

Research Assessment Exercise 2020 - Impact Case Study

University: The University of Hong Kong (HKU)

Unit of Assessment (UoA): 17 – Architecture

Title of case study: JINTAI VILLAGE PROTOTYPE: A socially and environmentally sustainable post-earthquake reconstruction project in Western China, innovatively combining rural and urban features



The Jintai Village features an innovative roof design which responds to dense planning requirements by allowing for greater natural light and ventilation. The roof also provides individual household farming.

(1) Summary of the impact

In 2008 the Great Sichuan Earthquake struck China, damaging 30 million houses, affecting 46 million people, and leading to more than 100,000 deaths or missing. The reconstruction effort was immense and required the rebuilding of 47,789 villages. A conventional strategy is to rapidly develop row houses or similar to meet the urgent rehousing need. The Jintai Village Prototype, however, was unique in several ways. The research, design, and village rebuilding process went beyond the reconstruction of generic village houses and addressed the ‘rural-to-urban’ transformation of housing in China without losing its quick responsiveness to the urgent resilience needs after the tragedy. It did so by combining rural elements (e.g., rooftop farms) and sustainable village features, with a dense layout reminiscent of urban environments. Having won many architectural awards and been widely visited, published and discussed by experts and the general public in China and beyond, the project has had substantial impact not only on post-earthquake reconstruction but also more fundamentally on the development of efficient, sustainable and economical housing. The impact has involved three main audiences outside academia: a) the government at provincial, county and local levels; b) the general public; and c) the villagers inhabiting the project. The project is changing design strategies for rural housing in China and government planning and policy with respect to rural reconstruction (including post-earthquake building production).

(2) Underpinning research

The design-research question addressed can be expressed as follows: how can a dense and modern village settlement be created in a precarious earthquake and landslide disaster location in a way that (a) re-establishes and enhances the community functions of village space; (b) adds food production space to the village to increase income-earning and subsistence agriculture potential; (c) conserves energy and water through sustainable water treatment; (d) maximizes natural light and air in a dense layout; and (e) provides a model for sustainable rural settlement reconstruction and village rationalisation that will influence local, regional and national decision-makers? These challenges necessitated research into i) sources of appropriate local materials; ii) environmentally friendly water systems; iii) architectural structure and layouts capable of supporting roof-top farming

and agro-production processes; iv) the planning of community spaces based upon current and future needs; v) processes of collaboration to integrate community opinions with government interests throughout the design process; and vi) post-occupancy evaluation to inform future village designs.

The underpinning research was in four phases, each conducted through a specific methodology. The first phase beginning in September 2012 included documentation of existing village houses and living conditions in order to derive a modern rural house design and program. The methodology employed axonometric projection drawing vis-à-vis the *Made in Tokyo* approach – the landmark ethnographic research done by Atelier Bow-Wow [a] and [e]. The second phase involved methodologies for stakeholder participation and employed large-scale and editable models as the basis for design iterations. Parallel sessions provided input from government and villagers alike. This process eventually established four basic prototypes that addressed the various spatial and economic requirements of villagers [b]. The third phase included assessment of appropriate sustainability features and materials. In-house grey-water recycling systems and a large reed bed cleansing system were custom-designed for the village. This phase of landscape design also involved a process of house location and planning that was derived through physical models and on-site consultations [c]. The final phase is a post-occupancy survey (completed in July 2018) involving two major components: interviews with villagers and a visual and architectural survey. The visual documentation of the houses records ongoing transformations to the original house typologies that have been implemented by the villagers themselves. This will inform future developments and design-research for rural house prototypes in China [d]. The findings from these four phases of research can be summarised as follows: an analysis of rural house typologies in western China showcased in an exhibition [d] and published in reports, book chapters and a book [e]; a methodology for earthquake-region village rebuilding consultation; and a unique system of grey-water collection and treatment in a high-density mountain-village setting.

(3) References to the research

[a] Bolchover, J. and Lin, J. (2018) “Rural Urbanization” in *Shaping Cities In An Urban Age* edited by Burdett R & Rode P with the London School of Economics, Phaidon Press, London, UK, pp. 102-111. [ISBN 9780714877280]

[b] Lin, J. (2016) “Designing for an Uncertain Future” in *Designing the Rural: A Global Countryside in Flux*, Architectural Design Series, guest edited by Joshua Bolchover, John Lin and Christiane Lange (Rural Urban Framework), Wiley London, pp. 72-77. [ISBN 978-1-118-95105-7]

[c] Bolchover, J. and Lin, J. (2016) “Strategies for Rural-Urban Architecture” in *Ressources Urbaines Latentes* edited by R. D’Arienzo, et al., Metis Presses, Italy, pp. 377-389. [ISBN 978-2-940563-03-6]

[d] Lin, J. and Bolchover, J. (2018) “Jintai Village Reconstruction” in the exhibition *Future of the Chinese Countryside* at the Chinese Pavillion curated by Li Xiangning in 16th International Architecture Exhibition: *Freespace*, curated by Yvonne Farrell and Shelley McNamara, La Biennale di Venezia, 26 May – 25 November 2018.

[e] Lin, J. (2013) “Jintai Village” in *Rural Urban Framework: Transforming the Chinese Countryside* authored by Joshua Bolchover and John Lin, Birkhauser, Basel, October 2013, pp. 173-178. [ISBN: 978-3-03821-061-0]

(4) Details of the impact

Six different forms of impact (4.a-4.f below) have affected multiple stakeholders and audiences including government officials, NGOs, the general public and village inhabitants.

(4.a) Impact on an international NGO. The Jintai project was funded by a partnership between an international NGO - Habitat for Humanity, local governments and the Rural Urban Framework Lab (RUF) based in the University of Hong Kong (HKU). After having participated in the reconstruction of hundreds of villages throughout China, the NGO was looking for new and sustainable approaches. RUF presented its ideas for combining rural and urban features and greater environmental

consideration in the design of villages and RUF's innovative model impacted the NGO sufficiently to award the project to HKU and make change in its approach to village reconstruction projects.

(4.b) Impact on local, provincial and regional governments responsible for village protection and renewal. The local governments co-funding the project were, by definition, impacted by the HKU team's innovative model. This first happened at an initial meeting in October 2012. HKU's model resulted in the support of local governments who accepted it as a solution for alleviating the density constraints of the hillside site while providing for better light and ventilation. **At the Sichuan Provincial Rural Culture Site Promotion Conference (19-20 October 2018) marking the 10th anniversary of the Great Sichuan Earthquake, the completed Jintai Village Reconstruction Project was selected as one of the key demonstration villages.** Approximately 100 government leaders participated in this conference and the associated village tour. These included the deputy secretary-general of the provincial government and leaders from various departments in the province. Sichuan Province is one of the most important provinces in China, comprising 488,000 square kilometres and over 87 million people. Explaining the village concepts to 100 government leaders is more than dissemination. It also constitutes impact, particularly because Jintai's local and county governments were presenting the project to the other governors as best practice. The impact is captured in the following quotes, taken during the conference.

The Director of the Sichuan Provincial Department of Culture, said: *“The art of architecture is a culture itself. The [Jintai] design fully used limited resources to create a new idea of rural life. It gave the government a lot of inspiration on rural development. [1] [3]”*

The Director of Nanjiang county poverty alleviation bureau wrote: *“This project has profound influence on the idea of rural development for us. For one thing, the way to fully utilize the limited land, such as compact layout of the houses, for the sake of making space for community life, as well as rooftop garden, has shown us a new way of planning a village. For another, the water treatment system in this project, introduced the concepts of environmental sustainability which we haven't yet implemented before. And I believe it will have impact on the future policy towards rural development in aspects of utilizing resources and environmental consciousness. [2]”*

The Party Secretary of Liuba Township, commented: *“Jintai village as a demonstration project will lead the policy of village planning and construction towards a more sustainable direction. The community center is the place to cultivate a cultural life, which is missing in many new villages. Currently our new plan is for many villages nearby to build one as well. [4] [5]”*

(4.c) Impact on the general public in China

Since 2017, the coverage of the Jintai Village Reconstruction Project in China's mainstream media has been extensive, including newspaper, TV, and online publication. **The total number of viewers of online publications of Jintai Village (across the top 20 sources) is more than 1.25 million.** A selection of comments from the general public (taken from [3] below) demonstrates a surprising shift in attitude towards rural development: *“It has such a significant practical meaning by exploring the connection of old and new by architectural means [8].”* *“Environmental consideration is raising the concern towards disaster prevention and relief. Really hope this type of architecture can be popularized throughout the country [6].”*

“Nowadays, more and more countryside became like the cities, there is increasing alienation between people. By making public space, it provides the chance for people to do exercise, read and communicate together, as such it makes connection of people possible again. In rural area, there is usually no such a funding for the community space, so the effort of the architects made to achieve this is appreciated [3].”

“It is different from other generic houses in countryside. This project made the sufficient life possible in rural, as well as enhanced connection between people. Hope there are more and more architects doing this! [3]”

(4.d) Impact on the villagers inhabiting the project

The project team initiated a post-occupancy evaluation survey (completed July 2018), which provides evidence of immediate impact. The village had the rare misfortune to have been destroyed initially by the Great Sichuan Earthquake and then again by a landslide a year and half later. HKU’s RUF won the contract to produce a design that met the basic rehousing requirements, added environmental enhancements, and increased local production capacity. **The village has been built according to the HKU team’s design and innovations and houses 21 families. This is an immediate, direct impact of the design research project: the 200 villagers are now back living in their ancestral village home [6] [7].** Our survey indicates that roof gardens are being used to engage in additional forms of agricultural production. Our survey also indicates that the design of a village with both rural and urban features has impacted willingness to live in rural areas [8] [9] .

(4.e) Value of present and future social impact. Following basic land economic theory, we objectively estimate the social impact of this project at **22.25 million RMB** (17 million for the land preparation works and 5.25 million on the house construction). The local government’s financial investment in RUF’s design can be equated to the net present value of the future stream of social benefits expected over years to come. In sinking investment funds to realise RUF’s design, the governments have expressed their valuation of its benefits to villagers and the wider community. It should also be noted that in an innovative institutional arrangement designed by the HKU team, the NGO partner financed the sustainable upgrades to the project over and above the funds committed by the local governments for standard reconstruction. **This amounted to 4.1 million RMB, which can be taken as an estimate of the additional social value of the design’s green elements.**

(4.f) Impact on perceptions of village housing in the wider area. One of the families interviewed in the post-occupancy evaluation survey was not from Jintai village but had relocated from the nearby city of Liuba. Although only a sample of one, local governments attached some importance to the finding, in view of their ‘back-to-the-village’ policy goals.

“The reason of me chose to move to Jintai from Nanjiang township is because I like the design of this house. Firstly, after retirement, my only income is the pension, which is around 1,000 rmb, but the rooftop of the house allowed me to plant various vegetables, in such I can live a self-sufficient life here without spending much. Secondly the lighting and ventilation is better than others. I like how quiet it is here, even in such a dense layout because of detachment from other houses, compare to the row houses or apartment in other new villages. [10]”

(5) Source to corroborate the impact

[1] *The Bund 原创* (23 April 2018 / Viewers: 33,710) [<https://bit.ly/2kS7V6T>]

[2] *Chengdu Economic Daily 成都商报: 原创: 成都商报* (12 April 2018 / Viewers: 53,19) [<http://bit.ly/2kFLv9b>]

[3] *Min Su Ke 民宿客* (2 April 2018/ Viewers: 100,000+) [<https://bit.ly/2kDgZwB>]

[4] *Xinhua 新华社* (7 May 2018 / Viewers: 516,108) [http://www.xinhuanet.com/2018-05/07/c_129866179.htm]

[5] *National Business Daily 每日财经新闻* (4 May 2018) [<https://bit.ly/2kS7ZUb>]

[6] *环球观筑* (10 April 2018 / Viewers: 100,000+) [<https://bit.ly/2miNhgE>]

[7] *艺非凡* (5 May 2018 / Viewers: 95,389) [<https://bit.ly/2kQLZt0>]

[8] *一席* (12 May 2018 / Viewers: 65,142) [<https://bit.ly/2ITApO2>]

[9] *Chinanews* (12 May 2018) [<https://bit.ly/2mhxcrv>]

[10] *Sichuan News (Sichuan TV, 13 April 2018)* [<https://bit.ly/2ISmRCh>]