

VULNERABILITY, RECONSTRUCTION AND MEMORY: EARTHQUAKE RECONSTRUCTION PROJECTS IN SICHUAN/CHINA

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Abstract

Natural disasters can cause complex multi-layered physical and social destruction, reconstruction is challenging. Facilities ranging from infrastructure to social amenities, industries or private residences need rebuilding. The situation is amplified by social de-stability of long-established or traditional communities. Local identity expressed strongly through regional architecture, cultural landscapes and evolving livelihoods are difficult to recapture. The 5/12 Earthquake in China forced a huge loss on the culturally rich and resourceful southwestern Sichuan province. It caused, for the first time, an open critical dialogue about shortcomings causing high vulnerability in a rapidly transforming communist regime. As a response, in the light of China's global development race, reconstruction projects started with incredible speed. Through 3 case studies involving different actors, methods and scope, the reconstruction process in Sichuan is evaluated. The paper is investigating if China is performing beyond physical reconstruction. It is common knowledge that during the last two decades, China's built and spiritual heritage has largely disappeared. Can the 5/12 Earthquake be an opportunity to use development in a positive realm and help grow stronger communities and preserve local identities?

Keywords: Vulnerability, Reconstruction, Livelihood, Culture, Architecture

Introduction

On May 12th 2008, a heavy earthquake unexpectedly hit the northwest of China, mainly the mountainous province of Sichuan and the bordering Gansu and Qinhai province. The earthquake reached a Magnitude of 8.0 Richter with its epicenter in Yingxiu Town in Wenchuan County, 90 km west/northwest of the provincial capital Chengdu. The earthquake lasted 2 minutes. It was still felt strongly 1500km away in the capital *Beijing*. Including many aftershocks, the earthquake left behind an estimated death toll of 69,134. 17.681 people are still missing. It was the deadliest earthquake since 1976 in Tangshan where 240.000 people died and the strongest since 1950 in Chayu, which read 8.5 on the Richter scale. Some 5 million buildings collapsed, mainly due to faulty, non-seismic construction even though the area is known to be risk-prone. Secondary hazards, such as landslides, rockslides and debris destroyed valuable farmland, infrastructure and employment providing industries. The direct financial cost is estimated at 865 Billion Yuan translating into a 5-year set back of the economy. The indirect cost is un-measurable. On top of material damage and human loss, heritage such as historic towns, minority settlements or cultural landscape are destroyed. In the realm of the Olympic games, it was the first time governmental media control was open. A local and international dialogue of China's shortcomings was established and provided the opportunity to monitor the reconstruction process. This essay focuses on three ongoing reconstruction projects regarding their physical and social

reconstruction performance. The first case compares the reconstruction of two farming villages, lead by the Chinese NGO 'Green Cross' promoting sustainable development through participatory planning. The second case is a government-led high profile upgrade of the former rural-industrial town 'ShuiMo' to a regional education and cultural tourist hub. A third study frames the town 'Hanwang', which was 100% destroyed. Hanwang will not be rebuilt. The ruins are foreseen to become a living outdoor memorial accompanied by a rescue-training centre. Essentially the essay will argue that China has not yet caught up to international recognized best practice. Rather, China uses its very own reconstruction methods, which seems to widely camouflage social reconstruction under the umbrella of architectural and cultural programming.

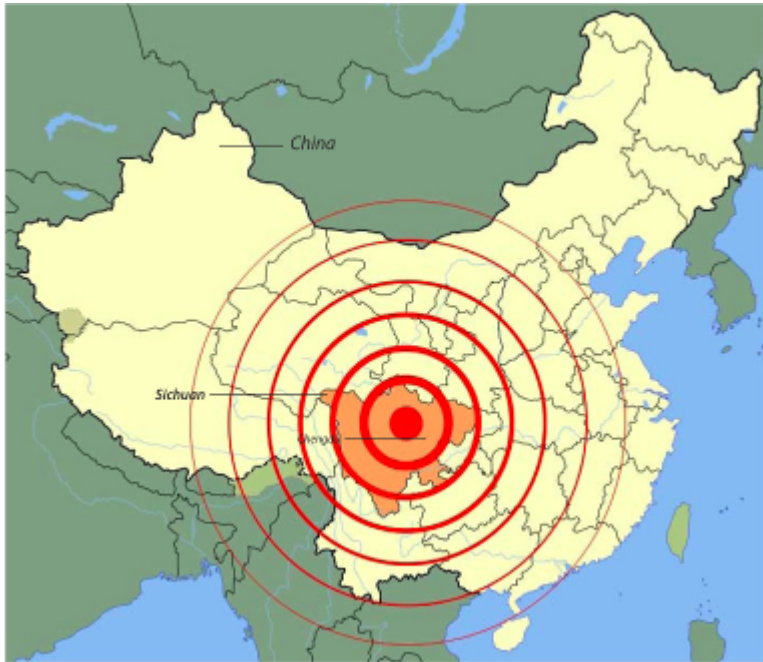


Fig. 1. Location of the Epicenter

Source: <http://earthtrends.wri.org/updates/node/316>

Research Methods

Two layers of reconstruction are monitored through three case studies, the physical and the social rebuilding process and how these two layers interrelate when it comes to cultural identity recapturing. As a starting research method to understand pre- and post-earthquake settings, some aspects are monitored under the concept of social and socio-spatial vulnerability. Vulnerability studies are the essential concepts in hazard research, mitigation and risk management over the last 50 years. Vulnerability can be understood as the potential of loss (Cutter, 1996). The general perception of vulnerability has changed to an understanding that disaster and risk are not solely triggered by natural or technological events but are socially constructed in daily life (Blaikie et al., 1994). The social vulnerability model helps to discover underlying social aspects. The socio-spatial vulnerability model falls back on geographic location and genius loci in combination with social aspects to fully understand a given local environment and its cultural dimension. Those two filters help to set parameters of the evaluation process.



Fig. 1. Hanwang Town Totally Destroyed by the Earthquake Source: Author's photos

Fig. 2. Homeless Local Farmer one and a half Years after the Earthquake

Fig. 3. Damaged Qiang Minority House

The three cases studies have been monitored over two years through field studies including interviews, workshops and on-site observations regarding physical and social rebuilding.

For a discussion of the outcome of this paper the underneath shown simple Model by the UNDP can be used questioning if development acts a generator or a savior against risk and vulnerability. Which development can be considered positive or negative? This enquiry is extremely relevant in the Chinese context being one of the fastest developing countries over the last century.

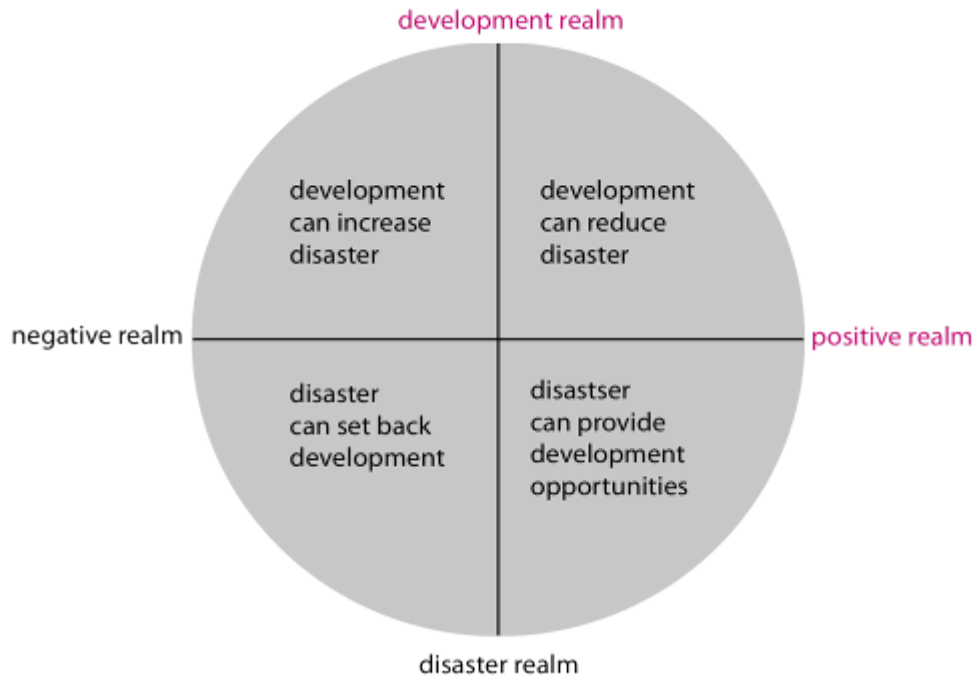


Fig. 4. Development and Reconstruction Relationship

Source: UNDP (2005). *Reducing Disaster Risk: A Challenge for Development*.

- Is the reconstruction process in Sichuan used to create development opportunities in a positive realm decreasing risk and vulnerability?
- Is local culture and identity part of the process?

Case Studies

1. NGO Efforts: Mianzhu Village and Shifang Village Reconstruction

The first case study compares the reconstruction of two rural villages initiated by the Chinese governmental Non-Profit Organization 'Green Cross'. Green Cross is promoting urban and rural regeneration through sustainable design, conservation of resources and environmental education. Cultural conservation and the establishment of self-sustaining communities by bringing in local green economies have been proven as a successful model since the funding of *Green Cross* in 2003. The following comparison lays open opportunities, but also difficulties and limits within small non-profit operations.

Mianzhu village and Shifang village are both located within the Deyang urban corridor about 90km away from Chengdu. In this region many high-tech factories have randomly spread in between rural farmland over the last 20 years due to cheap land-and energy prices. Nevertheless the high level of industrialization, the villages have not caught up with the booming global production around them. The farmhouses are of poor quality, mainly built by their owners without any construction knowledge, oversized in a sprawling arrangement with low hygiene. Farmers usually build on their own plot, which is lent for a 100-year period from the government. Local level building codes, laws or planning restrictions do not exist. During the 5/12 Earthquake, many farmhouses totally collapsed.

In Mianzhu Village, *Green Cross* collaborated with the Hong Kong University Round Table to assist a small community of 40 houses in constructing new rural homes. The farmers did have limited financial resources available. The government allocated additionally 17.000 RMB per family.

In a participatory planning process small units were designed sufficient for a livelihood of a typical farmer family with a possible second floor extension in the future. The units were attached sharing communal facilities and creating a better waste and energy system. Sustainable measures such as grey water reuse, biogas creation and recycling systems were installed. Local building materials were dominant. Roof forms and other features like door and window frames were designed in traditional Sichuan's building style to recapture cultural heritage. *Green Cross* assisted in setting up local industries such as organic farming and eco-farm tourism. The building and planning process went fast. Villagers took themselves responsibility in clearing and rebuilding. According to the *Green Cross* volunteers the most challenging task was to convince local villagers to participate in sustainable development.

The lack of knowledge seems the biggest obstacles to prevent vulnerability. Interviews showed that locals were not aware of their risk prone seismic location in Sichuan and thus not prepared in short- or long term recovery. By involving the local population in the planning process, the community capacity grew stronger. The awareness of people is high now. Mianzhu Village can be seen as a progressive regional pilot-project for small-scale development. It is meanwhile publicized and well known to other local governments.



Fig. 7. Mianzhu Village Sustainable Small-scale Farm Unit. Source: Author's photos
Fig. 8. Shifang Village Damaged Farmhouse Constructed from Local Weak soil

In juxtaposition, the second project of *Green Cross* demonstrates how non-profit organizations can struggle within their own limits and consequently are overruled by top-down governmental political decision-making process. Shifang is much bigger than Mianzhu village with 2000 units. *Green Cross* collaborated first with 'Foundation One', (a Hong Kong based charity). Instead of mobilizing and involving the local population Tongan University Planning Institute prepared an overall Master plan for the new village. The new village vision was emphasized on Sichuan small-scale rural tourism. The sponsor guaranteed 100% funding, which is beneficial for inhabitants but reduced the influence of both, the local community and *Green Cross* towards the planning process. The village was divided in different zones according to typical Sichuan themes such as tea, painting, water or grapes. Even though sustainability was not the major rebuilding motivation like in Mianzhu Village, environmental awareness still formed the base of *Green Cross's* involvement. The village space was to be reduced to one third of the original layout with two and three story houses featuring local architecture. Due to the large extent of the project funding and planning difficulties arose; the scope was to be too big for a small organization like *Green Cross*.

Foundation One could not find sufficient funding. Volunteers working on the project were too young and inexperienced. Consequently no work was undertaken until mid of 2009. The farmers were still living in temporary units within remaining debris one and a half years after the earthquake. There was no initiative by the villagers to clean up. Interviews revealed that the villagers were waiting for the government to clear and provide for new jobs. Most farmers lost their farmland and many are unemployed. The Chinese government used the earthquake as an opportunity to gain land for more industrial development in the Deyang region. In November 2009 Beijing City decided to be main sponsor for the reconstruction of Shifang Village. Although the planning was already far developed by *Green Cross*, Beijing City decided to alter the Master plan. Instead of a small tourist orientated community the villages size was blown up. A big plaza, an artificial waterfront with a large commercial area was introduced. The aim was to make a flagship rural recovery project and promote the strength of Beijing City local authority. All sustainable measures were eliminated and the architectural design standardized. In April 2010 the village was almost constructed. *Green Cross* responsibilities were reduced to economical training only, which was a disappointing outcome of their past efforts. Environmental education or preparedness training was not offered. From the beginning the community had no influence towards either the Tongan-*Green Cross* or Beijing City Master plan. Interviews proved that the local knowledge did not improve like in Shifang Village and the future seemed uncertain for most villagers.

This project can be read as an evolution on how a non-profit organization is attempting to follow their vision but realizes its limits in size and vision during this process. Finally the project was

changed into a themed commercial village rather than a soft tourist-orientated sustainable community. The success of this development is questionable. Shifang Tourist village will be surrounded by new infrastructure and industry without farmland.



Fig. 9. Shifang Village Tonggan University original Masterplan.

Fig. 10. Shifang Village Beijing City Masterplan revised 2009 version. Source: Green Cross NGO

2. ShuiMo - Government Steered Rebuilding

Shui Mo is a small rural-industrial town with 10,000 inhabitants nestled in a deep gorge of the Longshan Mountains within the Autonomous Tibetan Region 'Aba'. During the 80's dams were built to provide for high energy absorbing industries. This caused a typical mix of agricultural traditional farm settlements of the Tibetan minority population on the mountains and polluting industrial settlements along the river. ShuiMo is 60km away from the epicenter Wenchuan, only 95 people died during the earthquake but the building substance was declared 100% damaged. After the earthquake it was decided by the government to uplift ShuiMo into an Aba district educational, economical and cultural centre. One of the main motors in the governmental reconstruction process in Sichuan is the so-called 'Partnering Scheme'.

China unlike other countries does not have an independent governmental disaster agency. Instead rich counties are partnered with regions in Sichuan on a three-year basis to finance and manage reconstruction projects. Foshan, a large city of 5 million inhabitants in Guangdong province is the partner for ShuiMo's urban planning and reconstruction providing 1% of their local GDP. Beijing University Planning Institute was the main design force. This system is also foreseen to overcome fraud within the building industry, a well-known problem in China, which is often blamed to have caused the high loss during to the earthquake. The town vision is based on education and culture to form an eco-residential community with a self-sustaining economical base. Large-scale cultural facilities such as a cultural centre and museum are provided to celebrate the local Qiang minority population while serving as a recreational tourist hub. A new artificial lake inspired by Interlaken in Switzerland was introduced to promote ShuiMo as an ancient lake site town. A technical college hosting 10,000 students has opened with anticipation to double ShuiMo's population. A cultural street designed in traditional wood architecture including a performance stage and several city gates forms the new heart of the rebuilt town. At the east end of town, a new residential development in an alpine Tibetan style is overlooking the river. Most existing buildings were demolished regardless of their degree of damage and all factories including workers were relocated. Former urban dwellers would receive their living units for free with additional government funding. Farmers still have to provide most of their own funding for reconstruction similar to Mianzhu village with only 17,000RMB in government subsidy.

The planning process is top-down without any local involvement. Last year, Beijing Central government shortened the construction time to two years, which was still achieved under enormous stress by Foshan government. As a result of the time pressure, the finished quality on site was found to lack design details, and poor building and design quality. The construction costs were extremely high for a small town redevelopment. Sustainable measures were not followed, either in materials or amenities, which has been widely recognized as one of the principles for disaster reduction. One can say that ShuiMo is a success for the central government. It can also be considered an over designed theme park village rather than a successful recapturing of regionalism to serve the needs of local population to sustain their lives in the future. Any vulnerability upgrade will depend on tourism.



Fig. 11. ShuiMo: Newly Designed Ancient Street Source: Author's photos



Fig. 12. ShuiMo Before the Reconstruction

3. Hanwang-Recovery Through Memory?

As a contrast this last case is not about reconstruction but about how to capture memory in design. It has become clear during the research of the physical reconstruction in Mianzhu, Shifang and ShuiMo that cultural conservation and celebration, traditional architecture and art imitation including picturesque cultural landscape presentation are a core of many rebuilding strategies in Sichuan. This brief study can function as a summarizing reflection of the two factors, the physical and social rebuilding and the general confusion of cultural and social rebuilding in China. Hanwang town totally collapsed in the 5/12 Earthquake due to its unfortunate location right above the Longmen fault line. 4300 people died in Hanwang and all 60.000 inhabitants had to be relocated. 98% of all buildings collapsed including schools, hospitals and the main factory buildings. Hanwang was settled in this region during Mao's time as part of the 'Third Front Strategy'. This defense strategy was aiming to hide military production in isolated mountain areas. The Dongqi factory, which was the main employer in Hanwang produced large steam turbines. The vulnerable geographical setting in combination with non-seismic building standards formed the main reason for the high loss in Hanwang. Similar to the other cases there was no local knowledge about the earthquake-prone location. The ruins of Hanwang were kept after the earthquake, closed off to the general public with a possible outlook to create a memorial site within this dramatic setting. The existing ruins are extremely powerful to the visitor's eye.



Fig. 13. Hanwang Town Earthquake Scenery Source: Author's photos

Fig. 14. Hanwang town Earthquake Scenery

The deformation and distortion of the buildings are surreal in a ghost town environment where nature is slowly taking over. Interviews with the locals revealed that there is a favor for a memorial Site as the earthquake has strongly impacted their lives. Many farmers still live in temporary housing next to the ruins of Hanwang. In April 2009 Beijing Normal University and Hong Kong University collaborated to develop a design Vision Plan for a Hanwang Memorial Site, which would be combined with an Interpretive Center and an International Earthquake Rescue Center. The design of such a delicate site evokes much deeper implications. Hanwang is a prime example of how a global issue, in this case, a defense strategy, can create high local vulnerability. There are a few questions to start with: Will a memorial park built on a politically dangerous ground not cause anger instead of peaceful relief and respectful memory? Should this memory be captured? Can memory help to overcome disaster and loss be a positive reminder to be more critical about development in the future? Can the memorial Site form a future income for former Hanwang residents?

The final vision plan was very simple and proposed elevated landscaped walkways for visitors to observe the site. The old city of Hanwang was to be surrounded by a thick green layer to give a sense of eternity. The ruins were planned to be untouched with the result that they will disappear, taken back by nature in the future. The Rescue Center was set in the hillside and the Interpretive Center located at a scenic point for visitor to overlook the entire scenery of Hanwang's ruins. The new town of Hanwang is built only 5km away from the old center with yet unknown source of income.

In the Urban Design strategy for 'new Hanwang' the possibility of a memorial park and tourism was one of the main economic factors. Former factory employers have lost their jobs; much farmland has been destroyed or is used for infrastructural development. People are highly vulnerable here because of the pre-earthquake' monotype employment. This case demonstrates how a risk situation is completely socially constructed and could have been avoided from the start. After the design bid, funding for a memorial park was not granted even though development could have offered a positive impact regionally and locally.



Fig. 15. Hanwang Vision Plan: View over the Ruins of Hanwang
Source: HKU University / Author was member of design team

Research Results

As a general result, we can say that the pre-earthquake vulnerability in Sichuan on both levels, social and physical was high. Low education level, insufficient political involvement and missing policies and standards are just a few reasons to be mentioned. Historical development is also a main root cause, but will not be discussed here in detail. On the next page a table summarizes the post-earthquake results on physical and social realms to come to an overall evaluation on the status of vulnerability and development after reconstruction.

Discussion and Conclusions

Key Lessons Learned:

- China has not yet understood best practice of reconstruction
- Social reconstruction is camouflaged with architectural programming and cultural over presentation
- Political strategies are often not serving local population
- Only scale development are entering the positive realm
- Civil courage stays low
- Development in China is a mixture of scientific-mechanical Master planning and cultural plagiarism

Table 1. Case Study Comparison of the Social and Physical Realm

Source: Author

	Social Realm		Physical Realm		Overall Evaluation
	+	-	+	-	
Mianzhu Village: NGO + government steered	<ul style="list-style-type: none"> +Self-rehabilitation of a small community +Participatory planning process +New economic resource +Education and awareness of local population raised above 	<ul style="list-style-type: none"> -Only possible with guidance -Savings of locals are necessary -Only possible for a small community -Village committee must be motivated -A lot of preparation 	<ul style="list-style-type: none"> +Fast reconstruction +Simple functional layout +Low budget +Fit for local purpose +Each unit family individualized in design +Cultural identity in small details well kept 	<ul style="list-style-type: none"> -Local farmers do unsustainable self adjustment to their units -Only in locations with rural farming possible 	<ul style="list-style-type: none"> +Flagship project for a small scale non profit reconstruction +Role Model of sustainable community in the Chinese context +Vulnerability decrease
Shifang Village: NGO effort	<ul style="list-style-type: none"> +Beijing government speed up reconstruction +Free housing +Possible new income resource through agricultural tourism +Green Cross assists set up sustainable economy 	<ul style="list-style-type: none"> -No participatory planning -Long wait -Community capacity rebuilding not encouraged; Charity project -Community not active in clearing or reconstructing 	<ul style="list-style-type: none"> +Fast construction +Extensive housing and village amenities +Canal and commercial corridor 	<ul style="list-style-type: none"> -Not much thought of local identity -Over dimensioned spatial layout -Village character not well captured -Unsustainable -All pre-work of NGO banned 	<ul style="list-style-type: none"> -NGO project with good vision limited by its own nature in size and ambition -Political reasons delete original vision -Evolution from sustainable village to unsustainable themed tourist village
Shui Mo: Government steered planning	<ul style="list-style-type: none"> +Central government efficient and fast for large scale construction +Free housing for locals +People gain trust in government +New income resource; Tourism and Education +Factories and pollution has been removed 	<ul style="list-style-type: none"> -Top-down planning process -No community consultation -Program not according to local needs -Regional inequality -Farming population disadvantaged by citizenship -Charity project; no civil activism encouraged -Tourist concept, New ancient' city= risky -Job loss; relocation of factory workers 	<ul style="list-style-type: none"> +Earthquake proved structures +Fast rebuilding process +Extensive cultural programming with decorative buildings +Extensive educational amenities +Landscape restoration and lake side creation +Partnering: large funding +New identity of Town through architectural style 	<ul style="list-style-type: none"> -Detailing is poor -Buildings are over dimensioned -Minority design not authentic; especially color scheme -Unsustainable environmental and landscape design -Money overspend on décor and styles 	<ul style="list-style-type: none"> -Low social vulnerability pre-and post earthquake -The former Town has been totally removed and remodelled -Any original memory is lost through remodelling
Hanwang: University Initiative	<ul style="list-style-type: none"> +Memory and loss can be captured +Chance to reflect on pre-and post earthquake situation; mistakes and opportunities +New income for Hanwang +Capacity building by educating on earthquake 	<ul style="list-style-type: none"> -Possibility to steer anger—Possibility to offend death memory -Success and duration of memorial not foreseeable -Politically controversial for the government -job loss through factory closure and single employment source 	<ul style="list-style-type: none"> +Earthquake ruins interesting artifact of human development and nature in interaction +Spatial experience +Genius-loci capturing versus removing all earthquake relicts +Design innovation versus copying old 	<ul style="list-style-type: none"> -Difficult design scope -Ruins will be kept for many years in the region -Maintenance of ruins not simple -Safety issue -Budget high 	<ul style="list-style-type: none"> -Funding for memorial is not available -New Hanwang town is generic new town -Local population vulnerable; job loss and socially disturbed -Extremely high vulnerability post and pre earthquake

Memory, Loss and Identity

The case studies are observed and researched from a planners view on the base of social understanding hoping to communicate that rebuilding is a complicated multi-layered process, which includes more than just physical rebuilding of destroyed structures. A disaster damages assets and costs lives but also every day's life is disturbed. What we used to see, do, eat, smell might have suddenly be gone. Our whole experience has changed.

Culture and memory hold another dimension of loss that cannot be measured, but both are 'priceless' values above all economic and political debates. Culture is something concerning everyone; it is not about certain groups, agents or actions. What constitutes a sense of place and

how we can rebuild that sense of place after a disaster is a central question for a planner. Can we actually rebuild this sense at all and by which means can this be done? Cultural landscapes are extremely important in our perception, farmers are emotionally bound to their land, mountainous regions form different livelihood than coastal environments, and factory workers constitute their social network in their industrial environment. Origins translate further in traditions, lifestyles and are expressed in art forms, architecture and professions that come with it.

China likes to promote belief in local culture. Most Chinese people will tell you in great detail about the importance of traditions. In Sichuan it seemed culture was sprayed onto a surface of buildings, banners or contained landscapes for reconstruction. The deeper concept of memory, routines, traditions, arts and craft is barely understood. Social rebuilding of communities seems to be confused with this 'cultural banner' hoping to restart a better life, camouflaging and dismissing the past. Local needs are not well reflected and as the most critical part, civil engagement is still low, which as a final conclusion can tell us, that these places and people will stay vulnerable towards disaster and life in the near future.

Development has not been used to its full potential to form real opportunities after the earthquake. Hanwang Memorial Park had a potential chance to animate a better understanding of locality rather than falling into plagiarism. Walking up to those ruins, it is possible to breath in that sense of place, what it used to be and maybe meant for some. Even if it is a sad memory, it is an all overwhelming feeling for the acknowledgment of the past that one should never totally give up in order to be able to look in the future.



Fig. 16. Local Population near ShuiMo

Fig. 17. Mianzhu Village: Contented Local in the New Units by Green Cross

Source: Author's photos

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Author's Biography



Claudia Juhre obtained her diploma in landscape architecture at the Leeds Metropolitan University in 2001, followed in 2009 by a Masters in International Urban Studies at the Bauhaus University in Weimar. Her research interest focuses on the potential of community driven post disaster reconstruction. She has been teaching over the last 3 years in the Landscape Architecture and Urban Design Department of Hong Kong University. Currently she is a practicing landscape architect in Shanghai.