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Top-Down and Bottom-Up Processes for Rural Development and the Role of Architects in Yunnan, China

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Abstract: This study identified two alternative but potentially simultaneous processes for rural development in China. One is the 'bottom-up' approach where individuals and groups of villagers work innovatively in developing new building construction opportunities, prompted by contemporary and indigenous design and construction methods. The alternative 'top-down' approach is associated with changes caused by external influences, such as directions given from funding sources, and encouragement for the use of specific knowledge and technologies; this is then filtered down through village administrative systems. Two ethnic villages were studied in Yunnan province, an area with a larger rural low-income population than other regions. Each village exhibited strong traditional cultures and each had undergone different tourist redevelopment over a period of more than ten years. The case studies revealed discrepancies between the academic categorization of dwellings in villages based on the representations of traditional culture created by materials and techniques, and the villagers' own perception of the social and cultural meanings of their houses and spaces in the village. The outcomes suggest that architects and designers could have different involvement in rural development through building platforms for discussion and decision-making, used with and amongst stakeholders, and which could link the two different directions of approach.

Keywords: rural development; buildings; villages; China; stakeholders

1. Introduction

Recently, a greater understanding of future needs and a different emphasis on sustainable development in rural areas has been reflected in new Chinese government policies. Since 2005, China has created policies for development in rural areas with the national movement to build a 'New Socialist Countryside'. In 2013, the central government published guidance to improve investment and to accelerate transformation. Key changes in the design briefs for rural developments have offered the opportunity to integrate sustainable building methods into that process.

From different levels of the government administration system, funding has been allocated to support the development of small towns and villages. The approaches and impacts, however, have been variable in different regions in China because of the largely diverse social, cultural and natural environment in the country [1]. Based on the investigation of villages in 12 provinces in China, Zhang identified a wide range of diversity in this respect among villages situated around the country [2]. The most significant differences existed in the following aspects: natural environment; infrastructure; electricity and water supply systems; transportation; education; amenities and facilities; family income, villagers' educational levels, and local cultural impacts. The National Standard for Creating Eco and Cultural Villages in China refers to aspects of the rural built environment, which includes environmental air quality; waste water discharge; drinking water quality; and hygiene

standards for cultural and entertainment facilities. However, there is less detailed guidance on how to adapt the generic regulations for the large diversity and variation of design and construction techniques found in rural areas.

Professional architects and planners tend to work on two main aspects of rural projects; firstly, producing master plans for each village (which are currently required to cover a timeframe of 10 to 20 year's development). These plans would normally include detailed design proposals for buildings, land usage, water supply and drainage, electricity supply, and vegetation/agriculture. Interestingly, the timescales defined for master plans is longer than the requirement for cities. The problem in using a planning cycle of 10 to 20 years is that most villages historically have evolved quite slowly and more naturally, rather than having been part of defined and specified term planning process.

Secondly, some architects (working together with academic scholars) have carried out designs for new housing in ways that try to protect the otherwise fast-disappearing traditional buildings in towns and villages. For example, many development projects for villages in Yunnan that commenced in the 1990s, aimed to develop tourism to improve villagers' lives and preserve ethnic minority group cultures. However, the objectives of the design very often emphasize preserving traditional culture without taking sufficient account of changing rural lifestyles. This problem is linked to rapidly expanding urbanization in China which has brought fundamental changes to all people's lives, and researchers have argued that rural-to-urban migration has also re-defined lifestyles in rural areas [3–5]. Some studies have pointed out that the criteria for judging whether houses were constructed to match the context may have resulted in a primary focus on superficial decorations or forms that were copied from vernacular dwellings without considering the quality of the living space or other details of design [6,7]. It is also the case that there has been a tendency to introduce sustainable design methods and technologies taken from urban cities into many rural areas. The sustainable design concepts developed in the cities of China were very often perceived as part of buying into an expensive/luxury lifestyle because of the higher costs and supposed healthier environment associated with green products [8]. However, the situation is quite different in rural areas. Recent studies on the vernacular houses have provided useful information on design principles for enhancing the quality of rural life. They demonstrate that the congruency among local daily functions, environmental characteristics of region and vernacular functional spatial features are key aspects for sustainable rural development [9,10].

The research presented in this paper refers to case studies located in Yunnan province in the western region of China. This is an area with a larger low-income rural population than other regions according to a range of surveys, for example [11]. The author has first-hand experience through previous research and from frequent visits to the geographical area, of the processes of planning and building in rural villages. This has afforded multiple opportunities to discuss and record comments and attitudes from planners, architects, academics, village elders and many others. The knowledge gained from this process enabled a deeper understanding which has informed a number of the features of this paper. In addition, various visits took place over a period of 10 years with in-depth queries related to this research raised with key planners and architects in their offices and on-site in 2015 and 2016. By considering case studies in Yunnan, this paper aims to demonstrate various forms of expert and community knowledge at play in the village built environments. Therefore, the aims of the paper are: to identify barriers facing the application of sustainable design in villages and to make suggestions for optimal directions for future sustainable rural settlement research, including interactions among the villagers, administration teams, and the designers. The principles of the sustainable building discussed in the paper refer to those related to local interpretations, which reflect the interconnections of systems, people and markets. The principles are to involve all interested parties through a collaborative approach [12].

2. Research Design and Methods

The research described in this paper began with a background study of the problems of rural development in Yunnan Province, in the Southwest of China, resulting in three stages of activity

being identified. The first stage was to define the problems of rural development by considering the difficulties facing professional architects and planners in village development projects. The academic concepts for support of the architectural heritage led to a method of categorizing the village dwellings according to the materials and techniques utilized as a quantified measure of the physical changes enacted. Data for five villages in Yunnan were collated to act as examples of the method. Questions were then asked regarding the difficulties in the practice of development projects, especially concerning issues of how the external support can help with the diverse situations in different regions or various groups of inhabitants in one village. Out of these five villages, the main evidence of three villages were gathered by other researchers; two were studied in detail by the author. Therefore, the second stage of the study analyzed two case studies investigated by the author in more detail in order to trace the changes in these ethnic villages over the last decade. Both villages being chosen for intensive investigation have strong ethnic cultures and have been part of a common tourism development process for more than 10 years, yet they developed in very different ways. The results show a significant discrepancy between the academic categorization of dwellings in the villages, based on perceptions of, or perhaps sometimes a superficial understanding of traditional culture, compared to the villagers' own perception of the social and cultural meanings of their houses and spaces in the village. The study therefore suggests that development plans need to be sub-divided into two different processes: one relating to the villagers' self-reliance capabilities, the other to external influences in terms of knowledge associated with academic research, new technologies or support funding.

By dividing into these two processes, a third stage of discussion is suggested to be examined: that of a multi criteria analysis approach that can potentially be incorporated as a successful method to account for villagers' opinions as part of the decision making process. It is also suggested that research is needed on how architects and designers could have different involvement in development projects through building a platform for discussion and decision-making among stakeholders.

3. Academic Study of Traditional Buildings and Settlements

China published the first official document to define the architectural heritage in cities in 1982, when 24 cities were nominated as "Historically and Culturally Famous Cities". The study of the historical and cultural protection districts has been carried out and developed since that time. In 2002, the concept of the "Historical and Cultural Street District" was added in *The Law of Protecting Cultural Relics*, which referred to the districts, group of buildings, towns and villages that represented the intact traditional styles and features, or which showed ethnic groups' characteristics in an area [13]. In Yunnan, the book *Yunnan Historical and Cultural Famous City—The systematic protection research of towns, villages and streets* was published in 2012 [14]. The book included an extensive database, created listing the traditional buildings, streets, districts in villages, towns and cities in the Province.

In the book, traditional culture could be represented in three environments:

- Built environment: including culturally significant preserved elements; vernacular and old wells; preserved houses; ruins and remains; special constructions; and significant trees.
- Natural environment: such as mountains, rivers and topography.
- Cultural environment: including folk customs; regional arts and crafts; religions and beliefs; special local products; traditional businesses; and folk stories.

For research in the field of rural development, it is considered difficult to quantify changes in the cultural environment. Therefore architects and scholars who were involved in the study of the built environment, used a proxy of defining changes to village houses by categorizing them according to the materials and techniques used. All the villages have varying numbers of new houses that make use of new materials and technologies. Table 1 lists five villages, two that were surveyed by academic researchers from Yunnan Arts University, one that was studied in great detail by Kunming Urban Planning and Design Institute and two villages surveyed by the author using the same method.

The houses have been generally categorized into four types (listed below) to trace changes of the form, materials, and technologies; this enables use with the databases created for quantitative analysis.

1. The first category includes the well-preserved traditional houses that have embodied historical and cultural values
2. The second category includes the traditional houses that are in a derelict situation and need renovation
3. The third category is for those that have used a mixture of traditional and contemporary styles; many of which may have employed contemporary technology and materials but try to imitate the traditional styles at the same time
4. The fourth category includes the houses that have used contemporary/modern materials and technologies and had no consideration for the traditional form or construction

Table 1. Village information and the percentages of the four categories of houses in five villages in Yunnan.

Village Names (Year for survey)	A Zheke (2014) [15]	Qingkou (2014) [16]	Manbian (2015) [17]	Nan Wuliqiao (2016) [18]	Lubiao (2015) [19]
Village location in Yunnan	**Honghe**	**Honghe**	**Xishuangbanna**	**Dali**	**Anning**
Number of families in village	67	185	182	362	486
Population	380	892	805	1509	1890
Distance to adjacent town or city	28 km	37 km	6 km	3.5 km	26 km
Village area	1.43 km^2	0.35 km^2	3.32 km^2	0.25 km^2	5.6 km^2
Elevation above sea level	1880 m	1500–1650 m	1255 m	2100 m	1840 m
First category	29%	7%	7%	3%	1%
Second category	34%	15%	13%	8%	9%
Third category	15%	43%	49%	57%	27%
Fourth category	22%	35%	31%	32%	63%

Some additional information based on the forms and materials of houses was also gathered in the survey; for example, the issue of whether the buildings needed to be protected, renovated, and modified, together with those needed to be kept in the original form, or those to be altered.

In the five villages in Table 1: A Zheke and Qingkou villages were surveyed in 2014; Manbian was surveyed in 2015; the other villages were surveyed in 2016. Within the five villages, Nan Wuliqiao and Lubiao experienced significant changes from 2014 to 2016.

The features of houses listed in Table 1 helped demonstrate some common features that had impacts on the built environment of the villages. For example, the distance away from towns and cities may have affected how villagers could communicate with outsiders. Closer distances could lead to additional family incomes from commercial business in the towns and cities, and this income potentially affected lifestyles. In addition, the provincial government policy in Yunnan was to use tourism as a way to develop local economies. All five villages in Table 1 have been involved in tourism development; however, experience varied among villages. Out of the five listed in the table, A Zheke village, preserved the largest number of traditional houses. This was due to the isolated situation of the village, far from the nearby towns and city; it also developed local products for commercial trading later than the others. Qingkou village in the same county as A Zeke has been developing as a tourist village since 2001. However, the funding to support the village was not consistent after the initial development project was completed, which left the village slowly trying to adapt to the changed environment at its own pace. More details concerning Qingkou's changes are given later in the paper.

In contrast to this, Manbian village in Xishuangbanna was developed as a tourist village and benefited from the close distance to the adjacent town. It sits in the middle range of the five villages in terms of the changes to housing design. To maintain long term development, the village also needed to develop its own enterprises to increase self-reliance capabilities. Nan Wuliqiao village has benefited from not only tourism, but also the new enterprises set up in the village, including a slaughterhouse, a transportation company with more than 300 vehicles, and a food street area and

hotels. A large percentage of the villagers are Muslim, and the village has a Muslim school and the largest mosque out of the eighteen in the region. More details will be given later in the paper concerning Nan Wuliqiao village.

Lubiao village had the highest percentage of new concrete or brick houses, probably because of its location close to Kunming, the capital city of the province and its positive approach to develop commercial businesses. The village has a long history, having been established in the Ming dynasty period (1368–1644), and eventually developing as an important settlement for commerce along the ancient South Silk Road in the Qing dynasty (1644–1912). It was listed as one of the most important Historical Village Preservation Projects in Kunming district in 2013. The village has kept many traditional constructions, and with the short distance to Kunming and good transport routes, many people in the city spend their leisure time over the weekend in the village.

The comparison of five villages above suggests that although data for the four categories of the houses found in the villages demonstrate evidence for changes in the built environment, the factors that affected the development of villages are complex. Analysis of the categories made it possible to compare changes in different villages in quantitative terms; however, there are many detailed cultural aspects that cannot easily be explained.

The following section therefore analyses two villages in detail to explore the different understandings of the built environment by the villagers themselves, rather than the categories mentioned above which were chosen by others. Both villages are ethnic villages with strong traditional cultures, and more than ten years have passed in both since they were first developed for tourism, yet the ways they have changed are very different.

The first case study of Qingkou village shows how traditional clan groups in the village and religious beliefs have had influences on the village's built environment. The second case of Nan Wuliqiao village, on the other hand, explores how architects played a more supporting role in village development that has gone through significant transformations in recent years. A comparison between self-reliance and external support in both cases are discussed later.

4. Two Case Studies of Development in Rural Villages in Yunnan

4.1. Qingkou Village

The first case study is Qingkou village, which is a village of the Hani people. Hani is the term for an ethnic group living in Yunnan Province of China and in the neighboring countries of Burma, Laos, Thailand and Vietnam. They form part of the Burmese branch of a Sino-Tibetan language group. The Hani ethnic group number is about two million; of those, more than a million and a half live in China. There are two main ethnic sub-groups in Yunnan: one group (about 80%) lives in the central range of the Ailao and Wuliang Mountains in South Yunnan, experiencing a warm climate and abundant rain. The other smaller group can be found in Lanchan County and Xishuangbanna Prefecture in Yunnan. A very small percentage of Hani are scattered over a further ten prefectures in the North and Southwest of Yunnan. Hani houses found in the region of the Honghe River and Lancang River are traditionally of mud brick construction, built directly on the ground; rather different from the bamboo or wooden Hani houses built on stilts in Lanchan County and Xishuangbanna Prefecture.

The Hani have long been well-known for their development of agriculture. The Hani in Honghe Prefecture are particularly famous for their terraces of rice paddies on the mountains, which were listed as a UNESCO World Heritage site in 2013 see Figure 1. Hani villages were typically built in the middle of the extraordinary terraces of rice fields. Village size was restricted by the capacity for food production from the crops produced in the surrounding fields, and varies from less than 100 families up to 200 families.

Figure 1. Hani village in the terraced rice field.

The villages are built on the sun-facing side of the mountain. Houses in a village generally have the similar orientation, and are densely built on either side of the narrow lanes, following the topography of the site. Each village traditionally has its own village gate, water wells, and sacred cemetery. Before the 1960s, public wells served as the most important social communication space, but since the 1990s, the central square, developed for public activities in most villages, has increasingly become the main gathering space for the villagers. A village plan can be seen in Figure 2.

Figure 2. Qingkou Hani village plan in 1999.

Due to the small size of building lots on the hillsides, it is common to construct a house on different levels and create open platforms on the first floor as a drying space for crops as in Figure 3. A family courtyard is common; normally surrounded by a two-story house and further one to two-storey storage buildings. Typically, a house has three rooms on the ground floor: the living room with the shrine and

hearth, and bedrooms for the older generations, parents or married sons. One distinctive character of the Hani house is the mushroom shaped thatched roof as in Figure 4. Since 2000, timber roof structures have become more sophisticated because of external influences.

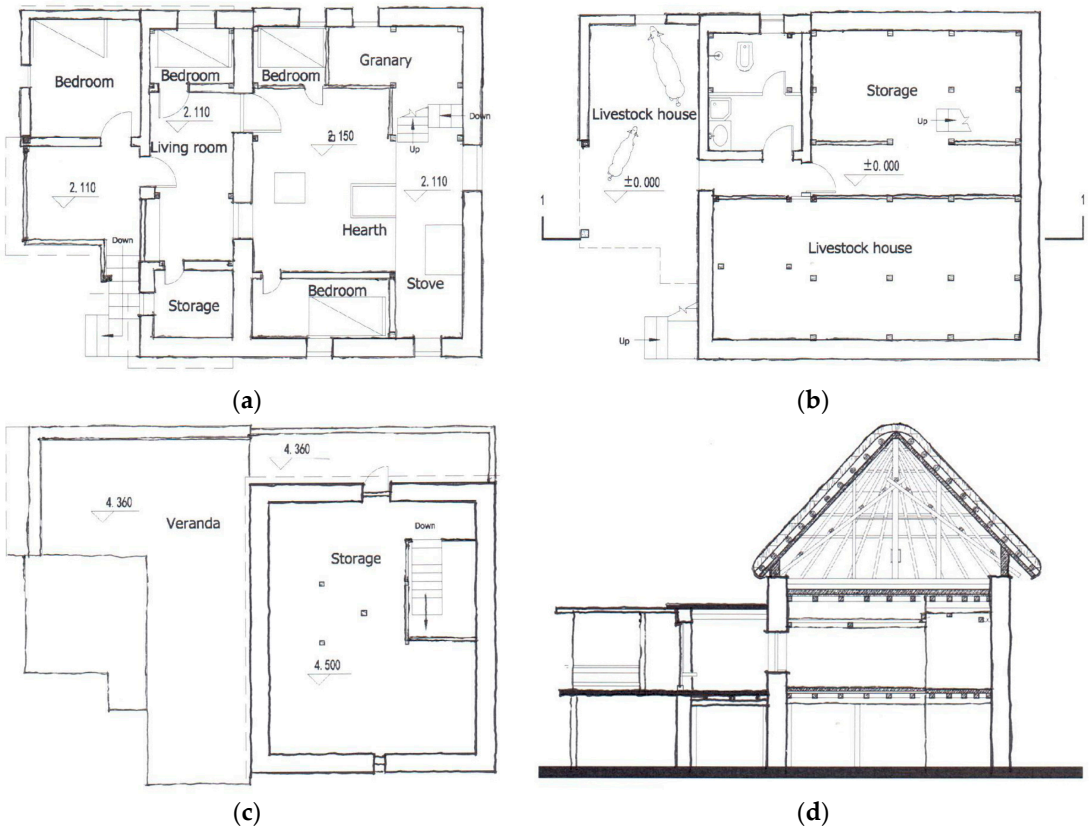

Figure 3. Plans and section of one Hani house in 2013: (**a**) Ground floor plan; (**b**) First floor plan; (**c**) Second floor plan; (**d**) Section 1-1.

Figure 4. Hani traditional mushroom house in 2001.

Qingkou village is located in Yuanyang County within Honghe Hani and Yi Autonomous Prefecture. It covers an area of 0.35 km^2 on a sloping platform in the middle of a mountain range between 1500 m to 1650 m above sea level. As with other traditional Hani villages, Qingkou has a village gate, a temple for ritual events, and a central square for festivals, as well as a 'Dragon Forest', the sacred cemetery. Traditionally, water wells were important public spaces where women did washing and socializing, with children playing around, and men cleaned their farm tools and took showers. The earliest well in the village has dried-up, but an annual ritual is still held around it to bring wealth to the village.

As the political, social and religious center of the wider community, the main village area had 185 families with about 900 people, consisting of three groups with different surnames. The clan with the surname of Li had most influence in the village as they were the first group that settled at the location and their houses were in primary positions in the village. The Li were found to consist of three surname groups with, in total, more than 100 families [20]. One of the Li groups had experienced more communication with outsiders and was generally wealthier. They were the group that chose to demolish the old mushroom style houses and built brick and concrete houses in the original locations.

The clan with the surname of Zhang had 26 families, and that of Lu 39 families [20]. They moved from adjacent villages to the area after the arrival of the Li groups. Their houses were more likely to be in the areas surrounding the locations where the Li families settled, on the perimeter of the village. In order to enhance their influence in the village, Zhang families held rituals to become the brothers of (and united with) the Li families.

Apart from these three clans, there were a few groups with different surnames, each had only one or two families. On special occasions of the year, especially during the religious rituals, each clan held their own ceremonies within their groups, organized by the ritual master of the group. The ritual masters' main functions were to hold ceremonies to protect against the negative influence of the spirits and to call for the blessing from the gods and spirits. They had important roles in the ancestral rites and funerals of every family. There is also a ritual master for the whole village, who deals with larger ritual activities such as the yearly ceremony for the village gates and water wells.

The essence of Hani society was one of mutual symbiosis. This attitude was a reflection of their belief of the existence of different souls. They were accustomed to practicing rituals to venerate to the different gods and spirits and thus to obtain their protection. Their religion was based on a cult related to their view of their ancestors and the forces of nature. In every house, there were two shrines for the spirits of ancestors to inhabit: the one by the hearth being most important and for the ancestors who had a natural death; and the one by the door being for those who experienced un-natural deaths. On the edge of the village was the sacred Dragon Forest, governed by certain taboos and ritual protocols. Modern day Hani people living in Qingkou village still follow their traditional religion, and carry on a set of family and village ceremonies each year.

In accordance with the Hani tradition, parents lived with the eldest or youngest son. Other sons who got married were expected to build their own houses. About three to four new houses have been built in the village each year over the past decade. The number of people in the village was restricted by the yield from the agriculture crops in the nearby fields. Typically, a village would split into two if there were too many people, stretching needs beyond the supply of crops that the adjacent fields could produce. However, this situation may be in flux as increasingly more people tend to work in the city and bring in extra income, external food and other produce compared to previously with less reliance therefore on immediate food supplies.

The main expenditure for families were those incurred in building houses; other large costs were those for marriages, funerals, and religious festivals. The new brick and concrete houses (Figure 5) and acquisition of televisions and other goods have created socio-cultural meanings associated with wealth and modernization.

Figure 5. Brick and concrete houses in village in 2013.

Annual ceremonies are still held at the village gate, by the oldest well, and for the ancestors of the clans. Their beliefs are reflected in their understanding of the ecological system in which humanity's serenity and happiness relied on the harmonious relationships among individuals and the supernatural spirits, and with the surroundings. There has been no fundamental change in relation to this belief, despite increasing availability of new house construction materials and technologies.

However, the village has been changed enormously as a result of the implementation plan to develop the village as "Qingkou Hani Folk Cultural and Ecotourism Village" since 2000 [21]. When Yuanyang County set up the tourism development projects in 1999, three Hani villagers in the area were selected to be examined for development. Qingkou village was chosen because villagers had retained the integrated Hani culture, lifestyle, and traditional Hani houses. Despite lacking experience of communicating with outsiders at the time, when consulted about the new proposal, villagers expressed strong desires to develop the village.

Since the project started, the village has changed in four particular aspects. Firstly, the tourism development in Qingkou introduced the Hani ethnic culture to a wider range of audiences and was linked to increased national visibility of such destinations through the promotional and informational policies generated by the local government.

Secondly, the development improved local living conditions. In accordance with the Development Plan, the local government funded the construction of infrastructure projects, museums, and a school, as well as other public facilities in the village. The integrated utilization of biogas was also promoted in the village, which created an ecological chain linking pigs, biogas and fruit production and a second linked combination of biogas plants, animal barns and toilets in Qingkou village. One third of the families in the village had been using septic tanks and had rebuilt their kitchens and toilets to adapt to the new systems when surveyed in 2006; by 2013 half of the families had installed the system.

Thirdly, the development project further divided the village community into socially and economically diversified groups; apart from the effect of marriage and of people moving in and out of the village. After 2006, tourism attracted six additional families into the village to manage a restaurant and run shops for locally produced silver jewelry and handicrafts.

Fourthly, the physical environment changed because of tourism development. The central square was enlarged to accommodate a space for goods vehicles to turn around. It was used as the space for festivals for people coming from adjacent villages, and as a space for the storage of materials for

building work. The fundamental changes made to the houses were more than the use of new materials and front façades.

The author identified two key aspects from study in the villages that are detailed as follows. Firstly, the academic study that created four categories of buildings was different to the categorization perceived by the villagers that was based on the dwellings of the different clan groups. The separate roles and responsibilities of various clan groups had influenced the built environment and cultural environment in the village. The needs of the village as a whole unit were different as compared to those of the individual family and the academic categories were based more on an individual dwelling analysis.

Secondly, for the development project carried out in 2000, architects played a leading role, working with the villagers closely, in the process of defining the brief of the projects and designing the action plan to transfer the village into a Folk Cultural and Ecotourism village. However, the funding and other support was provided intermittently, which led to difficulties with inconsistent planning and enforcement. Therefore, after the start of the development project in 2000, it became clear that rather than relying on external funding entirely, action plans were needed to incorporate self-reliance capabilities from villagers and support available from the administration teams. Nevertheless, the changing visual appearance of the built environment using either traditional or new materials did not imply a change in the villagers' belief in the benefits of a harmonious relationship with the environment.

Based on the analysis above, the following considerations were proposed based on the understandings gained.

- The village is not a single unit; there are different groups and clans with hierarchical social status within one village.
- The planning and design systems should work closely with the village management group which has the detailed knowledge to balance the benefits for different social groups in the village.
- The planning and design proposals must consider impacts on various levels: for the individual, the village, and the town or county.
- The planning and design process should involve different levels/groups within the village and encourage a range of aptitudes, for example, apart from those who work in agriculture, other people may have income from livestock, fishing, vegetable growing, from local crafts or from those who work in the cities. These other needs will be reflected in the spatial planning.
- Planning for a longer term trajectory and change is needed. For example, the fishing and forest hiking routes in Qingkou were initially designed for tourists, but were then used differently by villagers whilst the tourists focused more on the stepped rice field rather than the village. A flexible design process that takes into account the long term "moving targets" needs to be built into village planning.
- Guidance or workshops are important for the local villagers and for the construction teams to improve their knowledge for new design and construction methods. In addition, an assessment and monitoring system should be set up to ensure the health and safety for the construction projects.

4.2. Nan Wuliqiao Village

The second case study is Nan Wuliqiao village in Dali. The village has gone through a number of fundamental changes in recent years. Nan Wuliqiao village is located by Er Hai Lake, covering an area of 0.25 km^2. The plan of the village is as shown in Figure 6. The village location on a sloping site that extends from the bank of Er Hai Lake to the Cang Shang Mountain, is one of the most popular tourist destinations in the region. The village has 362 families and more than 1500 people. A large percentage of the villagers are Muslim [18].

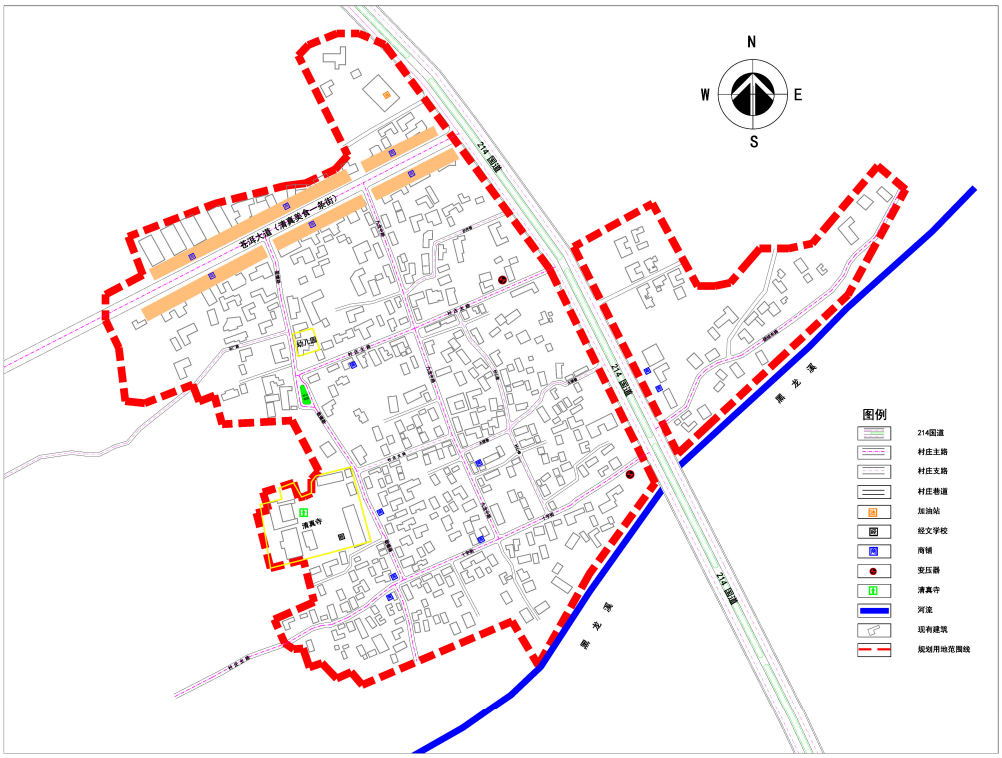

Figure 6. Plan of Nan Wuliqiao village, adapted from the map in *Compilation of Information of Dali Country Nan Wuliqiao—The Good Model Village for "Beautiful Villages"* [18].

There are six ethnic groups in the village: Muslim, Han, Bai, Yi, Zhang and Naxi; the largest grouping consists of the 245 Muslim families (1163 people) and there are 98 families of other ethnic groups (346 people). There are 35 different surnames in the village. The group with Ma as the surname is the largest Muslim group with 162 families. It is followed by the Zhang surname (46 families), Sha (20 families), and Qin and Liu groups (each with 19 families). The remaining 31 surnames are small groups with one to ten families. The village was established before the Tang dynasty, and called Baoxi Zhuan (Treasured River Village) at the time because a river went through the place. When the famous Three Pagodas in Dali were built in the Tang dynasty, the debris left from the construction projects were carried to the location of the village, which was five Li (about two Kilometers) to the south. The name of the village was changed to Nan Wulichao Village (The bridge five Li away on the south of pagodas). Historically, the village has military connections with both Muslim and Han families being offspring of soldiers who settled in the place.

The village has been well-known for its Muslim culture in a region which is also famous for the Bai ethnic culture in Dali. The village has the largest mosque in the Dali area, and Muslim people follow the religious routines of prayer each day and festivals each year. The village built environment was greatly influenced by the enterprises developed in the village for tourists, making the best use of the location between two famous tourist attractions, the Er Hai Lake and Chan Shan Mountains. Villagers run a food street well known for Halal foods. They also operate 40 hotels and have a 300-vehicle transport business. The village has built up modernized infrastructure with underground electric cables, telephone lines and a water supply network. Due to the close distance to Dali Old Town, a Muslim Technical Institute was set up in the village in 1991 and had students from 22 provinces in the country. In 2016, the average living area for each person reached 40 square meters, and average personal income was more than 20,000 Chinese Yuan per year [18].

Traditional houses in Nan Wuliqiao village were constructed with local materials (mainly stone). The skills and crafts for processing the stone building materials have been passed down through generations and are widely recognized and appreciated by the villagers. Three different types of

stone houses exist in the village and these clearly demonstrate the transformation in the use of building skills and techniques in the period before contemporary building materials and technologies became prevalent.

The first generation of dwelling houses were built with irregular stones. The majority of these houses were derelict when the author visited in 2016, some were waiting to be demolished to give space to new buildings as in Figure 7. The second generation had raised floor to ceiling heights and were two-story buildings. The stone walls were painted with white and black decorations on the wall, incorporating the influence of the Bai ethnic groups in the region as in Figure 8. Stone materials for those houses were processed manually before modern machinery became available. The textures on the blocks were widely recognized as resulting from valuable hand making crafts, much more appreciated by the villagers than machine-processed blocks that have become prevalent in recent years. The length of the stone block determined the sizes of the buildings and openings. A typical example was the house by the stone mason in the village which demonstrated good proportion of the ground and first floor heights for different functions and the appropriate proportions of the window openings, as shown in Figure 9.

Figure 7. First generation of stone house, built in the 1930s according to the villagers.

Figure 8. Second generation of stone house, built between the 1930s and the 1970s according to villagers.

The third generation houses generally used machine processed stone, though some new houses used bricks. Windows had wooden window shutters made according to traditional crafts and well-known in the Jianchuan region of Dali as shown in Figure 10. The internal garden incorporated timber pavilion forms from the central part of China, with high raised roof eaves similar to those in the traditional gardens of Suzhou in Central China as shown in Figure 11.

Figure 9. Home of the stone mason.

Figure 10. A traditional house being converted to a restaurant in 2010.

Figure 11. Pavilion in Nan Wuliqiao village.

All these different house types co-existed, although villagers considered the new concrete houses as representing advanced contemporary life. Nevertheless, the appreciation of the craftsmanship involved in stonework still held importance, and stone rather than concrete was used for the main gates of the village, and wooden carved window shutters were fixed in front of the glazing. The village also has houses designed by architects using craftsmanship from other parts of the region. The local regulations for controlling the height of the houses were generally followed. Some innovative methods were explored by the villagers themselves, such as using new balconies attached to the first floor that enabled movement of the staircase to the outside in order to enlarge the internal space and to separate the circulation space from internal rooms as shown in Figure 10.

The village has a higher percentage of new houses than others, as shown in Table 1, because of its popular location close to the Er Lake and extending towards to the Chan Shan Mountain at the rear. The village is now working with the university nearby to build a kindergarten at the edge of the settlement in which the plan is to incorporate the traditional technical features such as solar shading, thermal mass, passive solar gain, and natural ventilation. The new houses constructed in concrete have limited use of the traditional techniques however; the decisions were reported as being made based on the cost and the new forms available. Nevertheless, due to the relatively cheap price for the solar panels used for hot water, they were installed widely in the region, both in the city and in the rural areas.

The village has a strong administration team that managed several enterprises for villagers that have generated a significant amount of income used to fund a wide range of infrastructure projects in the village.

After the discussions with the villagers and the administration group in 2016, village development in Nan Wuliqiao was summarized as follows: Traditional structures very often had small windows which resulted in a relatively dark interior space. The locations of the openings on the wall seem to be related to the traditional spiritual beliefs. New brick or concrete houses had increased the sizes of the openings and the ceiling heights and optimized the location of the staircase. New houses incorporated large window openings from the ceiling to the floor, a feature copied by many others in the village. However, the large openings on the south facing walls had caused the interior space to become too hot, and curtains were kept closed most of the day to reduce the overheating. In this case, professional guidance would have been valuable to aid villager understanding of the new options.

Innovative measures have been demonstrated in the transformation of rural houses designed and construction by the locals. New brick and concrete houses had incorporated traditional craftsmanship for stone and timber decorations when financial abilities allowed. Techniques and forms from other regions were also imitated. In addition, artists and architects, who designed and built locally, also influenced the villagers' perception of the traditions and of modernization.

The distance from the village to the main transport network and to the tourist areas were important aspects that influenced how the village buildings changed. For villages close to the transportation network, there was an increased chance to be transformed by external influences and to attract funding to develop tourism. Villages away from the main transport routes, such as Qingkou village, relied more on the villagers working as a cooperative community on farms.

Local and indigenous leaders were crucial actors for good development when they had strong leadership to make a positive change, manage the projects for the longer term, and aim for benefits for the general public in the villages. Thus, planning and design for rural development should have different focuses for these various situations and take account of the local stakeholders.

5. Top-Down and Bottom-Up Processes

Qingkou and Nan Wulichao villages demonstrated two different kinds of self-reliance and external influence that affected the villages' development. For Qingkou village, the villager management groups and villagers had been involved in the discussions of the action plans. Architects and town administration teams had taken the leading role in deciding the development direction and scales from the beginning. When the tourists subsequently shifted their focus to the step rice fields, away from the village, many originally planned facilities in the village had to change their use. As the funding to support the village was not consistent after the development project finished, the villagers had to rely mainly on local knowledge and skills to adapt to the changed environment at its own pace. Government funding for the support of the low-income rural population has variable impacts on various groups. The design for redevelopment needs to include financial and technical support for refurbishment for all houses in a village. For villagers who built new houses, many worked with small rural construction teams producing monotonous brick or concrete block dwellings, which neither incorporated any heritage from local tradition, nor had sufficient consideration for impacts of sunlight/daylight, protection from the extremes of heat gain or loss, structural strength, or suitable spatial arrangement. Health and safety issues were also associated with these sometimes rather amateur construction processes, as well as inadequate build quality.

It is possible to conclude that guidance or workshops are important for the local villagers and for the construction teams to improve their knowledge of the new design and construction methods. In addition, an assessment and checking system should be set up to ensure the health and safety for the construction projects.

Varying from the model of Qingkou village, Nan Wulichao village had a much more urbanized development with rapidly established infrastructure and enterprises. In this case, architects were involved in the design for individual houses and public buildings, but were in the supporting role for making master plans for the village. On the other hand, professional guidance would still be valuable to guide understanding of the new options on how to integrate new materials and technologies with traditional craftsmanship.

In many areas in Yunnan that are prone to earthquakes, studies have found that vernacular timber houses had evolved techniques using structural frameworks to resist the impacts of earthquakes [22], but new brick and concrete village houses, without specific designed structural strengths, were more likely to be damaged by earthquakes. In these cases, not only professional guidance for design and construction was needed, but the villagers also needed a better understanding of the design quality aspects of living environments, sustainable resources, and suitable methods of construction.

5.1. Comparing Self-Reliance and External Influences

Based on the analysis of both case studies, Table 2 listed the aspects that were influenced by the administration teams in towns or counties, and those which were determined at the village level. In addition, the table also included actions that architects had been involved in both village projects.

Table 2. Comparison of self-reliance and external influence on sustainability.

	Agency	Villager Family	Village Management	Town or County Management	Architect Planner
External influences	Built environment, landscape and ecology			X	X
	Transport systems—access to the network			X	X
	Energy systems			X	X
	Infrastructure			X	X
	Waste design and management			X	X
	Education and other facilities			X	X
	Health and Wellbeing			X	X
	New technology			X	X
	New knowledge of the design methods and applications	X	X	X	X
	Funding support	X	X	X	X
Overlapping themes	Eco-products	X	X	X	X
	Interaction of knowledge and know how skills	X	X	X	X
	Appropriate tools, instruments and methods for sustainable development	X	X	X	X
Villagers' self relaince	Traditional knowledge of building	X	X		
	Local materials	X	X		
	Local craftsmanship	X	X		
	Access to outside influences	X	X		
	Changes of attitude about quality of life and sustainable development	X	X		X
	Innovative design due to the influence or limitation of the contemporary and traditional construction methods	X	X		X
	Willingness to respect the traditional cultural heritage	X	X		X
	Willingness to use sustainable materials and methods	X	X		X

Table 2 shows that architects and designers could and in fact had been involved in the discussions and decision making with different groups in both top-down and bottom-up processes for both case studies; therefore, they were in a good position to work as the link among different stakeholders. Several good examples of the collaboration among the academic scholars/designers and villagers in Yunnan can be seen from projects undertaken by the School of Design at the Yunnan Arts University. From 2004 to 2013, the students and staff in six design subjects in the school: interior design; building and landscape design; animation; multi-media; fashion; and product design, together with subjects of timber and stone crafts, jewelry, and products for tourism, worked with the administration group in a region, a town or a county in Yunnan each year, to make designs for the region based on local traditions [23]. Their projects have helped to develop new local products that entered the market. These local products included packaging design, leather bags, ceramic vases, wool textiles, tin accessories and jewelry. Books recording different craftsmanship were also published as a result of the cooperation [24].

5.2. Two Simultaneous Processes in Rural Development and Role of Architects

Based on the analysis detailed above, this study argues that in order to understand how to adapt regulations and guidance for the diversity found in rural areas, analysis should be separated into

two alternative, but potentially simultaneous, processes for rural development occurring in typical village redevelopments. One is the 'bottom-up' approach where individuals and groups of villagers work innovatively in developing new building construction opportunities, prompted by contemporary and indigenous design and construction methods. The alternative 'top-down' approach is associated with changes caused by external influences, such as the direction and prioritization provided from funding sources, and prompts for use of specific knowledge and technologies filtered down and promoted through village administrative systems. In both processes, some professional knowledge is needed for good quality and effective decision making.

This situation suggests value in using multi criteria analysis (MCA) and multi criteria decision analysis (MCDA) approaches [25,26]. A 'vertical MCA' provides an 'optimal solution' on top of the hierarchy, which relies on the professionals involved to take a leading role in the selection process. Public opinion helps provide supporting evidence for the decision, but is not part of the analysis. In contrast to this, in a 'horizontal MCA', the best solution is identified as a compromise output determined by the actors involved. A researcher who might be involved in the process is not the only party to choose the best solution; his or her role is to prepare a system using the information to achieve a maximum of transparency and accountability, allowing the best solution to be identified [25]. This approach has some implications for sustainable rural development. It calls for the sustainable development process to consider how the decisions can be made at the interface of the administration teams, architects and villagers. It also emphasizes that outcomes have to consider stakeholders, the decision making process, participation, and implementation; and enable each level to give feedback to the other levels in both top-down and bottom-up processes.

This process should lead to the development of specialist roles for architects in China involved in rural development; roles which should develop beyond the conventional professional duties. Many scholars of Chinese rural development have discussed the need for designers/architects to take on social responsibilities in order to improve the condition of the built environment, protect cultural heritage, and help vulnerable groups to improve their living conditions [27–29].

5.3. Roles of Architects

In existing Chinese architectural studies, some argue that Chinese architects should follow closely the international recognized professional standards for registered architects, which are considered by many, to be based primarily on design and management skills and knowledge. Some others, however, have called for professionals to take on more social responsibilities beyond the defined professional duties. In rural development projects, this study suggests that in practice, the designers and planners, using their professional knowledge, may potentially encompass special social responsibilities of supporting and nurturing village development over a longer term that can be very valuable for development projects. This is based on the MCA approaches discussed earlier, in which architects' professional knowledge is not the sole criteria used to assess sustainable development or decide the action plans. The villagers, who know more about local lifestyles and daily needs which form part of an integrated built, natural and cultural environment, need to act as part of the decision making process. In both case studies discussed previously, architects' roles in support of rural development have been shown to be important. These are different from normal professional responsibilities, skills and knowledge that are required for architects working on urban projects. The findings from the case studies indicate the possible roles and ways in which future decision processes could be developed as follows:

- Promote a working group for the development project in villages with participation from different stakeholders
- Support activity within the working group to evaluate the existing material culture and non-material culture, decide the nature of the village, which areas are to be focused on, issues around preservation, and which aspects are to be developed

- Encourage programmes within the working group to promote participative design as a link for discussion and decision-making from different levels
- Stimulate and nurture the changes in the attitudes concerning sustainability held by locals
- Provide appropriate tools, instruments and methodologies to support sustainable development. Support the complex interaction between the knowledge bases and practical know-how of different stakeholders
- Incorporate systems to protect the local cultural heritage, and to collect and record the local culture
- Treat the development as a long term process, including updating of plans for the medium and long terms

In practice, the designers and planners also have special social responsibilities that can be listed as follows:

- Support the actions by local communities to integrate many aspects into one design—preservation of traditional identity, tourist planning, details design, improving quality of life, refurbishment of derelict buildings and reinforcement of existing buildings for anti-earthquake requirements
- Constitute a platform for discussion and decision-making between the top-down and bottom-up processes with the local stakeholders at different levels. Simultaneously working as consultants to the administration leaders in preparing for decision-making, liaison among academic institutions and villagers and provision of the necessary data for discussion
- Showcase sample designs to stimulate and nurture the changes in the attitudes in the village and encourage the use of local resources
- Encourage the work group to analyze the specific situations in each case and find the suitable solutions as the result of the blending of forms of knowledge that the relevant stakeholders can accept based on their understanding of the technical knowledge, norms and values in play. Set-up workshops with the locals to promote the understanding and discussion about the sustainable criteria in each case

6. Conclusions

This study focused on the villages in Yunnan province in China, where there are more rural residents with incomes lower than the national defined poverty line than in other regions. The paper has explored existing research into Chinese rural development and has identified for the first time that two alternative but potentially simultaneous processes for rural development in Yunnan occur in typical village redevelopments. This finding is crucial to the understanding of why external support mechanisms, including funding, knowledge transfer and availability of new technologies might not always achieve expected results.

The two processes are: the 'bottom-up' approach where individuals and groups of villagers work diligently and innovatively in developing new building construction opportunities, and the alternative 'top-down' approach that is associated with changes caused by external influences. As a result, it is argued that design for redevelopment needs to treat these two processes separately, and include financial and technical support not only for new constructions but also for refurbishment for all houses in the villages. For villagers who built new houses, not only was professional guidance for design and construction needed, but also a better understanding of the design quality aspects of living environments, sustainable resources, and suitable methods of construction.

The case studies revealed the challenges for rural development: the inconsistent external funding; different levels of knowledge and technical support reaching different groups; and the incompatibility between academic categorization of villagers' dwellings and villagers' own perceptions of the social and cultural meanings of their houses. The self-reliance capabilities of the villagers are crucial for long term development.

This study therefore argues that part of the role of architects involved in rural development should be to support the interface between knowledge and practical skills coming from different

stakeholders. It is therefore important to recognize and support the roles of architects working as local social and cultural experts, in addition to working as designers. Since the government policies for rural development have now been in place for some time (since 2005), architects and planners should be encouraged to get involved in rural development by adopting a long term interest, rather than simply transferring their urban design methods to rural projects. If this does not happen, then there is a strong risk of ignoring the long term stakeholders, and in the process a danger of designers carrying on using their own preconceptions and reinforcing the top down process. This strongly suggests the need to consider the use of context-based assessment of the situations focusing on two aspects: self-reliance and external influence; hence, to separate the motivations and inputs from the individual family and the village, from the impacts arising from towns or cities. It also proposes that the design and planning process should be flexible and that the methods are sufficiently diverse to take account of the changing lifestyles over the long term and of different groups' needs within the village.

The analysis suggests that architects and designers can potentially work together to build a platform for discussion and decision-making among stakeholders which can link the two different directions in approach successfully. As this study is part of a larger ongoing project concerned with rural development, future research will analyze the detail of various methods concerning how architects can mediate different processes of the stakeholder's engagement in rural development. In this paper, the main focus is to provide a realistic understanding regarding how the different forms of knowledge are at play in village development and to suggest how architects' have a potentially significant role in the process. The skills and knowledge that will be required are different from those required in urban projects, yet it is this basis that is currently being applied. This issue has not previously been specifically identified or explored within existing research on China's rural development.

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