings

In the thousands of years of history, the Dai people have accumulated rich natural resources and a set of building skills and traditional wisdom to match. They have learned how to choose the most suitable bamboo, process and handle it, construct as well as maintain and repair bamboo buildings, all of which have laid the foundation for the long-lasting stability and lasting beauty of bamboo buildings. Their knowledge of bamboo goes beyond the look and feel of the bamboo, delving into its growth cycle, grain direction, internal structure, and moisture content. More critically, they have passed on this traditional knowledge and skills from generation to generation, forming a kind of intangible cultural heritage within the family or community.

### (1) building material

The Dai people are mainly located in China's Yunnan Province, a region with a rich environment and complex terrain. Here, the Dai people have formed their unique living habits and architectural styles, and bamboo buildings represent their existence.

The unique subtropical climate of Yunnan provides a favorable environment for the growth of bamboo, which has become one of the most common building materials in the region. There are many kinds of high-quality bamboo materials, such as Dalong bamboo, Jinzhu

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of architectural buildings in tropical climates[C]//IOP Conference Series: Earth and Environmental Science. IOP Publishing, 2021, 673(1): 012021.

8 Galmarini B, Costa P, Chiesi L. Natural Building Materials and Social Representations in Informal Settlements: How Perceptions of Bamboo Interfere with Sustainable, Affordable, and Quality Housing[J]. Sustainability, 2022, 14(19): 12252.

bamboo, Fengtai bamboo, and Maozhu bamboo, in the traditional settlement area of the Dai people. Red bamboo, with its large diameter and solid texture, has become the main material for the construction of bamboo buildings, especially used as pillars and beams; colored bamboo is colorful after special treatment and is often used as stair railings, fences, doors and windows of bamboo buildings, injecting rich colors into the buildings.

Traditionally, thatch is also used in bamboo buildings, and such a choice not only depends on the characteristics of bamboo varieties but also reflects the Dai people's use of the environment and their skill in discovering local natural resources.

In addition, to make the bamboo buildings built at the foot of the mountain, on sloping land, or near the river more stable, laterite or clay is often used as the foundation reinforcement material.

### (2) Tectonics

The main structure of a bamboo building consists of bamboo pillars, beams, and panels. Bamboo pillars are used as support structures to bear the weight of the bamboo building; bamboo beams connect the pillars to reinforce and stabilize them; and bamboo panels are used to enclose and partition the space. The overall structure is simple and flexible.

**Bamboo Pillar:** The Bamboo pillar is the core of the bamboo building support structure; a solid bamboo building begins with the selection and processing of the appropriate bamboo pillar; first of all, the selected bamboo needs to undergo 4-6 years of growth so that the bamboo in the diameter, firmness, and flexibility to reach the best state. The bamboo sections without joints are especially popular in the selection part because they have better load-bearing capacity and stability. [ He Jingyuan, *Dai Bamboo Building*, China Ethnic Architecture Research Society, 2017] Secondly, to ensure the longevity of the bamboo column, it will go through a series of treatments before construction, such as sun-drying, baking, and soaking, to remove the sugar and moisture inside the bamboo and reduce the risk of insect infestation. In the design of bamboo buildings, the layout of the bamboo pillars often reflects Dai's understanding of home and space. They are usually placed evenly to ensure a balanced load-bearing of the building and provide maximum interior space utilization. In contrast, the proper spacing ensures natural ventilation and light, making the building a fresh and comfortable environment.

**Bamboo beams:** In bamboo building construction, bamboo beams play a crucial role as both the skeleton of the building and the support for the roof and walls. Compared with bamboo pillars, bamboo beams need to be more finely selected and processed, as it is necessary not

only to maintain the original strength of the bamboo but also to ensure its stability over a long period.

In selecting the material for bamboo beams, the middle section is usually chosen because the bamboo in this part possesses the best uniformity and bending strength. During the treatment process, apart from the conventional sun-drying and baking, craftsmen will also use age-old techniques to enhance the density and strength of the bamboo beams, such as harvesting in specific months to ensure that the bamboo has a low moisture content. Connections are also an important aspect of bamboo beam design. Traditional tying or locking techniques, in addition to reducing material costs, make maintenance and repair easier. When a bamboo beam is damaged, the damaged portion must be replaced and re-bonded without disassembling the entire structure.

In addition, the bamboo buildings of the Dai ethnic group are nearly square in overall structure, with two floors total; the upper floor is for living, and the lower floor is for raising livestock and stacking things. Stairs are connecting the two floors, corridors, and drying platforms.

### (3) Basic Functions

As an important place for the Dai people to live and reside, bamboo buildings have strict spatial division, usually with functional areas such as a hall, bedroom, front porch, living room, sun deck, and kitchen. In addition, bamboo buildings are also convenient for the Dai people to organize weddings, rituals, dances, and other activities.

**Hall:** The hall is the centerpiece of the Dai Bamboo House, equipped with a "fire pit" and a "center pillar."<sup>9</sup>The fire pit serves multiple functions. First and foremost, it was a source of heat, ensuring the warmth of the building when it was cold and providing the necessary heat for cooking food. In addition, the fire pit is also the center of family gatherings and dinners, story sharing, and daily communication. Therefore, it is a physical structure and a connection between family and culture. At the same time, the center pillar not only plays a structural role but also represents the family's foundation.

**Bedroom:** In Dai Bamboo House, the bedroom is a place of rest and a haven for family members to seek privacy and relaxation. Although its interior design is simple, it does not hinder its functionality and comfort. Beds are often handmade from local materials, and traditional ethnic ornaments hung on the walls, such as embroidery, beading, and handmade paintings, not only add color to the interior but often carry the blessings of ancestors or memories of family history and often have deep religious

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<sup>9</sup> Ancient building Home, Dai bamboo building - Ganlan-style building, 2020

or cultural significance, representing Dai's reverence and gratitude to gods, ancestors or nature.

**Front Porch:** The front porch is an important part of the Dai Bamboo House and the center of the family's daily life. Its spacious design provides ample space for family members to carry out various activities. The semi-open design of the front porch not only ensures good ventilation and plenty of natural light but also allows the family to stay connected to the outside world and enjoy the surrounding natural scenery. When visitors arrive, the front porch often becomes the preferred location for entertaining and networking.<sup>10</sup>In addition, traditional festivals and celebrations are often held here, and family members will gather at the front porch to celebrate together, which makes the front porch a central place for Dai cultural exchange and inheritance.

**Sundeck:** The sundeck occupies an indispensable position in the Dai Bamboo House and is designed to meet the multiple needs of family life.<sup>11</sup>First, a sundeck serves as a sunny area ideal for family members to dry clothes, grains, and other produce. Secondly, the sundeck may also collect rainwater and store it in special containers, which is especially important during the dry season. In addition, the open space of the sundeck becomes the stage for some of the family's daily activities.

**Downstairs space:** The lower space of the Dai bamboo building is a wise response to limited land and many needs. The southwest and southern borders of Yunnan have a lot of rain, humid air, and high temperatures, and the overhead space can help residents escape the local summer heat and humidity. At the same time, the elevated floors are a good way to avoid the infestation of insects and pests, providing a more comfortable living environment for the villagers.<sup>12</sup>In addition, to make full use of this space, families will store some agricultural tools and daily necessities here to ensure that the upper living space is tidy and comfortable. Certain families go a step further and plant some commonly used herbs or small plants here, beautifying the environment and providing a convenient source of livelihood for the family.

**Stairs and Corridors:** The staircase is not just a practical connecting tool in the Dai Bamboo House. It carries the history and culture of the family, and each step seems

to record the growth and inheritance of the family, representing the integration of the past, present, and future. At the same time, the corridor, as a passageway connecting various spaces, is also designed to be spacious and bright, providing a place for residents to cool off, rest, or chat with neighbors, deepening the connection and interaction between communities.

## Ethnic Cultural Elements in Dai Bamboo Buildings

For the Dai people, the bamboo building is a physical space and a synthesis of their cultural traditions, lifestyle, and human-land relationship. Its structural design and spatial layout have a complete set of logic based on Dai culture and traditional thinking, which includes religious beliefs and family concepts on the one hand and respect for nature and consideration of social and recreational needs on the other. This is not only the superficial form but also the philosophy of life contained in it.

### (1) Influence of Religious Beliefs on Bamboo Buildings

In Dai culture, Buddhism occupies an important position and deeply influences the design and construction of bamboo buildings.<sup>13</sup>In bamboo buildings, the middle pillar is a key structural support and has deep symbolic significance at the cultural and religious level. It is regarded as the family's spiritual pillar, often surrounded by Buddha images, Buddha plaques, scriptures, and offerings, highlighting the family's devotion to Buddhism. This configuration also makes the pillar a place for family members to meditate and pray daily, ensuring that religious activities are closely integrated with family life.

The Buddhist concept of feng shui also influences the layout and design of the bamboo buildings. Orientation, the placement of doors and Windows, and even the overall spatial openness have been carefully considered to ensure a harmonious atmosphere throughout the building.<sup>14</sup>To meet the religious needs of the family, many bamboo buildings will be carefully designed for small family altars or Buddhist halls, which become special Spaces for Buddhist ceremonies on important family festivals or anniversaries. In addition, the interior and exterior decorations of bamboo buildings, such as murals, carvings, or tapestries, often incorporate Buddhist elements and depict Buddhist stories or scriptures, adding

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10 Gujianjiayuan, Dai Bamboo Building - Minority Characteristic Residential Buildings / gujianjiayuan, (), 2020

11 The Research Base of the Visual Image of the Chinese Nation, Southeast University, Dai Bamboo Building: bamboo building with people on top, 2022 project No. 20VMZ008

12 Tourist, Dai Ganlan-style change - Zhulou, 2023

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13 Dai Network (Yunnan Information Port), southern Buddhism and polytheism of religious belief, <http://www.daizuwang.com/index.asp>, 2023/10/21

14 Liang Xiaofen, Yunnan Blue Book. Report on the Religious Situation in Yunnan (2006-2007), The Positive Effect of Theravada Buddhism on Social Harmony in Dai Ethnic areas of Yunnan, 2010

to the beauty of the buildings and further highlighting the centrality of Buddhism in Dai life.

(2) The influence of family concepts on bamboo buildings  
In Dai culture, the concept of family is the core of its social structure and daily life. The bamboo building is a physical space and a carrier of family spirit. Here, every piece of bamboo, every slate, and every decoration may carry a certain family story or an important historical moment.

When we observe the design of the Dai Bamboo Building, we can find that it has fully considered the needs of family life. The spacious public space can accommodate the family's daily activities, gatherings, and ceremonies. Private bedrooms and independent activity areas ensure intimate contact between family members while maintaining personal privacy. Special rooms, such as those named after family forefathers or specific decorative motifs, highlight the Bamboo House's deep cultural and historical heritage.

In addition, the design and layout of the interior of the bamboo buildings also reflect the Dai people's respect for family traditions and culture. For example, portraits, deeds, or related symbols of important members of the family or forefathers who have made special contributions may be placed prominently as a memorial to them. Meanwhile, important family events, such as weddings, birthdays, or festivals, are held in bamboo buildings, making them an important place for transmitting family culture.

(3) The influence of nature worship on bamboo buildings  
The Dai bamboo buildings reflect respect for nature at different levels during the design and construction. Bamboo was chosen as the building material not only because of its rapid growth and sustainability but, more importantly, because it is compatible with the subtropical climate and geography inhabited by the Dai people, and its unique texture and color make the bamboo buildings harmoniously integrated with the surrounding natural environment.

The open design of bamboo buildings provides the occupants with the opportunity to get close to nature and ensures the natural integration between the building and the environment. For example, bamboo buildings are often built with large balconies or terraces, allowing residents to directly experience the changing seasons, the moisturizing rain, and the warmth of sunlight. This satisfies people's demand for a natural experience and enables the bamboo buildings to maintain a suitable indoor temperature during hot and cold changes.

In addition, the Dai people also fully consider natural factors when choosing the location to construct bamboo buildings. For example, it avoids causing damage to trees

and other vegetation to ensure harmonious coexistence with the natural environment. The roof and base of the bamboo buildings are also often adjusted according to the surrounding terrain; for example, bamboo buildings on the slopes of mountains may adopt a stepped design, while bamboo buildings on flat land may pay more attention to the connection with the surrounding waters.

Overall, the design and construction of Dai bamboo buildings fully reflect the Dai people's reverence and respect for nature. From selecting environmentally friendly building materials to the meticulous design based on the natural environment, the bamboo buildings have become a model of harmonious coexistence between man and nature.

### **iv Impact of socialization and recreation on bamboo buildings**

In the Dai community, the bamboo building is not just a living space but a place full of life. Social and recreational activities are deeply rooted in Dai traditions, and the bamboo building is the main venue.

The front porch, an open space connected to the outside environment, is often the main gathering place for residents' leisure time. Whether for tea conversation in the morning or songs and dances in the evening, it becomes a place for people to share joy and exchange information.

As the heart of the bamboo house, the danggong often becomes the center of various family and community activities. Various celebrations, ceremonies, and gatherings may be held here. Different seasons and festivals are accompanied by activities in the dangshu, such as dances at New Year's, singing contests at harvest festivals, or storytelling on an important day. These activities are not only entertainment but also a kind of cultural and traditional inheritance.

In addition, the design of the Bamboo House itself encourages social interaction. The spacious open-plan structure ensures air circulation and facilitates movement and interaction. The open spaces or courtyards adjacent to the bamboo buildings are often used as venues for various outdoor activities, such as traditional food preparation, handicraft activities, or children's playgrounds. Bamboo buildings are not only the living places of the Dai people but also an important carrier of their social and cultural life. Every design and every activity demonstrates the unique understanding of the Dai for socializing and entertainment.

### **v Influence of Dai Culture on the Overall Layout of Bamboo Buildings**

The Dai people revere harmony with nature. Therefore,

the overall layout of Dai bamboo buildings usually blends with the surrounding natural environment. Bamboo buildings are often built at the foot of mountains, along rivers, or near fields and other beautiful places to maximize the enjoyment of natural scenery and resources. The layout of the bamboo buildings will take into full consideration factors such as the surrounding terrain, vegetation, and wind direction to ensure that the occupants can live in a comfortable and harmonious environment.

Besides, the Dai people attach great importance to family and community cohesion. Therefore, the overall layout of Dai bamboo buildings often focuses on community interaction and communication. Bamboo buildings are usually centralized or semi-centralized, with multiple bamboo buildings arranged around a central courtyard or square. This layout promotes communication and interaction among residents, enhances community cohesion, and facilitates joint participation in community activities and traditional ceremonies. The overall layout of Dai bamboo buildings is usually divided into different functional areas. The interior of a bamboo building will be divided into different functional areas, such as a living room, bedroom, kitchen, etc., to meet different living needs. This division of functional areas makes the use of bamboo buildings more reasonable and convenient and also reflects the importance that the Dai people attach to family life and the consideration of the overall layout.

The Dai culture pays attention to the details and the artistry of decoration. Therefore, the overall layout of Dai bamboo buildings usually emphasizes the treatment of details and the use of decoration. The exterior of bamboo buildings is often decorated with carvings and colorful paintings to show the unique charm of Dai culture. Meanwhile, in the interior of bamboo buildings, attention is also paid to the treatment of details, such as the placement of furniture, mural painting, etc., to create a warm and beautiful living environment.

### Conclusion

As a unique architectural entity, the Dai Bamboo Building synthesizes Dai culture, history, and respect for nature. Each bamboo and each space tells a story about lifestyle, beliefs, family traditions, and respect for the environment. These buildings are not only places to live but also witnesses to history, bearers of culture, and promises for the future. The existence and maintenance of Dai Bamboo Buildings show a unique blend of tradition and modernity. It reminds us that while pursuing modernization and technological progress, we should not forget our cultural

roots and harmonious relationship with nature, and we should constantly maintain the harmony and balance between man and nature, community and individual. In today's globalization, the rich national wisdom contained in Dai Bamboo Buildings provides a philosophy of life for people to explore how to live better in the future, and it is hoped that this spirit of respect for nature and harmony and coexistence can be further inherited and carried forward in the future.

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