中国桃坪羌寨
以社区为本的震后重建

美国华盛顿大学
中国四川大学

2009年建成环境工作室
秋学期城市规划设计科报告

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COMMUNITY-BASED EARTHQUAKE RECOVERY IN TAOPING, SICHUAN, CHINA

University of Washington
and Sichuan University

2009 Built Environments Lab
Autumn Quarter Studio Report
Urban Design and Planning 508

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Draft 30 March 2010

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简介

2008年5.12 中国四川大地震，造成了大约九万人死亡，超过五百万人无家可归和一千五百万人需要异地安置。面对这一切，美国华盛顿大学建成环境学院决定采用新成立的跨学科、多科系的建成环境工作室来面对灾后重建的挑战。我们的建成环境研究小组包括一个九个月长的课程（讨论课、实地测绘和规划设计课），跨文化、语言和学科的合作，以及对灾后复原的文化尺度的关注。我们与四川大学合作，探索研究居住于四川的羌少数民族人民的灾后恢复重建。由于长期居住在封闭的山区，羌族已经受到了中国城市化与地震灾害的巨大冲击。所以我们与合作者一起集中力量关注于作为文化遗产保护地与重要生态文化价值的羌族聚居区的桃坪村寨。我们希望调研结果和设计构想能帮助桃坪和相似的社区从灾后复原，并且能面对未来灾害的挑战。我们的方法包括：促进当地的社区，让民间知识发挥作用，尊重自然与文化的地方特色，采用节约资源的技术，在社会的各阶层与各级政府之间建立良好的互信。

这份报告是建成环境研究小组的最终成果—— 即华盛顿大学2009年秋季12个星期长的规划设计课的结晶。每一个章节是一个学生小组规划与设计提案的成果。章节的顺序按其可能施行的次序排列，并且依照从小到大的空间尺度（建筑设计到区域规划和行政管理）安排。然而，每一章节实际上是我们研究结果这一整体的一部分：每一章节来源于课堂上的集体讨论与研究，以及基于其他与桃坪研究相关课程中的研究成果。这份报告的前言解释每份章节是如何衔接的，并且提供有关于桃坪和建成环境研究的背景与文脉介绍；以及概括被我们的研究和每一小组采纳的总的学术纲领和目标。更多有关于我们先于2009年秋季规划设计课的细节请参见附录A和B。

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INTRODUCTION

by Dan Abramson, Josh Miller and Yue Gong

The earthquake of May 12, 2008, in Sichuan, China, killed up to 90,000 people, rendered over 5 million homeless, and displaced more than 15 million. In response, faculty in the University of Washington's College of Built Environments proposed to devote the first of a new series of interdisciplinary, multi-departmental Built Environments Laboratories (BE Labs) to the problem of "Resilience in the Built Environment". This initial BE Lab consisted of a nine-month sequence of courses – seminar, field survey and studio – that included cross-cultural and cross-lingual as well as interdisciplinary collaboration, and focused on the cultural dimensions of earthquake recovery.

Partnering with Sichuan University in Chengdu, these courses addressed the problems of recovery for the Qiang people, a minority ethnic population that suffered disproportionately from the earthquake. Long settled in isolated mountain valleys, the Qiang already struggled with the impacts of China's urbanization when the earthquake struck. The partnership particularly addressed the village of Taoping, an officially designated heritage preservation site as well as an emblematic Qiang settlement in this ecologically and culturally sensitive region. The partners hope that their survey findings and design ideas suggest how Taoping and similar communities may recover from a devastating disaster, and enhance their resilience in the face of future disasters, by: empowering local residents; giving voice to local knowledge; respecting the natural and cultural character of localities; employing resource-saving technologies; and building trust between and among members of society and different levels of government.

This report presents the results of the final stage of the BE Lab sequence: a full-quarter (12-week) studio at UW in Autumn 2009. Each chapter is the work of a separate team of students, in the form of planning and design proposals. The chapters follow roughly in the order of their likely implementation; and according to the spatial scale of their concern, from small (architectural design) to large (regional planning and governance). However, each chapter in fact represents part of an integrated approach – the result of much discussion within the studio as a whole, as well as the culmination of multiple courses of work by different groups of students in previous academic quarters. This introduction therefore explains how the chapters are related. It provides background and context information on Taoping itself and on the activities preceding the final studio, and it lays out the overriding principles and goals which the studio as a whole adopted, and which informed each separate chapter. More details on activities prior to the final studio are provided in Appendices A and B.

文脉和问题

桃坪位于四川省阿坝自治州理县境内（图1.1）。阿坝自治州的人口主要是藏族和羌族。桃坪是位于四川西部羌族聚居区的典型例子。桃坪有着羌族传统碉楼建筑并且位于联合国教科文组织世界文化遗产的候选名单之中。[1] 她也是国家级的文化遗产保护地和区域旅游胜地（图1.2）。桃坪位于北纬31° 33’，东经103° 26’。杂谷脑河流经桃坪、理县、汶川而后注入岷江。桃坪对于理县的经济开发有着战略性的地位。这是因为桃坪是理县中靠近地区经济中心汶川最近的乡，同时也位于成都和旅游胜地松潘、黄龙、九寨沟之间，而这些旅游点包括桃坪已经为高速公路相连。桃坪的这些优点然而却是相对的，因为地震及其后果已经证实，岷江流域上游的区域容易在司空见惯的山体滑坡和泥石流这些灾难来临的时候被孤立。这个夏天，另一组研究小组在参观桃坪时就经历了好几次道路阻塞。由于山泥倾泻，原定与理县官员会见的计划也不得不推迟。7月17日早上，在全体研究小组的成员离开桃坪回成都仅仅一小时后，一场较大的滑坡就将桃坪与外界隔离了三天。而一个星期之后，更大的泥石流摧毁了一条主要的岷江大桥和堵塞了成都至汶川的高速公路。

图1.1 理县桃坪的地理位置
Source: http://en.wikipedia.org/wiki/File:Location_of_Li_within_Sichuan_(China).png

2008年5.12大地震沿龙门山脉地址断层发生并沿成都平原以东向西到达青藏高原。 大部分的灾害区位于陡峭的山脉与河谷之中并沿着岷江上游及其支流分布。 （图1.3）

建成环境工作室将桃坪以及其他处于地震带上的藏羌聚落所面临的问题，归纳为以下几点：

1. 如何为在地震中无家可归的村民重建住宅，并且同时确保传统村庄的历史整体性和新村的质量？
2. 如何在重建中既保持村庄的历史传统，又确保居民继续居住其中？
3. 如何以新的方式重建，使村民不用放弃宝贵的耕土，并且有更多的机会改善居住环境、增加收入来源。
4. 在开发旅游市场的同时，如何确保社区的安全性与可持续性？
5. 如何既使社区自主管理和发展，同时也使村民在经济发展中获益？

图2（左图）桃坪羌寨，新建的桥梁和碉楼（2002）；（右图）古老的内街（2008）
Dan Abramson（艾丹）摄影。

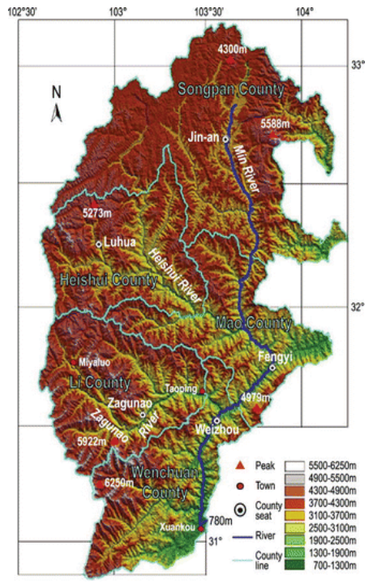

图3 岷江上游流域图（注：汶川在此处的地名是Weizhou）(Map by Tu Jian-jun)
Source: http://is.gd/7V6tY

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CONTEXT AND PROBLEMS

In summary, the studio work presented in this report addresses the following set of problems that confront Taoping and many other rural settlements in the earthquake zone:

- How to rebuild housing quickly for those displaced by the earthquake, without compromising the historic integrity of their old village or the quality of their new village?
- How to rebuild the old village in a way that is faithful to its historic tradition, but that allows residents to continue inhabiting it as a living community?
- How to rebuild the new village in a way that gives residents opportunities for improved living conditions and new sources of income, without giving up valuable agricultural land?
- How to maintain the community in place safely and sustainably, while improving access to tourist markets?

Taoping is located in Li County, Aba Prefecture, in Sichuan Province (Figure 1.1). Aba is an autonomous Tibetan and Qiang region due to the high proportion of those ethnicities in its population. Taoping is a prime example of western Sichuan's Tibetan and Qiang watchtower (diaolou) buildings and villages, which are on the UNESCO World Heritage Tentative List. It is also a nationally-listed cultural heritage preservation site; and a regional tourist destination (Figure 1.2). Taoping is located at latitude 31°33' north, longitude 103°26' east, along the Zagunao River where it flows out of Li County to join the Min River at Wenchuan. Since Taoping is the closest village in Li County to the larger county town of Wenchuan and to the main highway between Chengdu and the more significant tourist destinations of Songpan, Huanglong and Jiuzhaigou, it is strategically located from the county's perspective on economic development. It's advantages of accessibility, however, are all relative; as the earthquake and its aftermath have demonstrated, settlements throughout the upper Min River watershed are easily isolated in times of disaster, or even after quotidian landslides and rockfalls. The summer field studio group that visited Taoping prior to this studio experienced frequent road blockages first hand, or nearly so: meetings with county officials were delayed due to a landslide, and had the group left Taoping to return to Chengdu just one hour later than it did on the morning of July 17, another landslide would have kept the group in Taoping for an extra three days. A week after that, a large rockfall smashed a bridge on the main Min River highway between Wenchuan and Chengdu.

The earthquake of May 12, 2008, occurred along the Longmen Mountain Fault, which bounds the Chengdu plain to the east and forms the first range of mountains culminating in the Tibetan Plateau to the west. Most of the disaster zone is characterized by steep mountains and narrow river valleys, mainly along the upper Min River and its tributaries (Figure 1.3).

Figure 1.1 Location of Taoping, Li County, Aba Prefecture, Sichuan, China. Source: http://en.wikipedia.org/wiki/File:Location_of_Li_within_Sichuan_(China).png

Figure 1. 2 (a left) Taoping in its setting with a bridge over the Zagunao River and old-style tower, both recently built (2002); (b right) interior street (2008). Photographs by Dan Abramson.

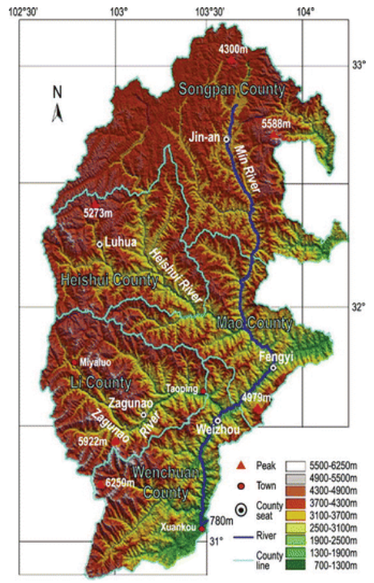

Figure 1. 3 Location of the upper Min River Basin (note that Wenchuan county town is here shown by its other name, Weizhou). (Map by Tu Jian-jun) Source: http://is.gd/7V6tY

灾害区位于陡峭的山脉与河谷之中，并主要分布与江及其支流一带。受影响的地区包括工业城市和相对自给自足的乡村。主要的人口包括汉族、藏族和羌族。更精确的是，这场灾害袭击了绝大多数的羌族居民以及他们居住的岷江上游和北川县龙门山的东部一带地区（如图1.4）在306000的羌族居民中，大约有10%在地震中失去了生命（这占地震死亡总人数的10%），大部分的传统住宅严重受损。

传统的羌寨并不仅仅是羌族文化身份的重要象征，他们也是对岷江上游独特环境的一种高度衍生的反应。这一流域最高的山峰在4500-5100米左右。在这个低纬度地区与极端不同高程和陡峭峡谷的地带,最高的部分生长着茂盛的植被。随着海拔的降低，降雨也随之减少。更高的海拔能滋生自给自足的农业，但对外交通却极其不便。

低海拔处的聚居区交通较为便利，但却依靠溪流和泉水，因而选址多在支流和主干河流的交汇之处。这些村庄一般都坐落在布满岩石并高出溪流之上的地带，这是为了对抗山体滑坡和泥石流堵塞溪流造成的灾害。(易碎的岩石，陡峭的山坡和稀少的植被使山谷的滑坡灾害频发。)沿着主干河流的冲积平原是这些村庄农业用地的首选。图5清晰地显示了这种联系。位于杂谷脑河和曾头沟交汇处的桃坪村是这些村庄的典型。桃坪村的海拔在1500米(4921英尺)左右，位于理县的最低点。

总的来说,整个地区的人口在历史上是相对稳定的，并较均匀地分布在高或低谷的聚居区中。历史上，高山村落很可能由于有着更可持续的农业而人口较多。过去的25年中，主要道路设施的改善给这一平衡带来了变化——交通的便利使得贸易、服务业、旅游相对于农业更可行和更有吸引力。年轻一代的村民日益离开村落去在较大的城市寻求教育或工作机会,但相对于高山村落，低海拔处的村落并未失去那么多的人口。

利用频繁的对外接触机会，桃坪的村民们对邻里的依赖性越来越少，同时更加积极、敏锐地应对地方和区域政府转变政策。不同村庄的血缘关系已经比同一村庄的邻里关系更为重要，在经济上，高山村落的居民们已经在经济上变得更加依赖他们在山脚村落的亲戚。这些趋势在山脚村落新建开发中得到了体现。比如：山脚村落的独立家庭雇佣他们在高山村落的亲戚来帮助建造他们的新房子。建设的速度和体量变得日趋重要，以使村民充分利用因为改变政策或经济状况改变而产生的机会。因为砂浆凝结缓慢的缘故，传统的房子需要一年的时间才能建造一层。今天,居民们更倾向于采用钢筋混凝土框架结构,这使整个房子的建设只需几周的时间。新建房子的楼层面积趋于最大，这往往是为了确保许多居民从政府处得到土地使用转换的最高赔偿。新的房屋也因此完全与其他房屋分离开来以减少它们之间需要协调的关系，尽管这样会要使用更多的土地和增加更多的建筑外墙以及材料。

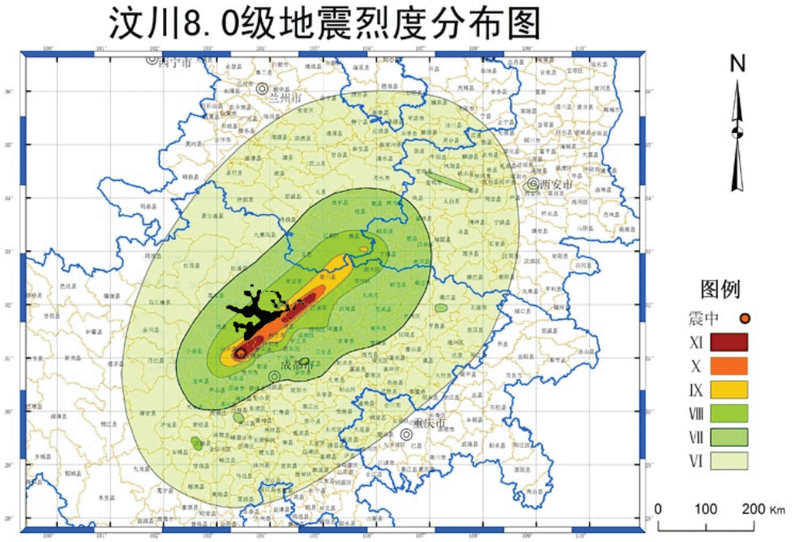

图 1.4 从中国地震局的地图所示：羌族聚居区（黑处所示）位于8.0级汶川震中附近。来源：中国地震局，http://is.gd/7s3FU，以及李伟作者,《羌族民居文化》（成都：四川美术出版社，2009，ISBN 978-7-5410-3913-3)，第39页.

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The affected settlements range from industrial cities to isolated and relatively self-sufficient agricultural villages. The population is a mix primarily of China's ethnic Han majority, and minority ethnic Tibetans and Qiang. Indeed, the disaster encompassed nearly all of the homeland of China's minority ethnic Qiang people, distributed throughout the Upper Min River watershed and some of the eastern slopes of the Longmen Mountains in Beichuan county (Figure 1.4). An estimated 10% of the 306,000 Qiang population died (over a third of all earthquake deaths), and most traditional housing was severely damaged.

Traditional Qiang villages (Qiang zhai) are not only important symbols of Qiang ethnic identity; they are also highly evolved responses to the peculiar environment of the Upper Min watershed. The highest peaks of the watershed are 4500–5100 meters or about 14500 feet above sea level. In this low-latitude region with extreme differences in elevation and steep and narrow valleys, the highest valleys are typically the most lushly vegetated. Rainfall actually decreases at the lower elevations. Higher locations are thus favored for self-sufficient agriculture, but suffer from inaccessibility.

Settlements at the bottom of the valley have greater accessibility, but are dependent on streams and springs for water, and so locate where small tributaries join with the main river. These villages are typically situated on rocky outcroppings above the streams, for protection against the mud and rock flows that occur when landslides dam up the streams. (The friable rock, steep slopes and minimal vegetation of the main river valleys make landslides a frequent occurrence.) The small alluvial flatlands that these flows create along the main river course are the chief locations for agricultural fields in low valley villages. Figure 1.7 shows this relationship clearly. Taoping, located at the confluence of the Zagunao River and the tributary Zengtou stream, is typical of these lower villages. Taoping's elevation, at approximately 1500 meters (4921 feet) above sea level, is the lowest point in Li County.

Overall, population throughout the region was historically relatively stable and somewhat evenly distributed between high and low valley settlements, or indeed high valley populations were larger, due to the greater capacity in high valleys for subsistence agriculture. Road improvements through the main river valleys during the last quarter-century or so have brought changes to this balance. Improved accessibility has made trade, services and tourism more feasible and attractive relative to agriculture. Younger residents everywhere increasingly leave to seek education or jobs in larger cities, but low-valley settlements have not lost as much population as the higher settlements.

As villagers position themselves to take advantage of increased accessibility, they have become less dependent on their neighbors, and at the same time more sensitive to shifts in local and regional governmental policy. Kinship relations between relatives in different villages have become more important than relations between different families in the same village; high-valley residents have become more economically dependent on their low-valley relatives. These trends express themselves in the dominant new housing typology of low-valley village expansion. Individual families employ their high-valley relatives to help them build their new houses. Speed and volume of construction are increasingly important factors, in order to take advantage of windows of opportunity that may close due to changing policy or economic conditions. Traditional houses required one year for the mortar in each story of a house to "cure", before the next story could be built. Today, residents prefer to use reinforced concrete frames, which allow an entire house to be built in a matter of weeks. The houses tend to maximize floor area per lot in order to assure residents of maximum compensation should the government expropriate their land. The new houses are also therefore completely detached from their neighbors, in order to minimize coordination between households, despite the savings in land and material that common walls would allow.

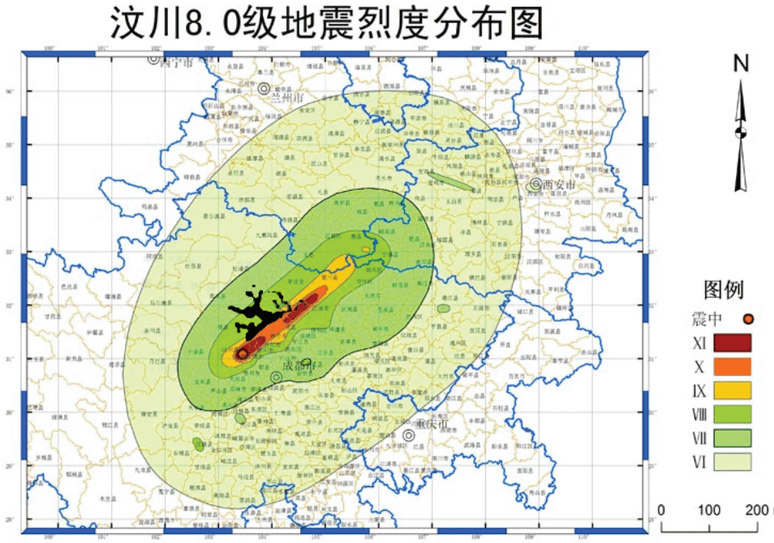

Figure 1.4 Map showing highest concentrations of Qiang settlements (in black) overlaid on an intensity gradient map of the 8.0 Wenchuan earthquake from the China Earthquake Administration. This map is an overlay of the image at China Earthquake Administration, http://is.gd/7s3FU, and the image in LI, Wei, Qiangzu Minju Wenhua [Folk Residence Culture of Qiang Nationality] (Chengdu: Sichuan Fine Arts Publishing House, 2009, ISBN 978-7-5410-3913-3), p 39.

与此同时，在更大的尺度上的区域性投资，例如修建水电站和沿杂谷脑河的高速公路以及建造硬质护坡和河岸，造成了植被的损失。这加速了人工水渠的建造和减少了水的自然积蓄(图1.5)。震后，大规模的政府投资正在促进整个地区的重建。这在另一方面加剧了为保存文化认同、生态可持续发展、减灾及生态平衡、公平的经济增长所面对的挑战。

桃坪的发展保持了在结构上整合以及缓慢砌筑的传统建筑，但它处在这些复杂的趋势之中。在古建保护方面，地震后，媒体和文化遗产保护部门大力宣扬传统施工工艺,例如宣传其有特殊的抗震性能。桃坪坐落于距离地震带17公里处。虽然地震导致了大部分的传统建筑不再适合居住并迫使村民居住在临时的帐篷中，却没有造成较大的生命财产损失，建筑结构的损失也较其他村落为少（图1.6）。虽然，科学分析不能完全证实这是源于桃坪村寨的选址和结构。但桃坪因其村寨建筑的抗震性能而被国家文物保护局而评定为“重要的国家文物保护基地”。

在地震发生之前，桃坪村民将他们自己的大量资产投资到旅游业中。这包括建筑一座新村来容纳到桃坪的旅游者。 在新村中的住房是用半传统和半现代的技术建造的预应力混凝土住房。每一栋房子是由单个家庭建造。为了新村的建设，村民不得不放弃了大量的农田。（图1.7、8、9）这个规划方案从一开始就矛盾重重：将近三分之一的村民没有参与并且拒绝领取援助款。一些村民希望建设新村并领取了援助款，但在地震之前还没有开始动工。

图 1.5 在杂谷脑河畔的桃坪旅游新村

图 1. 6 地震对桃坪的影响：(左)对历史村寨的损害；（右） 演场上政府分发的蓝色帐篷和居民建的临时住房。

图 1.7 旅游开发之前的桃坪

图 1.8 旅游开发之时的桃坪 2007

图 1.9 地震之后的桃坪 2009年7月

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Meanwhile, at a larger scale, regional investments in hydropower dams and highways along the Zagunao River, and the armoring of slopes and riverbanks, have caused the loss of aquatic life, accelerated drainage and reduced natural water retention (Figure 1.5). Post-earthquake, large-scale government investment in the reconstruction of the entire region has added fuel to all these developments, possibly exacerbating challenges that existed before for the preservation of cultural identity, ecological sustainability, hazard mitigation, and balanced, equitable economic growth.

Figure 1. 10 New Taoping tourist village on the Zagunao River, July 2009.

Taoping illustrates all these trends, even as it is celebrated for its traditional architecture of structurally integrated houses and slow-cured masonry. Moreover, since the earthquake, the media and heritage preservation authorities have promoted Taoping's traditional construction techniques as having special seismic resistance. Taoping is located just 17km from the earthquake fault, and although the quake rendered most of the old buildings uninhabitable, forcing residents to live in temporary shelters, the villagers suffered very little loss of life or limb and structural damage seemed to be less than in most other villages (Figure 1.6).

Scientific analysis has not yet verified this fact, or whether it is due to Taoping's siting and construction, but in the meantime the central State Administration of Cultural Heritage designated Taoping a "key national heritage site", partly in response to the village's possible seismic properties.

Before the earthquake, Taoping families invested many of their own resources in tourism, including the start of construction of a new village to cater to tourists adjacent to the old village. The new village was to consist of large detached, reinforced-concrete houses in quasi-vernacular style, each constructed by an individual villager family with a combination of private funds and a government grant. In the process, the village sacrificed much of its agricultural land (Figures 1.7, 8 and 9). The plan was controversial from the start: approximately one-third of village households did not participate, and refused to take their grant. Others were willing to build and took their grant, but did not start construction before the earthquake struck.

Figure 1. 6 Earthquake impacts in Taoping: (a left) damage t houses; (b right) government-issued blue emergency tents and resident-built temporary shelters occupying the main outdoor performance space.

Figure 1.7 Taoping prior to development of new tourist village.

Figure 1. 8 Taoping clearing agricultural land for new tourist village, c.2007.

Figure 1. 9 Taoping with new tourist village construction aborted after earthquake, July 2009.

地震发生后，县级政府已延期建设自建旅游发展新村(图10)。相反，使用中央政府灾后的重建经费和技术援助以及来自湖南省的援助，理县计划“统一发展的一个新的旅游村”，而这将比以前使用更多农业用地（图1.10)。

对于湖南的设计院制定的方案（图1.11)，目前还不清楚桃坪每个家庭的风险和收益。这些居民对已经投资建造的房屋没有任何明确的追索权。政府也没有提供新的资金来补偿，村长制定的优先政策（用其他家庭早些时候已经拒绝接受的资金来补偿）也是颇有争议的。在此期间，这个村庄历史遗产保护设计被指定给一家在北京从事建筑设计、施工的公司。在我们实地调查的2009年夏天，无论是当地村民，甚至乡级官员都不清楚历史重建保护规划的具体内容。

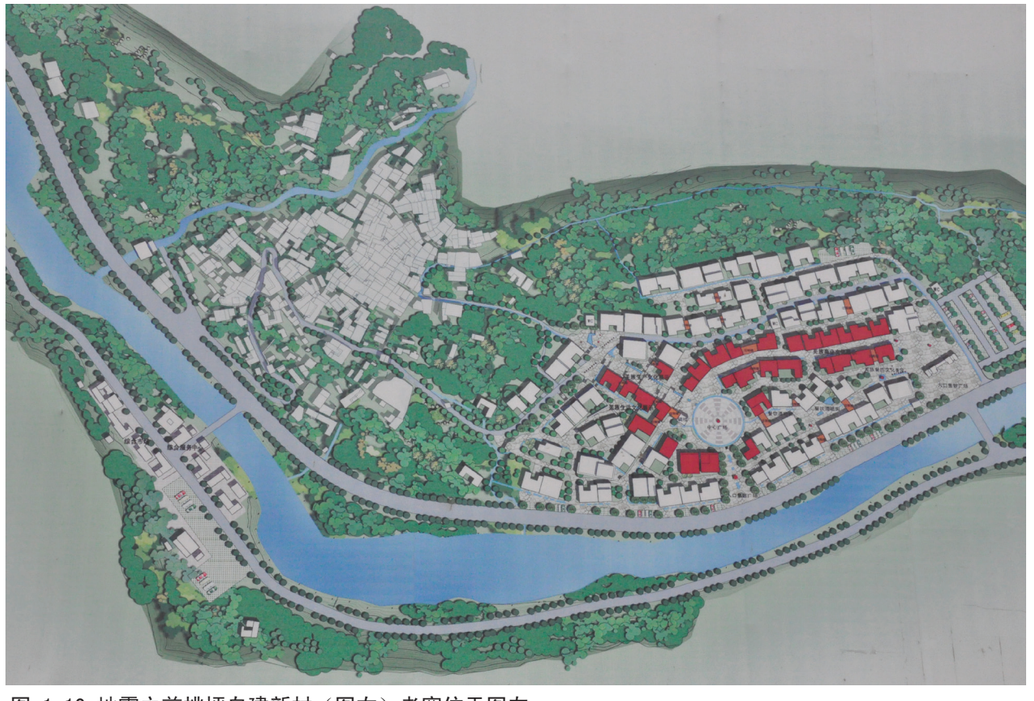

图 1.10 地震之前桃坪自建新村（图右）老寨位于图左

图 1.11 地震之后统建的新村

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After the earthquake, the county government put a moratorium on further construction of the village's self-built new tourist development (Figure 1.10). Instead, using central government-coordinated post-disaster reconstruction funds and technical assistance from Hunan Province, the county plans a "unified development" of a new tourist village, which would consume even more agricultural land than the original new village did (Figure 1.11).

It is not clear what share of risks and benefits individual Taoping families would have according to the new plan. Those residents who had already invested in building houses in the original new village did not have any clear recourse. The government offered no new funds to compensate them, and the village head's preferred policy – to compensate them using the grants that other households had earlier refused to take – was highly controversial. In the meantime, the historic village's heritage preservation designation put responsibility for the reconstruction of the old houses in the hands of a firm in Beijing specializing in historic architectural design and construction. As of the time of the summer field survey, no residents or even lower county officials had any knowledge of the status of the historic reconstruction plan.

Figure 1. 10 Pre-earthquake plan of self-built new tourist village in Taoping (on right; old village is on left).

Figure 1. 11 Post-earthquake plan for "unified development" of new tourist village.

The BE LAB ENGAGES TAOPING

The BE Lab devoted three quarters of 2009 to address the challenges facing Taoping, and develop a model of resilient, sustainable disaster recovery for fragile mountain valley settlements throughout the region and beyond. The team organized a sequence of courses including: a preparatory seminar and expert workshop and charrette at UW in Spring Quarter; a one-month Summer Quarter field studio in southwest China; and a 3-month design and planning studio at UW in the Autumn Quarter. A summary of these activities is included in Appendix A. However, since the summer field studio bears most directly on how the autumn studio approached its task, more detail about the field studio follows here.

The first half of the field studio involved a study tour of cultural and natural heritage preservation districts and reserves, including the historic districts of Kuan Zhai Xiangzi and Jingli in Chengdu; the World Heritage City of Lijiang, its outlying villages of Baisha and Shuhe, and the Wenhai Ecolodge on Jade Dragon Snow Mountain, in Yunnan province; the World Man and Biosphere Reserve of Jiuzhaigou National Park, and the Dujiangyan hydro-engineering World Heritage site, in Sichuan province. The second half of the field studio involved survey work in Taoping itself and other Qiang and Tibetan villages in the Zagunao River valley, and a design charrette that generated ideas which the students presented to county officials and villagers.

The survey of Taoping and other Zagunao villages revealed the patterns of settlement and development trends described above. For the charrette, students in the summer field studio chose to design according to one of four development scenarios or directions for Taoping itself, each based on different planning assumptions. These were: Complete Reconstruction, Restore the Natural Character, Balanced Development, and Regionally Integrated Planning.

Draft 30 March 2010

建成环境工作室参与于桃坪事务之中

我们的建成环境研究工作室用2009年的九个月时间来研究桃坪所面临的挑战，并建立一个区域甚至跨区域的模型来在环境破坏严重的山谷聚居区施行可持续的灾后恢复重建。这个团队组织了一个序列的课程包括:春季预备研讨会，专家工作坊 和互动交流创作课（charrette）；暑期一个月对中国西南地区的实地考察；秋季为期3个月的规划与设计课。附录A总结了这些活动。因为夏季的实地调研直接与秋季的课程相关， 以下将介绍有关实地调研更多的细节。

实地调研的前一半是深入旅游文化和自然遗产保护、区域历史古迹学习研究，这包括成都的宽窄巷子和锦里；世界文化遗产之城丽江及白沙、束河古城；云南玉龙雪山之中的文海生态旅馆；世界级生态自然保护区九寨沟国家公园；世界文化遗址都江堰水利工程。实地调研的后一半包括在桃坪和其它在杂谷脑河谷以内村寨的实地调研以及一个互动交流创作课（charrette）。 其中，师生一道与理县主要官员和桃坪村民分别进行了交流讨论。

在桃坪和其他村寨的实地调研显示了乡村聚落模式与发展趋势，这正如以上所描述的。在互动交流创作课（charrette）中，学生们在以下四个规划开发构思的前提下进行设计创作。这些前提是:完全重建、恢复自然风貌与农业特征、均衡发展、区域整体规划。

完全重建构想是指被地震摧毁的新村会被重建到相同或是更高的密度。该模型着重于旅游经济和创造适宜旅游者的环境。特别的构造物和其它展示区域的开发将优先于不直接服务旅游业的农业用途。在这种情况下，历史文化保护可以包括原有结构的复原和新建建筑物的仿旧。

第二个构思“恢复自然风貌与农业特征”假设未来的开发不是重建新村， 而是恢复从前占主导地位的农业土地利用。在该模型中，旅游和其他的经济增长点取决于和次要于农业。

均衡发展是第三种选择。它是对前两个选择的一种综合，并且将新村开发和传统的农业相结合。在这种情况下，新村建设规模缩小为仅容纳不再想留在旧村的居民。旅游业存在于新和旧的村庄，但不会支配她们中的任何一个。

区域一体化规划并不是一个要替代前面三种构思,而是让学生有机会专注在更大的尺度上的考量。这种构思显示区域内的所有社区都可以分享旅游业发展的成本和收益，以及减灾、反应和重建工作。

在将学生们的作业中的经验教训和去文海、丽江、九寨沟、都江堰的经验总结起来，老师学者们提出了一套桃坪规划的原则——“桃坪五点”:未来桃坪羌寨开发的宣言。

1. 桃坪新村的开发不应该过于急促,而要循序渐进。在适当的步骤中，地震后必须首先和快速解决居民的居住；但是这种快速的住宅重建努力不应被误认为是长期与适宜的可持续发展的规划。

2. 经济发展可以采用多种方式，旅游、农业和生态保护应有机结合。他们并不是相互排斥的，也不能互相隔离。

3. 保存历史应该把桃坪羌寨视为一个活着的实体。应该允许居民生活和使用历史保护区；历史桃坪羌寨不应该仅仅成为一个博物馆展出的文化遗产，这些遗产也并不限于只有建筑，也应包括她的文化景观；其遗产是自然也是文化的。

4. 计划和管理杂谷脑河流域为综合性的一体，将其设计为一个完整的生态旅游廊道，而不是作为一个个分散的小点。为了避免河流变窄，道路宽度应被限制；可借鉴九寨沟的规划经验、限制和减少私人机动车交通和使用公共交通系统连接各景点。

5. 考虑建立一个区域管理单位，将血缘亲属关系作为一种联系模式，以确保所有的居民获取平等利益与发展，而后积极参与管理建设。

桃坪居民在村寨主要的会议厅参加了建成环境研究小组的互动交流研究成果（charrette） 的汇报(图1.12)。多数村民都表达了更偏爱“均衡发展”的态度，但两倍的居民倾向于“恢复天然性格”而非“完全重建新老村庄”。尽管旅游业带来了越来越多的财富，村民并不愿放弃他们以农业为基础的生活，也不想以牺牲环境作为旅游开发的妥协。年长的居民尤其想继续生活在历史老村中。令村民大感沮丧的是缺乏重建的信息，虽然他们已经收到了重建的计划但他们无法影响开发的形式和时机。许多村民说我们的研究小组是第一批与他们交流重建的人员。村民们有着一种无法控制他们村庄命运的恐惧。目前村民们不得不面对呆在临时房屋中的困难，却不知道会如何或在什麽时候修理他们的老房子。所有这些村民的反应形成和影响了我们规划设计课的基础。

图1.12 桃坪村民残余建成环境小组夏季调研小组的成果展览

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The “Complete Reconstruction” scenario assumed that the new village, whose construction the earthquake aborted, was to be rebuilt at the same or higher density. This model embraces the tourist economy and emphasizes a tourist-friendly environment. Specialized structures and other display areas would take precedence over agricultural uses that do not directly serve tourists. In this scenario, historic preservation could include both reconstruction of old structures and new construction in the old style.

The second scenario, “Restore the Natural Character,” assumed that rather than rebuild the new village, the formerly dominant agricultural land use should be restored. In this model, tourism and other bases for economic growth are dependent on and secondary to agriculture.

“Balanced Development” provided a third option to integrate the first two options, and combine new tourist development and traditional agricultural practices. In this scenario, the construction of a scaled-down new village would primarily serve residents who no longer wish to remain in the old village. Tourism could be accommodated both in the new and old village, but would not dominate either.

“Regionally Integrated Planning” was not really an alternative to the previous three scenarios, but rather an opportunity for students to focus on a larger scale of considerations. This scenario would illustrate how all communities in the watershed could share in the benefits and costs of developing and accommodating tourism, as well as of hazard mitigation, response and rebuilding.

To connect the students’ work to the lessons learned from the visits to Lijiang, Wenhai, Jiuzhaigou and Dujiangyan, the faculty developed a set of general principles for Taoping’s planning, called the “Taoping Five Points”: a Statement on the Future Development of Taoping Qiang Village:

1. The development of New Taoping Qiang Village should not be rushed, but should proceed gradually, in a proper sequence of steps, bearing in mind that re-housing residents after the earthquake must be addressed first and quickly; immediate re-housing efforts should not be confused with long-term plans for appropriate sustainable development.

2. Economic development should be approached in multiple ways; tourism, agriculture, and ecological preservation should be combined organically; they are not mutually exclusive, nor can they be addressed in isolation from each other.

3. Preservation should treat historic Taoping Qiang Village as a living entity. Residents should be allowed to continue living within and using the historic district; historic Taoping Qiang Village should not simply become a museum to exhibit to visitors; Taoping’s heritage is not limited to its architecture, but includes its cultural landscape as well; its heritage is both natural as well as cultural.

4. Plan and manage the the Zagunao River Watershed as an integrated whole, and design it as a complete ecological tourist corridor, not as a collection of dispersed individual points. In order to avoid the channelization of the river, roadways should be limited in width; drawing on the experience of planning in Jiuzhaigou, restrict and reduce private motor vehicle traffic and use public transport to link up each attraction.

5. Consider establishing a regional management entity that would take current inter-village kinship-based relations as a model to ensure all residents obtain benefit from development and actively participate in it.

Of the residents who attended the group’s presentation of charrette results in Taoping’s main assembly hall (Figure1.12), most expressed a preference for “balanced development,” but twice as many residents preferred “restore the natural character” to “complete reconstruction” of both new and old parts of the village. Despite the greater affluence that tourism brings, many residents did not want to abandon the agricultural base of their livelihood, or to compromise the environment. Older residents especially wished to continue living in the historic part of the village. Residents spoke with great feeling and frustration over the lack of information they had received about plans for their village, and their inability to affect the form and timing of development. A number claimed that the BE Lab had been the first group to present any plans to them at all. The most heartfelt expressions concerned fear that residents were losing control of their village’s fate. It was especially difficult for them to remain in their temporary housing, not knowing how or when their old houses would be repaired. All of these responses shaped the final studio’s work in fundamental ways.

Figure 1. 12 Taoping residents attend BE Lab summer field studio presentation.

华盛顿大学城市设计课

这份报告的主体是2009年建成环境工作室的最终成果。这个工作室是秋季三个月的城市设计和历史保护课程，并致力于创作详细的桃坪灾后重建的设计思想。这个工作室和设计课程由艾丹教授主持，博士生龚岳担任助教。共有11名学生报名参加，另有一名学生参加了部分课程研究。其中，三名同学参加了春季的研讨会和夏季的实地调研(Ching Chan, Jason Hutto,和 Nathan Tseng)；另有三名同学参加春季的研讨会(Meng Cai, Magda Celinska, 和 Scott Williamson)，其余六人是第一次接触这个设计保护课题(Allan Co, Cecelia Gunn, Ashle Fauvre, Garrett Klifman, Carlene Thatcher-Martin 和 Joni Wilm)。

基于春季的研讨交流和夏季的实地调研，秋季工作室提出了一套灵活重建计划：依靠一个组合策略和多样化的自给自足的旅游开发。从安全和预防灾害的角度，工作室认识到无论多大的基础设施的改善都不能防止滑坡经常堵塞道路和隔离整个山谷。结果，旅游业本身不是一个可靠的生活来源——尤其是这样短时间访问和高流动动性的旅游。因此，有需要继续当地的一种自给自足，如同“备份”或“应急”的基础农业：这也就如同提供一个新的资源，为“慢速旅游开发”或农业旅游提供辅助。该方法不仅最有弹性，也在文化底蕴和民族认同上备受推崇；它最能保持生态平衡，也是最理想的社区所有制和管理体制。

在以上基本策略的前提下，工作室成员Magdalena Celinska, Ashle Fauvre 和 Scott Williamson率先计算村庄居民和游客展开自给自足的环境承载力。这一计算是基于对现有人口、农业资源的生产力以及污水污物处理的自然方法。这能确定有多少土地需要恢复到农业土地利用，又有多少土地将被用于建造新屋。以下表1-1表示农业资源的生产力的计算。第5章更具体地讨论污水污物处理的自然方法，以及别的修复生存环境的自然功能。

另一部分的学生参与了解决短期内震后住房困难问题，长期内的保护古建筑特征的问题；恢复保存自给自足的农业；以及污水生态处理、多样化协调不同类型的旅游村和整个杂谷脑河谷的关系问题。这些解决方案包含在以下的论述中，它们中一部分对应于暑期实地调研的“桃坪五点”，其他则是新的创意和策略。

即时提供耐用的震后住房不需要与长期持续发展的土地利用开发与传统建筑实践相妥协。为了说明这一点，工作室的Carlene Thatcher-Martin（第3章)提出了一个紧凑的新村方案。方案以单个家庭为单位的核心房屋能很快的建成并可逐步扩大。随着时间的推移，新村的房屋会越来越多并拥有老村一样的集成特性。这些特点甚至可能包括传统石材，如果未来可以预期，村民快速恢复住房的压力也能得以减少。Jason Hutto（第2章)，示范了如何在新老村庄容纳游客和居民：当很多居民仍然在新村居住，而另一些人则回到老村，让出新村的部分空间给游客。Jason的章节处在Carlene之前，这是因为虽然他使用Carlene的新村平面作为研究的基础，但他的章节讨论了最直接和基本的问题：什么类型的家庭重建需要面对何种不同的情况，以及这些策略考虑是如何影响整个发展的阶段性。

老村的重构，包括修建地震之前就已存在的不同的房屋，这样做，就不会丢失宝贵的历史资料以及村民重建传统房屋的能力。为了说明这一点，工作室成员Garrett Klifman 和 Nathan Tseng（第四章)分析了建筑在不同年代和不同地震受损状况上的空间分布，以揭示设计导则在何处应着重于历史保护，而在何处则能更灵活应用而又不牺牲和历史语境的相容性。他们将 “兼容” 定义为继承原有历史建筑的高度和体量、开窗、地块足迹的形状、基地面积和形状等等，而不是完全地模仿传统细节和形式。

灾后重建给桃坪提供了一个增加多样化旅游业以及加强生态可持续发展的机会。文化、生态、建筑与景观是相互依存、相互建构的。充分理解这一点后，旅游发展就不需要取代传统并且减少对原有生活环境的冲击。重建的过程，及可持续发展的新建筑和基础设施，可以成为旅游胜地的一个部分，并让游客有机会参与到重建之中。为有助于理解这一点的可能性，工作室成员Allan Co, Ashle Fauvre 和 Scott Williamson（第5章)提出了一项计划将原有部分的新村开发恢复为地震前的农业用地。这个计划包括一个系统的生态运河和湿地以处理废物，一个科学教育中心来解释和展示的桃坪的生态处理功能。这个新计划并不完全删除地震的遗迹而是通过合并一些在地震中幸存下来的新村房屋结构以保留住震前开发的记忆。Magdalena Celinska 和 Joni Wilm（第6章)为桃坪规划了生态教育、旅游自愿者和农业旅游者参与的活动。这些活动包括参与和学习实际改造和修复过程，以及其他将游客和当地村民组织在一起的文化、生态农业活动。

庄稼	每平方米农地的猫收益（斤）	劳动密集度
小米	.84	中
荞麦	.25	低
冬小麦	1.33	低
大麦	.32	低
土豆	3.13	高
豆	.138	中
苹果	7.04	高
核桃	1.23	不明
椒	.889	不明
平均	**1.68**	中
多种栽培	**8.05**	高

表1-1. 桃坪能生产的典型庄稼的猫收益。
Sources: http://factsanddetails.com/china.php?itemid=404&catid=5&subcatid=87. An Analysis of Farming Systems in Quang Ngai Province. Hoang Thi Ngoc Nam URS Sustainable Development, 04/03/2007.

主要假定与计算：
1. 现有人口：大约500人（98户，每户平均有5人左右）
2. 新寨总建设用地面积（每户能建一栋新住房、平均宅基地面积100平方米、10%土地用为基础设施和道路）：9800+1000=10800平方米
3. 现有农业生产的需求：45341.61平方米（每人需要730斤，所以每人需要90.7平方米农地）
4. 总土地面积（不包括古寨历史文物站的地）：151,101平方米
5. 为农业可使用土地面积（减25%为基础设施、陡坡地）:113,325.75平方米
6. 为游客或新居民能使用的农地面积：113325.75-67984.14-10800 = 34541平方米左右
7. 游客或新居民的承载力：34541/90.7 = 380

所有游客或新居民得住在古寨里的历史住房与新寨的98栋新住房。

2010年3月30日草稿

UW TAOPING DESIGN STUDIO

The body of this report represents the final stage of the 2009 BE Lab: the work of a full-quarter Autumn urban design and historic preservation studio carried out on the UW campus and devoted to the detailed development of design ideas for Taoping's recovery. Prof. Dan Abramson, assisted by doctoral student Yue Gong, led the studio. Eleven students enrolled for full credit and one student participated for partial credit through an independent study arrangement. Three of the students had participated in both spring prep seminar and the summer field studio (Ching Chan, Jason Hutto, and Nathan Tseng); another three had participated only in the spring prep seminar (Meng Cai, Magda Celinska, and Scott Williamson); and the remaining six were new to the topic (Allan Co, Cecelia Gunn, Ashle Fauvre, Garrett Klifman, Carlene Thatcher-Martin, and Joni Wilm).

Based on findings from the summer field survey; and making use of ideas generated in the spring and summer charrettes, the autumn studio proposed a flexible plan for the village's reconstruction that relied on a combined strategy of local self-sufficiency and diversification of tourist development. From the perspective of safety and hazard mitigation, the studio as a whole recognizes that no amount of infrastructure improvement will prevent the landslides that frequently block roads and isolate whole valleys. As a result, tourism alone is not a reliable source of livelihood – especially the kind of tourism that consists of quick visits and high mobility. There is a need, therefore, for continued local self-sufficiency, in the form of "back-up" or "emergency" subsistence agriculture, that can also double as a resource for new, "slow" tourism or "agritourism" when accessibility is good. Not only is this approach the most resilient; it is also the most respectful of cultural heritage and ethnic identity; it is the most ecologically balanced; and it is the most capable of community ownership and management.

With this general strategy in mind, studio members Magdalena Celinska, Ashle Fauvre and Scott Williamson took the lead in calculating the self-sufficient environmental carrying capacity of the village for both residents and tourist accommodation, based on the existing population of residents, the productivity of agricultural resources, and the natural treatment of waste. Thus they determined how much land would need to be restored to agricultural use, and how much land would be available for construction of new housing. Calculations of productive carrying capacity are shown in Table 1-1 below. Waste treatment capacity is discussed in Chapter 5, on Bioremediation.

Specific teams of students then developed short-term solutions for post-earthquake housing difficulties, as well as long-term solutions for preservation of architectural character; restoration of agricultural self-sufficiency; ecologically sustainable wastewater treatment; and diversification and coordination of different types of tourism in the village and throughout the Zagunao River valley. The solutions serve to illustrate the following arguments, some of which responded to the Taoping Five Points established during the summer field studio, and others of which were new.

Crop	Gross yield per sq.meter (pounds)	Labor Intensity
millet	.84	Med
buckwheat	.25	Low
winter wheat	1.33	Low
barley	.32	Low
potatoes	3.13	High
beans	.138	Med
apples	7.04	High
walnuts	1.23	unknown
pepper	.889	unknown
average:	**1.68**	**Med**
polyculture	**8.05**	**High**

Table 1-1. Yields for sample crops that might be grown in Taoping. Sources: http://factsanddetails.com/china.php?itemid=404&catid=5&subcatid=87. An Analysis of Farming Systems in Quang Ngai Province. Hoang Thi Ngoc Nam URS Sustainable Development, 04/03/2007.

Key assumptions and calculations

- Current Population: approximately 500 people in 98 households
- Current Agriculture needs: 45341.61 sq m (since a person needs 730 lbs, each individual needs 90.7 sq m)
- Assuming each household is allotted one new plot, the average plot for new housing is 100 sq m, and 10% of land is needed for infrastructure and circulation, the total required land for new housing plots is approximately 9800 + 1000 = 10800 sq m. for the new village construction.
- Total land not occupied by historic village structures:151,101 sq m
- Assuming 75% is usable after steep slopes, infrastructure and circulation are counted, there is 113,325.75 sq meters of useable agricultural land
- Land available for growing food to accommodate tourists/new residents: 113325.75 - 67984.14 - 10800 = approx. 34541 sq m
- Capacity for tourists/new residents: 34541/90.7 = 380

It is assumed that all tourists or new residents will be accommodated in a combination of old village houses and the 98 new houses.

灾后可持续的恢复，最终取决于杂谷脑流域内村寨和基础设施的协调发展和管理。工作室提出的对策虽然只针对桃坪，但这些措施可作为一个模型应用在其他乡村。为了最大化这一模型对区域的影响，工作室成员 Ching Chan 和 Cecelia Gunn（第7章）对理县全杂谷脑河流域的旅游发展提出了一套战略性措施。为了减少建设对环境的影响，高速公路将保持在当前位于桃坪村跨过杂谷脑河的位置而不被移动。通过道路管理，兼顾公共交通、商业的交通和限制私人客运车辆，而非增加车道数量和公路宽度， 使交通得到改善。一个区域系统化的标识、地图、指南和其他营销工具将有助于促进山谷的多个村寨形成特定的、多样化的旅游景点以吸引不同类型的游客、多样化的旅游景点以吸引不同类型的游客，而不是让每个村庄都去尝试所有的旅游项目。

新的治理结构利用现代的和传统的社会关系（如氏族或家庭），并保证公平的机会。这应有助于扭转一些负面的趋势：减少社会和邻里的分裂，提高集体竞争和决策的能力。为此，基于夏季对桃坪氏族、住房和土地所有的研究，Ching Chan（第7章）提出了利用村寨范围的合作协会来管理多方面的旅游发展。这些合作协会由代表不同家族的委员会来轮流管理。

所有这些思想的具体实现取决于更大程度的研究实践和更多的当地村民对于社区的参与，这已超出工作室在2009年内的研究成果。然而，通过这种叙述故事的过程，我们可以发现物质、经济、生态和社会行为可以整合在一个持续恢复的过程中。工作室奠定了进一步讨论和研究的基础。我们希望桃坪和其它在岷江流域的羌藏村寨能发现这一项研究是非常有价值和实用的。到那时，以社区为基础的活动与开发将付诸于实践。

感谢

2009年建成环境工作室非常感谢一下团体对我们调研的鼎力支持：桃坪村民；华盛顿大学建成环境学院院长办公室；华盛顿大学Jackson学院东亚国际研究中心；四川大学设计研究中心；华盛顿大学与四川大学本科生交换计划；理县政府；桃坪乡政府；九寨沟国家公园；丽江、大研古城管理局。

并且我们特别感谢以下个人：Eddie Schmitt（史乐问）先生，华大-川大交换项目管理经理；龙晓琼女士，桃坪向导和居民；朴伟馆长，理县文化馆；第宝丰博士，四川大学环境科学学院讲师；艾南山教授，四川大学环境科学学院；祁郁女士，四川大学考古学博士候选人

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图1. 13 参与2009年夏季桃坪实地调研的师

2010年3月30日草稿

The immediate provision of durable post-earthquake housing does not need to compromise a long-term land-saving development approach that continues important traditional building practices. To illustrate this, studio member Carlene Thatcher-Martin (Chapter 3) proposed a compact new village of individual household lots with small, quickly-buildable core housing units that could be gradually enlarged. Over time, the new village would increasingly take on the integrated characteristics of the old village. These characteristics could even include traditional masonry, if a measure of predictability of tenure were introduced to reduce pressure on residents to build quickly. Jason Hutto (Chapter 2) demonstrated how both old and new villages would accommodate a mix of tourists and residents, as some residents remain in the new village while others return to the old, leaving space in each for guestrooms. Jason's chapter precedes Carlene's because although he uses Carlene's new village plan as a basis for illustration, his chapter addresses the most immediate problem of what types of re-housing needs are facing families in different situations in Taoping, and how that consideration influences the phasing of the entire development.

The reconstruction of the old village can include buildings that vary in the degree to which they literally recreate structures as they existed prior to the earthquake, without compromising either the loss of valuable historic information or the ability of residents to re-inhabit their old homes. To illustrate this, studio members Garrett Klifman and Nathan Tseng (Chapter 4) analyzed the spatial distribution of buildings of different ages and levels of earthquake damage to discover where reconstruction design guidelines should require more literally historic restoration, and where the guideline can be more flexible without sacrificing historical and contextual compatibility. They defined "compatibility" as adhering to fundamental rules of building height and mass, fenestration, lot and footprint shape and size, etc., rather than literal mimicry of historic details or overall form.

Disaster recovery presents an opportunity for increasing and diversifying Taoping's touristic significance as well as enhancing its ecological sustainability. Culture and ecology, architecture and landscape, are mutually dependent and constitutive. When this is understood, tourism development need not replace traditional, environmentally low-impact forms of livelihood. The process of reconstruction, and the sustainability of new building and infrastructure, can themselves become a part of the tourist attraction, and provide visitors with a chance to become involved in the recovery itself. To illustrate these possibilities, studio members Allan Co, Ashle Fauvre, and Scott Williamson (Chapter 5) then developed a plan to restore to agricultural use the bulk of land that was cleared for new development prior to the earthquake. The plan included a system of living canals and wetlands to treat waste, and an interpretive center to explain and display the biological functions of the site. The new plan also memorialized (rather than complete erased) the pre-earthquake new village development, by incorporating some new village structures that survived the quake. Magdalena Celinska and Joni Wilm (Chapter 6) then programmed the site for a diverse array of eco-educational, "voluntouristic" and "agritouristic" activities. These would include participation in and learning about the actual reconstruction and bioremediation process, and other cultural, ecological and agricultural activities that bring tourists and residents together.

The sustainable post-disaster recovery of any village in the watershed ultimately depends on the coordinated management and development of all villages in the watershed, and the infrastructure that connects them. The studio proposed measures that could be implemented in Taoping alone, but ideally these measures would serve as a model for other villages as well. To maximize the regional effectiveness of the Taoping model, studio members Ching Chan and Cecelia Gunn (Chapter 7) proposed a set of development strategies for the Zagunao Valley. In order to minimize environmental impacts of construction, the main highway through the valley would remain in its current alignment, across the Zagunao River from Taoping. Transportation would be improved by managing existing road use, giving priority to public transit and commercial traffic and restricting private passenger vehicles, rather than by increasing the number and width of highways. A regional system of signs, maps, guides, and other marketing tools would help to promote the particular and diverse tourist attractions of multiple village destinations in the valley, to appeal to different types of tourists, rather than leave each village to try to be all things to all tourists.

New governance structures that make use of existing and traditionally meaningful community relationships (like clan or surname groups), and that guarantee equitable opportunities and outcomes for all community members, should help to reverse the current trend of social fragmentation, decrease competition between households, and increase collective decision-making capacity. To this end, Ching Chan proposed village-wide cooperatives to manage different aspects of tourist development. These co-ops would be governed by revolving committees of representatives from different surname groups, as identified by the summer surveys of housing and land ownership.

Actual implementation of these ideas would depend on much greater input and participation by the residents of Taoping and other community stakeholders than the studio could orchestrate in 2009. Nevertheless, by telling and illustrating a story that shows how innovative physical, economic, ecological and social initiatives can be integrated in a sustainable recovery process, the studio has laid a foundation for further discussion and alternative action. We hope that Taoping and other Qiang and Tibetan villages in the Min River watershed may find them useful, and that there will be time for community-based action to follow.

Acknowledgements

The 2009 BE Lab is grateful to the following groups for their generous support: The People of Taoping • The Dean's Office of the UW College of Built Environments • The UW Jackson School of International Studies East Asia Center • The Design Research Center of Sichuan University • The UW-SU Undergraduate exchange program • Li County Government • Taoping Township Government • Jiuzhaigou National Park • Lijiang Dayan Old Town Management Bureau

Special gratitude is due the following individuals: Mr. Eddie SCHMITT, Chengdu Site Manager, UW-SU Exchange • Ms. LONG Xiaoqiong, Taoping guide and resident • Mr. PU Wei, Curator, Li County Museum • Dr. DI Baofeng, SU Instructor in Environmental Science • Prof. AI Nanshan, SU Department of Environmental Science • Ms. QI Yu, SU PhD Candidate in Archeology

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Figure 1. 13 Faculty and students on the field trip to Taoping, Summer 2009

2010年3月30日草稿