An Anthropological Look at the Built Environment:
Investigating Culture-Specific Forms of Sustainable Solutions

by Hai-Yin Kong

Problem: In the flash construction of urban areas common to the global south, unorganized generic environments appear. As a response to the great pressure for construction, the ideals of the globalized city are heavily borrowed from. Rapid growth has led to un-planable population densities without self-sustaining amenities which would generally exist in city centers. This "Generic City" is a fractal repetition of the same module.[1] It is a place which comes from tabula rasa, layers of the past have been ignored. The homogenization of environments erases culture which had in the past acted as a transmitter of information. This monoculture of systems is rapidly replacing regional diversity, and invaluable culture specific solutions. The mass importation of international architecture stifles a developing area's possibility to evolve at its own pace. As this sense of inferiority grows, "it evokes the desire to exhibit wealth through an outward display of affluence."[2] Mutated adaptations of post-industrial lifestyles promote inefficiencies such as car dependence and decentralized living. Context of local geography and culture have been lost; the balance of society and ecology have been broken.

What if we learn from cultures which have retained the spirit of their habitat? There is much to learn from societies which have developed by reflecting on its geographic context. Terms used by the industrialized world such as "green" or "sustainability" may not be conscious in traditional cultures yet these concepts are ingrained in everyday life.

Intent: In this paper I will discuss some sustainability solutions I've come across in non-globalized settlements located in western and southern China. The purpose of exploring these solutions is not only to suggest their application in generic settlements, but also to encourage the exchange of information between settlement typologies. This study of human habitat requires a new discipline combining elements of architecture and anthropology.[3] An anthropological look at the built environment can help us comprehend the essence of architecture. Investigating culture-specific forms may lead to a better understanding of fundamental human responses to the built environment.[4] For clarity, I have organized the solutions into three categories: designs of household devices, dwellings, and settlement, human organization of the community as a help-force, and connectivity to the land from livelihood dependencies and religious rituals.
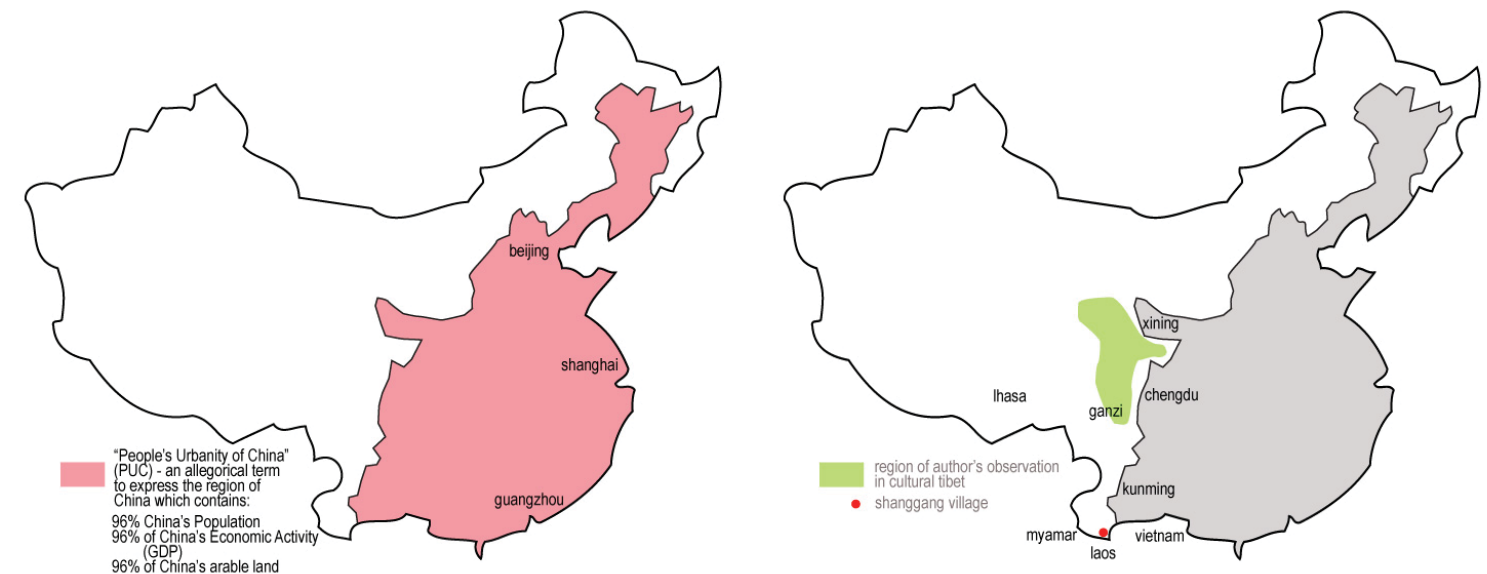
1   Rem Koolhaas, "Generic City." In *S, M, L, XL : Small, Medium, Large, Extra-large*, edited by Office for Metropolitan Architecture et al. (New York: Monacelli Press, 1995),1251

2   Carl Pruscha, *Himalayan Vernacular* (Koln: Walther Konig, 2005), 18

3   Pruscha, *Himalayan Vernacular*, 23

4   Pruscha, *Himalayan Vernacular*, 24

Background Information: There are 55 officially recognized ethnic minority groups in China. The urbanized and relatively affluent eastern region of China[5] is home predominantly to the ethnic majority, the Han Chinese. This region is also where China's global cities, Beijing, Shanghai, and Guangzhou are located. Serving as portholes for globalized ideals and design, these cities have heavily influenced contemporary Han Chinese culture. While the Han Chinese have settled increasingly in all areas of China, they have predominately migrated only to urbanized areas because of economic incentives. Cities of non-Chinese origins such as Lhasa and Kashgar are now populated mostly by Han Chinese. Villages, however, have retained their ethnic homogeny and their traditional cultures more so than cities. While it is a universal truth that all peoples welcome improvement to their standard of living, modernization is valued differently. By no means should implementation of modern infrastructure automatically equate the demise of traditional culture, but often it does because of political and economic factors. Strong traditional cultures may be less willing to compromise their way of living and have retained their "non-global" lifestyle even as settlements around them have changed. This deviation from the urbanization cycle has allowed for the layering of knowledge creating a rich resource for designers to understand different perspectives in sustainability solutions.

region of author's observation in cultural tibet

shanggang village

"People's Urbanity of China" (PUC) - an allegorical term to express the region of China which contains:

96% China's Population
96% of China's Economic Activity (GDP)
96% of China's arable land

Research Context: I will be drawing examples from my own field research in Shanggang village in Xixuangbanna,Yunnan Province, located in the Southwest of China conducted in April of 2009. Shanggang is located between the cities of Mengla and Mohan (which sits on the China-Laos border). The population of the village is about 1500, with around 150 households. Dai language and culture is closely related to those of Laos, Burma, North Vietnam, and Thailand. I will also be discussing my observations of Tibetan areas of Western Sichuan, and Gansu province located in the West of China made between December 2009 to June 2010. Traditionally, Tibetans are either sedentary farmers or nomadic yak herders. Farmers need farmland around their dwelling, usually resulting in smaller less dense settlements. Nomads alternate between living in tents with the yaks during the summer months in higher elevation, and living in denser villages during the winter months. Religion is an important part of the Tibetan life and many community events are centered around the monastery.

5   Saskia Vende,"PUC." In *The Chinese Dream: A Society Under Construction*, edited by Neville Mars et al., (Rotterdam: 010 Publishers, 2008), 30

Household Design:
**From Domestic-Use Devices To Village Planning**

To start from the smallest scale of sustainable solutions we can look into how individual households respond to create energy efficiencies. The concept of "sustainability" may not be the driving force of household decision in the global south. However, maximizing resources while working within economic constraints often lead to creative solutions.

A simple device common to Tibetan homes is the parabolic solar water cooker. In cold climates such as the Tibetan plateau, hot water is both a necessity and a luxury. Because often times the water is drawn from a stream or spring, boiling drinking water is a never ending daily chore. In the high altitude of the Tibetan plateau the sun is a very strong and accessible resource. The main function of the parabolic solar water cooker is to reflect and focus the sun's rays on to a water-filled kettle. This concave device is approximately 1 meter tall and 1.5 meters wide. In my observations there are

two models mainly in use. The lower end model consists of many little reflective tiles, much like the pieces of a disco ball, mounted onto a singular satellite-shaped dish. A lighter model found in more affluent homes have two metallic panels which can be adjusted to best redirect the sun's rays throughout the day. In both cases, the device is mounted on wheels so that its position relative to the house can be changed according to the path of the sun. There is also a portable model made of reflective metallic fabric which nomads can take with them to their summer campsites. Since this device is made of metal, tiles, or fabric and not solar voltaic panels, the cost is within range of any household.[6] This simple technology of water heating could be adapted to heating bathing or cooking water in sun-rich area just by utilizing sunny rooftop or balcony spaces. By using low-cost, simple technology, this sustainable solution has easily proliferated in less affluent places.

6   The cost for a conventional solar parabolic water cooker is 120-150RMB, about 20USD.
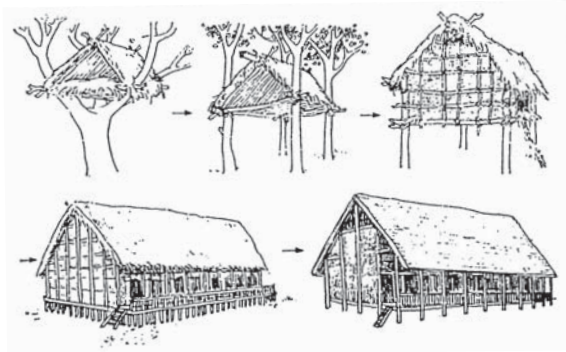
Hypothetical sequential development of dwellings
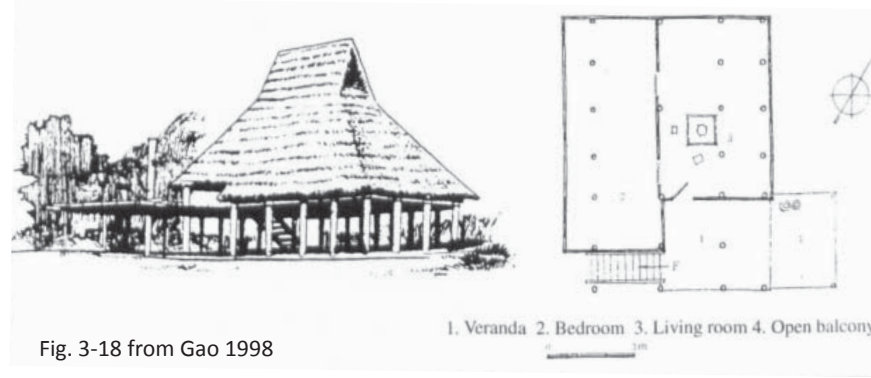Source: Fig. 12, from Knapp 1986:5

Fig. 3-18 from Gao 1998

1. Veranda 2. Bedroom 3. Living room 4. Open balcony

As architects continuously explore green building design, remembering to look at vernacular architecture can enlarge the library of inspirational precedence. Dai architecture is an outstanding example of designing for the local climate, as well as designing to create the social conditions to facilitate sustainability. Xishuangbanna and other areas populated by the Dai are forested and in semi-tropical climate. Traditional Dai houses are made of wood, thatched straw, bamboo, and baked clay tiles, all materials that can be gathered locally. Believed to have been evolved from tree houses[7], Dai homes have only one inhabitable layer which is built on stilts. As the climate can be hot and rainy, the raised house is protected from flooding and allows for ventilation from all dimensions. Dai architecture also features a continuous verandah around the house under the shade of a steep pitched roof which extends almost to the floor. As the weather is hot, humid, and rainy, shaded yet permeable living spaces allow the home to be comfortable without the implementation of air conditioning.
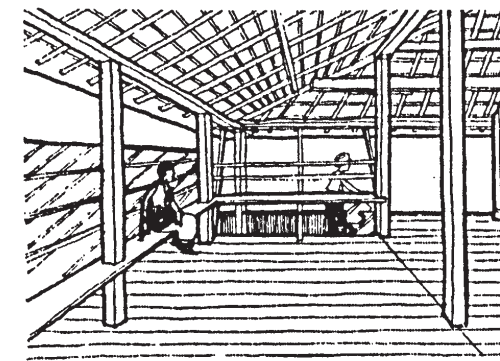
7   Ronald G. Knapp, *Traditional Rural Architecture -A Cultural Geography of the Common House* (Honolulu: University of Hawaii Press, 1986), 5 Fig.12

Lofting the structure also creates an additional layer of use for the household. The undercroft of the house creates an outdoor area protected from the sun which can be used as work space or storage. This area also serves as shelter for livestock as chickens live shaded amongst the stilts and in some households pigs are penned in at night[8]. After each meal, the humans toss food scraps over the railing, feeding the chickens. Eventually, the chickens become plump enough to become dinner, creating a small vertical food cycle within one household[9].

The design of Dai homes not only creates a comfortable living environment amongst the elements, it also fosters family and community gatherings. The verandah is where most of the family's social activities happen. Wooden planks built-in along the outer edge of the verandah act as benches, welcoming guests to sit and visit. Low

Veranda
Fig.5-7 from Gao 1998

8   Most households in Shanggang village have built shaded pig pens unattached to the house. In Shanggang pigs are usually kept in the pen at all times, where as other villages may allow their pigs to roam during the day and only put them in pens at night.

9   Author's observation in Shanggang Village, Xishuangbanna, Yunnan Province, China April 2009

bamboo tables can be easily brought out and moved during meal times. The verandahs allow for an inside-outside lifestyle, encouraging people to be more social since they spend the majority of their time in semi-public view. It is common for people on the verandah to call out to friends on the street, asking them to come up for a meal, or shout across to a neighbor who is also on their verandah. This frequent connection and human interaction facilitated by permeable architecture fosters strong community bonds.

In Shanggang, it is common for friends and family to work together in larger household activities such as butchering a pig, making "Baba," a traditional cake made from grounded rice, or house construction and repair. Instead of working alone, each household has their own network of help which they can call upon. The covered open spaces of the verandah as well as the undercroft allow for a flexible and large work space to accommodate various group activities. The verandah, as it is protected from the sun's direct rays, yet still brightly lit, is a space where family and other village members can comfortably gather along the benches and movable furniture to discuss village matters, eat, or work. The undercroft, as it is a larger space that spans the entire area of the house, is an area for larger and messier projects (especially for those which might leave behind some food scraps for the chickens). The open plan of Dai dwellings not only accommodate but encourage group gatherings, allowing work which would be considered chores when attempted alone to become social events in group settings. This strategy can be useful in motivating citizens to participate in any efforts of environmental sustainability improvement.

Shanggang village has a relatively dense plan; the roofs of neighboring houses in some cases are just inches apart. As there is plenty of empty viable land surrounding the village, this density is a choice of the villagers to connect and share with each other. Along with this choice for density, the village has also made a choice to determine its optimum size. While most villages in China have been losing their younger population to the city, Shanggang, a village of strong cultural identity and community living, has been growing in population. To address the issue of population growth, intelligent leadership had identified optimal settlement size and created self-imposed planning regulations. Growing families are to relocate to create a new village nearby, around a new set of community amenities. Besides educational and small scale commercial amenities, Shanggang's public space comprises of; an informal market area around the open space of the well (a), a basketball court which also acts as an outdoor performance area (b), a more formal square where the *zaxin* (a traditional shrine made of wood logs) used to stand (c), a temple (d), and an open space in the fields outside of the village for large festivals (e). This mix of formal and informal flexible open spaces allows for the large variety of community activities in the village. The residences of the village are generally orientated in the same direction, along a landscape element such as a river or a valley's edge. Built alongside dirt roads, the houses are staggered in traditional Dai fashion, so that no

two houses are directly facing each other. Because Dai houses have no front door, only stairs leading up to the inhabital layer, there is no strong sense of frontality, adding to the sense of fluidity of the village. With the dwellings arranged in this fashion, the houses are identified "not only as a free standing entity, but as the component member of an encompassing whole."[10] As it is both reflected and encouraged by its plan, Shanggang as a village is able to arrange and use its space to come together as a unified entity, able to create and mobilize in order to achieve collective goals.

10   Yun Gao, "The Dai Vernacular House In South China: Tradition and Cultural Development in the Architecture of an Ethnic Minority" (PhD diss., Edinburgh University, 1998), 150

To the Left:
Ladies born of the same year wearing coordinating outfits for the Water Splashing Festival

Below:
Girls of the same year practicing for a dance performance

Human Organization - the Community as a Help-force

With organization either under recognized leadership or self-forming, strategic decisions can be made to direct the settlement as a whole in order to realize environmental goals. The community must be cohesive enough to recognize the leadership or group authority and work together to achieve the vision.

Having retained the communist model of work teams, the villagers of Shanggang are using a non-traditional organization method in order to maintain their cultural identity and traditional cultural lifestyle. From childhood, the people of Shanggang village are organized into community work units according to the year of birth. Younger groups are mentored by an older member of the community. Each group (depending on their age) is assigned tasks relating to cultural events or for village goals. For instance, during a large cultural festival, the leaders of the village might ask the girls born in 1988 to prepare a Dai styled dance performance, the men born in 1977 might be asked to construct temporary shade coverings, and the women born in 1954 might be asked to prepare food. By dividing up the members of the community, the village leaders are able to organize the teams to achieve a larger and more complicated community goal. Not only is this format a way for the leaders to govern the village, it also provides strong social motivation for everyone to be active in the community and help out. Instead of being regarded as a punishment or a chore, community service is a social event. Also, the peer pressure aspect of this group formation would draw attention to individuals who don't contribute to the community. Not only are these groups a functional workgroup, they are also very tight social groups which last for entire lifetimes, increasing the community ties and the identity of the village. Besides these organized workgroups, large networks of kinship ensure support for each household. In reciprocation, it is Dai tradition that each household must assume responsibility to the village.[11] Combined with intelligent leadership, these networks of work groups can be very effective for implementing settlement-wide infrastructure which could greatly increase the level of sustainability.
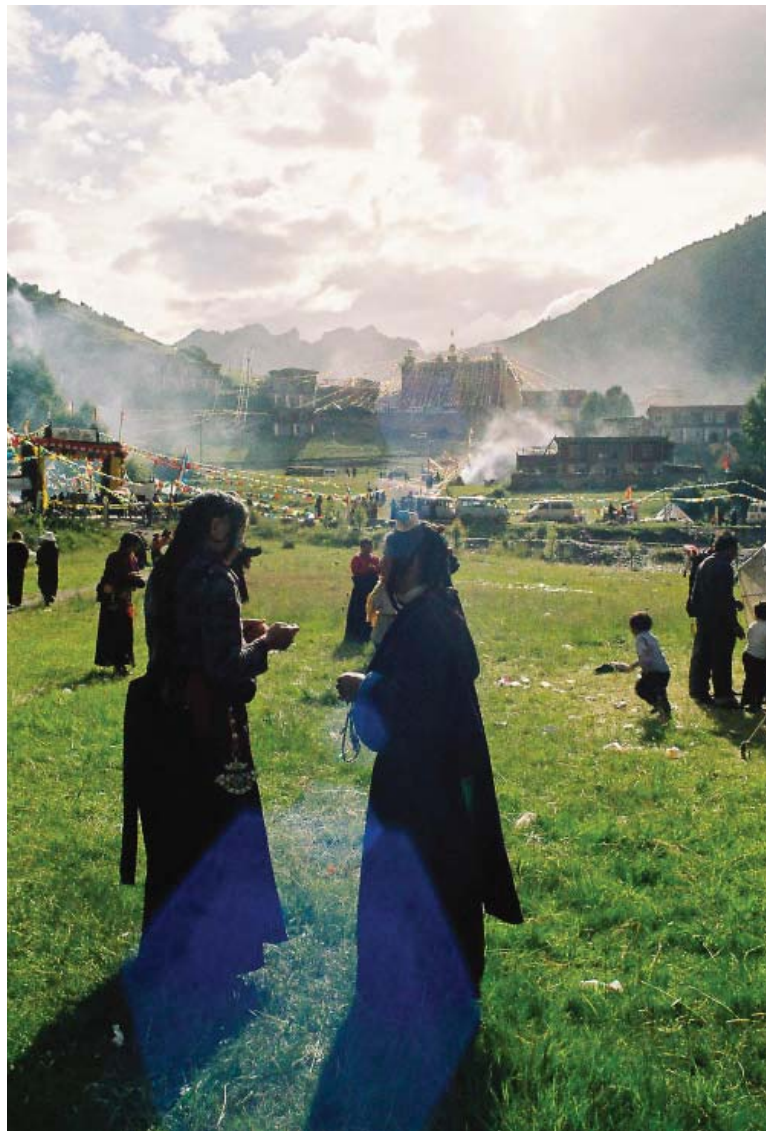
Tibetan community service is generally organized around religious activities. The construction of a monastery depends not only on monetary donations of individuals but also time and labour contributions. In Tibetan Buddhism there is the concept of merit-gaining where good deeds add up to positive karma. Even though the underlining motivation to participate in community works (such as the construction of a monastery) may be religious, communal building has developed into a cultural event. As packed dirt is widely used in Tibetan architecture, a large portion of the building construction requires the action of pounding earth with a mallet. This is an exercise that is simple enough for everyone to help with. To accompany the process, songs and dances have been created for packing the earth during building construction[12]. In this manner, a large project can be realized in an social manner. The outcome of the process will not only be the realization of a built project, but also a strengthening in culture and community. Cultures with an ingrained sense of social responsibility are more capable of motivate their denizens to work towards the larger cause global environmental sustainability. No matter the methodology to sustainability, location or settlement type, community work culture is an ideal approach to problem solving.

12   Roof building songs and dances can be viewed at The Tibetan and Himalayan Library (THL) http://www.thlib.org/avarch/mediaflowcat/titles_browse.php?media=all&transcript=all&presfilter=0&subSeries=175

Connectivity to the land

The Tibetan nomad, the *drokba,* lives a life of intimate dependency of the land. This close relationship between human and nature fosters the respect and the inspiration to preserve the earth's resources. Traditions living closely with the land also often follow religions which revere deities that correspond to native landscapes. Whatever the approach may be, the conviction for environmental ethics is essential in the global efforts of a sustainable future.

Tibetan yak herders fill a specific ecological niche, exploiting a natural grassland in a semi arid climate which would otherwise be unproductive. As grass cannot be digested by human beings, the yaks are needed to convert the grass into meat, milk, and furs; products necessary for the survival of the *drokba* and also products of economic potential. During the summer, the *drokba* set up camp in the pastures of higher altitudes, limited by the snowline, and in the winter they live in villages by the pastures of lower altitude, limited by the barley fields. By rotating pastures, these nomadic pastoralites can efficiently coax the landscape of harsh high altitude conditions to yield an output on a land that is unsuitable for agriculture[13]. Though it appears to the outsider as though the nomads come and go as they please, the migration route of nomads are actually a carefully scheduled choreography of movements which are adapted to the variations in each year's conditions depending on the seasons and the herd. The livelihood of the nomad is in a fragile balance, disease, drought, and storms can easily devastate a herd. Also, a herder's surplus cannot be stored away like money in a bank, animals must be cared for constantly and are continuously at risk. Therefore, there is a strong incentive to use surplus yaks for social transactions to make marriages, create friendships, provide hospitality, strengthening and widening the his support network in case of hard times.[14] Because the lifestyle of the nomadic pastoralites is closely dependent on the conditions of the land, the manner in which they interact with nature and with each other is one of a deep consciousness of the consequences of what will come if the land is not treated with intelligent planning and respect.

13   Thomas J. Barfield, *The Nomadic Alternative* (Englewood Cliffs, N.J.; London: Prentice Hall, 1993) 11
14   Barfield, *Nomadic Alternative,* 15

Indigenous traditions closely tied to their local bio-regions for the livelihood tend to have their environmental ethics embedded in their worldviews.[15] Rituals of permission seeking prior to taking natural resources and then of gratitude after use help people make emotional connections with nature. The Dai tradition has a history of specific rituals which dictate how to gather and take materials from the forest to build a house. Before the felling of trees offerings of fruits and alcohol are made to the spirit of the tree. The head of the household would then explain to the spirit of his reasons for building a new house and beseech the tree to stay with the family for life.[16] It is believed that the spirit of the tree will continue to live in the wood, becoming apart of the house and the family. Each column of the house is given a specific term, but the most important two columns are the *sao sautsaw* and the *sao nang*, the column of the prince and princess. While observing the ritual of sleeping with their heads towards the *sao sautsaw*, or placing offerings at the base of the columns, the family will be constantly reminded that their home is built from living things of the forest. Nurturing emotional attachment to nature perpetuates a respect for the earth and careful use of her resources.

Timing for house building and repairs are dictated by the Dai calendar.[17] It is considered auspicious to fell trees for your home in September, late in the rainy season when the rivers are high enough to transport the timber to the village. Wall and fence repairs are scheduled for the tenth or eleventh month of the Dai calendar, which is also the optimal time to harvest bamboo. Roof thatching is scheduled for the second month when the grass is high. Ritual calendars are often derived from cycles of nature.[18] By keeping in tune with nature's cycle, we can recognize earth's limitations and understand when her resources are abundant and when they are stressed. Though it can easily be written off to be superstition, "skilled use of ritual made many traditional societies far more successful in caring for their environment than industrial societies have been."[19]

Above: Traditional Dai music and dances during the Water Splashing Festival

To the far left: Setting off of Dai fireworks - decorated bamboo poles stuffed with gunpowder

Upper left corner: Eating at the festival under outdoor shade coverings

15   Gary Gardner, "Engaging Religion in the Quest for a Sustainable World." *State of the World 2003* Chapter 8 (2005) Accessed January 2, 2011, http://www.worldwatch.org/node/3619, 155

16   Gao, *Dai Vernacular,* 106

17   Gao, *Dai Vernacular,* 94

18   Gardner, *Engaging Religion*, 155

19   Gardner, *Engaging Religion*, 156

According to Tibetan Buddhism, certain deities live in mountains which are considered to be holy. These mountains are identified as holly because self-arisen images, "a miraculously produced Bas-relief of a deity or historical personage that emerges (super)naturally on a rock face such as a boulder."[20] There is a concept of sacred space and respect for deities who occupy the landscape. There is a belief that the land is conscious and feeling, and man should treat it as such. Circumambulating the mountain, flying prayer flags, erecting a stupa are some of the ritual activities which reinforce an ethic of environmental consciousness. When people feel a sense of connectivity to the land they will also assume the duty to protect the environment of area. People are aware of their karma actions relative to the land: aware that their actions will have direct and indirect consequences.

20   José Ignacio Cabezón, "SeraSe ra and the Metaphysics of Tibetan Sacred Space." In *The Space of Sera (Se ra'i khor yug)* (2006) Accessed Dec 18, 2010, http://www.thlib.org/places/monasteries/sera/spaces/#essay=/cabezon/sera/spaces/s/b33#ixzz1AH5Zw3f6

It is an increasingly common observation in humanities academics that religion plays a big role in how humans view and interact with nature. For instance, in Christian thought, humans who conquer the evils of nature are celebrated, where as in eastern religions such as Buddhism, humans are merely a small part of the cycle of the world[21]. Whatever their philosophies maybe, religions have certain assets which could be utilized in the efforts to build a sustainable world. Religious institutions have "the capacity to shape cosmologies (worldviews), moral authority, a large base of adherents, significant material resources, community-building capacity, experience in informing perspectives of ultimate concern," and most of a history of inspiring the populace.[22] Since scientific facts about global warming and environmental crisis dire as they are have not been enough to altered human consumption behavior, maybe values and ethics, religion and spirituality can mobilize mankind for transformation.[23]

21   Donald K. Swearer, "Roundtable: Interdisciplinary Perspectives on Ecological Urbanism" *Ecological Urbanism Conference* (Harvard Graduate School of Design, April 3-5 2009)

22   Gardner, *Engaging Religion*, 154

23   Tucker, Mary Evelyn. Preface to *Ecology and the Environment: Perspectives from the Humanities* edited by Donald K Swearer et al. (Cambridge, Mass,; London: Harvard University, Center for the Study of World Religions, 2009), 3

Disclaimer and Application

Though I point out these two cultures as examples of sustainable solutions, I am by no means claiming that they are civilizations of utopian living standards. For instance, the introduction of processed products has created a constant stream of non-biodegradable waste, mostly plastic wrappers of food. As these villages do not have a trash collecting system, these things are usually just tossed outside and/or burned. What is causing this inefficiency of trash is the incompatibility of the modern system of product cycling and the traditional system of waste disposal. "Vernacular architecture in these pre-industrial societies cannot be reduced to static, timeless objects."[24] The intent of this research is not to suggest a literal translation of these cultures. Instead, it is an attempt to better understand different perspectives of human responses and motivations in relation to the built environment. Strategies that have been exemplified in this study can be interpreted in various ways and tailored to another culture and site. In addition to the latest green technologies, it is my hope that designers of buildings and cities will keep in mind these certain points of this study:

1. Remember simple, low-cost, low-tech solutions

2. Adapting design to the local climate

3. Designing dwellings with flexible space for multiple purposes

4. Designing dwellings with semi-public spaces to encourage community gathering and works

5. Planning settlements as an entity

6. Reinforcing the concepts of sharing and communications

7. Organizing networks of formal and informal community help-force

8. Cultivating a sense of social responsibility

9. Encouraging community work by making it a social and cultural event

10. Promoting a deep understanding and interaction with nature

11. Creating a respect for the land

12. Organizing seasonal activates to correspond with earth's cycles.

When designing to implement these points, an anthropological method of understanding the culture and climate of the site can augment the strategy's potency. As I have defined several points on how to achieve sustainable settlements according to my observations of two cultures, scholars and designers of all types have also strategized solutions from their own perspective. No matter which points a designer chooses to take on, there must be a strong emphasis on the interpretation of how to implement the idea in the space and culture she is designing for. This will come from a deep understanding of not only what the people will need to live a sustainable lifestyle but also on how to motivate the people to make sustainable decisions and how to cultivate an ethics in environmentalism. "If we are to deliver a sustainable built environment, we must create places that people will value and to which they can connect emotionally. "Without human connection to a site or a city, even our best efforts at creating sustainable environments will not succeed."[25] As architects, it is necessary but not sufficient to only design for a sustainable future, we must also transform the post-industrial citizen's consciousness of the world around him.

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24   Gao, *Dai Vernacular*, i

25   Martha Schwartz, "Ecological Urbanism and the Landscape." In *Ecological Urbanism*, edited by Mohsen Mostafavi et al. (Cambridge, Mass: Lars Müller Publishers, 2010), 525.

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