

An ecological assessment of the vernacular architecture and of its embodied energy in Yunnan, China

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Abstract

This article engages ecological architectural concepts to evaluate the traditional dwellings of the Lancang River Valley, Yunnan Province, China. By discovering the implied interpretation of nature and assessing the energy consumption of vernacular houses, this research establishes certain advantages of vernacular building in light of a modern environmentally aware evaluation.

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1. Overview of existing challenges

Undeniably one of the most beautiful landscapes in the world, the southwestern Chinese province of Yunnan is visually stunning not only due to its picturesque limestone mountains. Many small towns and villages in Yunnan collectively contain some of the best-preserved and aesthetically delightful traditional architecture in all of China. This traditional architecture integrates naturally into its setting, rather than being an artificial imposition upon it. It is due to a heartfelt desire to both learn from these ancient buildings, and also to consider ways of preserving them, that, during the fall of 2000 and spring of 2001, I participated in a broad survey, of vernacular habitats in the Lancang River Valley. This paper is largely based on my findings during this period. The Lancang River Valley covers almost the entire western portion of Yunnan, nearly one-third of the province.

While conducting my research, I was always touched by the charm of this magnificent red land, Yunnan. This homeland to 26 ethnic minorities possesses a fascinating

geography, history and culture. But as an architect, it was the vernacular architecture and traditional settlements, which impressed me the most. I gasped in admiration—but also felt deeply saddened.

When old traditional buildings and villages are being torn down one by one, architects, photographers and artists pick up their tools hastily for capturing a portrait of the doomed. However, what else can we do regarding our heritage, one might ask, except record and preserve an image? What else does our traditional architecture possess, except aesthetic and cultural values? (Fig. 1)

Firstly, what are the environmental challenges confronting this area? Yunnan faces frequent natural disasters: earthquakes, land-slides, flooding and so on. According to the Water and Soil Protection Bureau of Yunnan, since the 1950s, 31.3% of the topsoil of the Lancang River Valley has been lost to erosion. Rates of soil erosion are generally affected by four factors, namely, topography, geology, rainfall pattern, and type and degree of plant cover. But actually, unsustainable agricultural practices and ruthless industrialization combined with runaway and unregulated construction have displaced all natural factors as the primary causes of soil erosion and environmental degradation.

Despite the natural inevitability of frequent earthquakes, turbulent weather and massive rainfall, Yunnan

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Fig. 1. Yunnan, China Source: http://www.lib.utexas.edu/maps/middle_east_and_asia/china_pol01.jpg.

has been a desirable area for human habitation and produced a vernacular architectural tradition well adapted, both functionally and aesthetically, to its dramatic setting. However, the rapid development of this area, especially since the 1980s, has been detrimental to the traditions of the past and ignored their relevance in meeting the challenges of the future. Not only over-population but over-exploitation of the natural resources has already run out the “capital” of our descendants, while a great number of people are still struggling at the edge of poverty.

Without underestimating the aesthetic, historical and cultural values of traditional architecture, I feel that it is today crucial to re-survey vernacular architecture in light of up-to-date environmental and ecological concepts (Fig. 2).

2. The distribution and typology of ethnic vernacular dwellings

The lay of the land of Yunnan inclines from northwest to southeast, the altitude decreasing from more than 7600 to 76m. This area is characterized by a segmented topography. There can be a 1000–3500m difference in elevation between the valley floor and the jutting mountain tops that surround it. Various climatic



Fig. 2. View of Lancang River.

zones affected by topography, altitudes and latitudes are distributed according to season and location forging a complex tri-dimensional climatic character. A veritable jigsaw puzzle of microclimates, climatic zones change from valley floor to the mountain summits and from the sunny to the shady side of hills. A local ballad depicts this as “Four seasons within a mountain, a different climate within 10 miles”. The climatic character in this one river valley area varies from northern tropic, sub-tropic, to southern temperate zones.

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