ONE UNIVERSITY ONE VILLAGE 一專一村

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The 1U1V programme under the COVID-19 outbreak

In 2020, the spread of the coronavirus disease (COVID-19) affected the whole country and factories, schools and offices were forced to be shut down in many places with various economic activities coming to a standstill. Fortunately, as 1U1V team's operation mode in rural villages is different, some self-construction projects in the villages continued under the pandemic. For example, Yi people in the Baipoxiang of Miyi County have been building their own houses after the Chinese New Year. Except for some of the materials that must be brought from somewhere outside the villages, most of the construction materials can be obtained on-site in sufficient quantities, and thus the rammed earth walls can be built according to the original plan. This proved that the strategy of "**local materials, local technology and local labour**" is of high flexibility and strong resilience even under such special circumstances.

Work & Achievement in Six Years

The Research and Development Centre for Rural Vitalization in Yunnan has been completed and it has conducted soil analysis, materials testing and artisan training simultaneously. More academic activities, rural architects-in-residence and internships will be launched when the COVID-19 is over.

Others :

Artisan Training: trained over 100 artisans, including 26 women, and five independent construction teams (including one women team)
Awards: 12 international and local awards
1U1V Scholarship: 1 recipient
Books: 3 nos. (to be published soon)
Local rammed earth construction manual: 1 no. (to be published soon)

Our Projects

Site Location: Qiunatong Village, Gongshan County, Nujiang Prefecture, Yunnan

Project Nature: Rural Sustainable Development Assistance Programme

Teams: CUHK, Peking University & Kunming University of Science and Technology

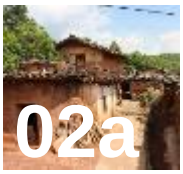
Project Duration: Dec 2013 – Jun 2020

Final Stage of the Project

The Nujiang Qiunatong Village project aims to facilitate the community development of the village and must be built with a stable long-term relationship with the locals in terms of communication, mutual trust and support. The main tasks were carried out from early 2014 to mid-2019 with a wide-range of aspects in the local community (see the table below). The results and outcomes facilitated by the community development services might not be visualised or presented in a physical form; however, the changes of the community, the lives and social interactions of the villagers, can reveal and reflect the achievements and the significance of our works and services.

In terms of the livelihood of villagers, the team conducted many investigations, tests and participatory designs, in order to raise the concerns and improve the understanding of the villagers and the local government, so as to improve their health and living environment. From an educational perspective, local villagers and the local government thought that the three-year early childhood education service was most admirable. Following these services, the local village committee has successfully applied to establish the first village-level kindergarten in the local county, and the scope of early childhood education has now been expanded to the surrounding 4-5 village groups.

2014	Village Investigation: Society and economy; built environment; humanities and health Mapping of the Village: Traditional buildings; settlements and layouts; village topography
2015	Public Health: Health education; basic medical examination; screening for chronic diseases Built Environment: Art decorations in village square; production and installation of wooden doors in public toilets; indoor air ventilation assessments and air quality tests in village houses; seismic performance of house structures; safety investigation of pedestrian pathways Living Environment: Investigation on water supply and drainage system; tests on drinking water quality; waste management investigation and solution plans Social Community: Community surveys (including topics such as population trafficking, community medical map); collection of folktales Agricultural Economics: Surveys on handicrafts and agricultural products; cultivated land soil environment quality analysis; permaculture design for family farming
2016	Education: The first early childhood education service Economy: Sightseeing route investigation and hand-drawn maps for village ecotourism Architectural Design: Eco-farm design (it was acknowledged by the local community, however, the construction project was suspended due to the conflicts between the site and local government's development plan)
2017	Education: The second early childhood education service Architecture: Vernacular house renovation as a village library (a dispute of land use right emerged and the project was suspended in May 2018) Safety improvement of road pavement (the project was suspended due to the high construction cost after the assessment of the design; the poverty alleviation projects of the local government has renovated the pedestrian paths for all villages)
2018	Education: The third early childhood education service; positive discipline psychological training for class teachers in township middle schools Economy: Investigation in local art crafts and improved packaging design for villagers' homemade wine Social Community: Field studies including local tourism development, economic and cultural industry plan, village management, village planning, design proposals of village hostels and souvenir shops, etc.
2019	Education: A picture book about Nu River Valley (already completed the selection of stories and liaison with the publisher, however the project was suspended as it was difficult to find a suitable illustrator in Hong Kong and Mainland for the collaboration) Training for service learning programme to students from Chung Chi College of CUHK Social Community: Participation in the workshops on "Community Conserved Areas and Endogenous Development" in Lijiang with villagers



Site Location: **Gaoliangdi Village, Xiyang Township, Jinning District, Kunming City, Yunnan**

Project Nature: Earth Building (Whole Village Rebuilding Plan)

Teams: CUHK & Kunming University of Science and Technology

Project Duration: Oct 2018 – Dec 2022

The Gaoliangdi Village project is a rebuilding plan for the whole village; 68 households have now been confirmed to participate. After the negotiation with the township government, the project is expected to be completed by 2022 with a 3-phrase construction plan. Site formation has been starting since Aug 2020 and is expected to be completed by October 2020. Afterwards, the foundation and the concrete framework will be constructed by the contractor, who is commissioned by the township government. The township government will hire professionals to supervise the quality of construction work. The 1U1V team will provide professional technical support and equipment for the building of rammed earth walls and the main body, as well as provide training in rammed earth construction technology to the contractor and local villagers so that they can all participate in the house construction together.

Site Location: **Daheixin Village, Xiyang Township, Jinning District, Kunming City, Yunnan**

Project Nature: Earth Building

Teams: CUHK & Kunming University of Science and Technology

Project Duration: Jun 2019 – Feb 2021

The Daheixin Village project is to transform a multi-purpose activity hall (public hall) to an anti-seismic rammed earth building. When the team re-visited Daheixin Village in August 2020, the public hall had been demolished and the site formation had been initially completed. The team noticed signs of settlement of the foundation works after an on-site investigation and the cause can only be determined after geological survey. Therefore, once the rainy season ends, the team will carry out related geological survey work and conduct the foundation construction after the natural settlement of the foundation for one month.

In addition, through laboratory soil tests, the team found that the soil in Daheixin Village is suitable for rammed earth construction. Nevertheless, based on the fortification intensity 8 of the seismic code of Kunming city, the soil cannot meet the compressive strength of 2 MPa under the fortification intensity 8 without adding any binding materials. Therefore, this project will adopt construction forms of load-bearing steel structures enclosed with rammed earth walls. According to the current schedule, the design of the project will be finalised in September and the foundation construction will then start in mid-October, aiming to complete all construction works before February 2021 so that the villagers can celebrate the Chinese New Year in the newly-built public hall.

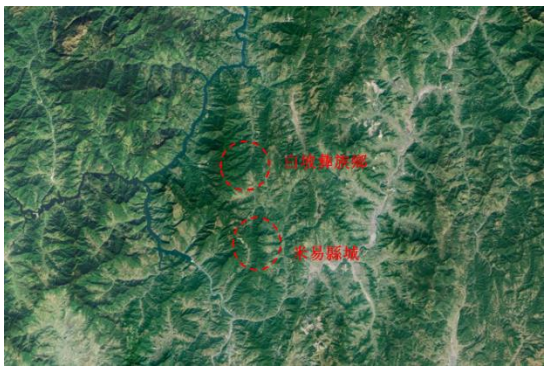
Site Location: **Baipoxiang Village, Miyi County, Panzhihua City, Sichuan, Yunnan**

Project Nature: Earth Building

Teams: CUHK & Kunming University of Science and Technology

Project Duration: Dec 2019 – Dec 2021

Since the team successfully rebuilt rammed earth rural houses for 7 households at the Hetaoping Village of Miyi County in Sichuan in the end of September 2019, it set up a good demonstration for the Miyi Construction Bureau and local villagers. Later in mid-November, the Miyi Construction Bureau invited the team once again to rebuild the rural houses for 7 Yi households in Baipoxiang. This will serve as a pilot demonstration project. Those participating villagers already demolished the original houses themselves and completed the on-site training in mid-December 2019. By May 2020, the construction works of 4 households had been completed. The other 3 households are expected to complete the construction by December 2020.



As the new rural houses completed in the early stage have demonstrated the benefits of rammed earth houses, several surrounding households have been attracted to sign up for the next construction plan. The township government and the Miyi Construction Bureau hope the next stage of the project can be extended and be systematic. Not only can the project satisfy the basic needs for housing of the Yi people, but also train up a local construction team to build and promote anti-seismic rammed earth buildings in Miyi County, Panzhihua City, and even for the whole Liangshan Prefecture. The project has now opened for villagers' registration and underwent the resources application from all government levels. The project details will be confirmed in October. The team will then start the project investigation and initial design immediately after the rainy season. It is expected that the construction will start in November 2020 and be completed in December 2021.

Household 1

Household 2

Household 3

Household 4

Site Location: **Dashuijing Village, Fumin County & Ganhaizi, Wuding County in Yunnan**

Project Nature: Earth Building

Teams: CUHK, KMUST & Habitat for Humanity China

Project Duration: Oct 2019 – Apr 2021

The **Dashuijing Village** project was originally planned for a reconstruction of three village houses (two on new sites and one on the original site), but finally only one household participated as expected. The team spent about three months to complete the construction for a household in early 2020, whilst the remaining two households suspended their reconstruction plan due to financial and other reasons.




Following the successful demonstration of the Dashuijing Village project, 3 households in the nearby **Ganhaizi Village** at Wuding County decided to build their new rammed earth rural houses. At present, the team has been continued to collaborate with Habitat for Humanity China (Yunnan Region) and has already completed the site formation works for these 3 households. Construction is expected to start after the rainy season and be completed by April 2021.







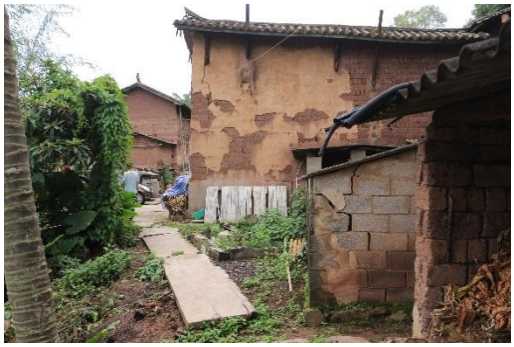
Site Location: Xinshan Village, Xiyang Township, Jinning County, Kunming City, Yunnan

Project Nature: Earth Building

Teams: CUHK & Kunming University of Science and Technology

Project Duration: Aug 2020 – Sep 2021

Background



Since the two anti-seismic rammed earth house rebuild projects in the Xiyang Township of Yunnan were completed successfully in 2017 and 2018, recognition of such construction technology by the township governments and local villagers has increased dramatically. Xinshan Village is located in the mountain areas of the Xiyang Township, about 11 km away from the market town. Xinshan Village has an area of 16.09 km^2 at an altitude of 1,811m, with an annual mean temperature of 17°C and an annual precipitation of 800mm. Xishan Village is entirely populated with Yi minorities who are simple and unadorned. In recent years, as more villagers worked outside the village, most of the houses left behind only the elderly and children.

Work Plan

In August 2020, after communication and consultation with the villagers and the township government, the team initially decided to assist 5 farmers in 3 natural villages to build new houses for them so that they could return to their home villages and make a living there. During the investigation, the team obtained soil samples from the local village committee for analysis and testing. The team plans to complete the preliminary design before November 2020. By then they will have communicated with the villagers on the design and negotiated with the township government on the construction team, contractors, etc. The team hope to complete all construction work and the handover of the new houses before the rainy season in September 2021.

Site Location: **Miwang Village, Mawang Town, Youyang County, Chongqing**

Project Nature: Bridge Building Programme

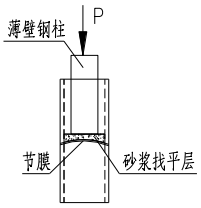
Teams: CUHK & Chongqing Jiaotong University

Project Duration: Sep 2019 – Oct 2019

Miwang Village is located in the east of Mawang town in Youyang County of Chongqing City. It is one of the 130 poor villages in the County. There are 168 households with 739 people living in poverty. The villagers usually cross the river through self-built simple bridges but the bridges are too simple and without any safety facilities. Some villagers even cross the rivers by stepping on temporary materials like bamboo and wooden planks. As a result, it poses great safety risks to the locals, especially in rainy seasons and for elderly and children. The team initiated the site investigation in September 2019 and found that the river was deep with rapid water flow when water rose in summer. Therefore they suggested to build a permanent footbridge to completely solve the problem of inconvenient travelling for farming, visits and schooling. The team successfully built a 12-metre-long, 1-metre-width footbridge for the villagers. After the completion of the bridge construction, the team also carried out some educational events and visited the elderly and vulnerable people in the village.

(Due to the spread of COVID-19 in mainland China in early 2020, the schedule of bridge projects has been affected and will be resumed once COVID-19 is over.)

In terms of research, the team conducted compression tests on bamboo poles and shear tests of nodal diaphragms in July and August of 2019. The purpose of shear tests of nodal diaphragms is to make use of the shear strength parameters as a guidance of the joint connections between round bamboo structures and the joint connections between bamboo structures and foundations. Also, it helps to calculate the tensile strength of the connection form of steel structures with grouting materials, which can determine how many internodes should be grouted in order to provide sufficient tensile capacity.



Planning Ahead

Earth building projects:

Collaborations with the Habitat for Humanity China and other organisations:

The collaboration with the Habitat for Humanity China (Yunnan Region) in the Dashuijing Village project is a good attempt in organisation and technical cooperation. The two organisations have fully utilised their respective advantages, resulting in a higher efficiency in construction and benefitting the promotion of the technology and rural development. The team will then contact different organisations to discover other potential collaborations and hope to initiate more projects in Yunnan, China, and other Southeast-Asian countries.

Building code for anti-seismic rammed earth-buildings in Yunnan Province:

After the internal discussions amongst the team and consultations with relevant expert groups in this field, the preparation and promotion of the building code for anti-seismic rammed earth buildings in Yunnan Province will adopt a two-step approach. The first step is to gather information of traditional rammed earth buildings and to complete relevant tests and preparation of the basic content. It will become an internal guidance manual for the industry under the Yunnan Housing and Urban-Rural Development Department after the approval of expert review. The second step is to receive feedback from different pilot cities in Yunnan and then conduct a meeting to review the revised draft by the experts and the leaders of the Yunnan Housing and Urban-Rural Development Department. Based on the theories and feedback from the practical application, it will be promoted as an official building code for anti-seismic rammed earth buildings in Yunnan Province. Affected by the spread of COVID-19, the preparation of the content and the approval of related government departments have been slightly delayed. Thus, it is now planned to complete the first step by June 2021. Depending on the pilot applications and the feedback, the team will strive to complete the second step in one year.

Academic publication about 1U1V's rural architecture concepts and earth building construction:

After the communications and discussions with the editors of the Tsinghua University Press, the original plan for the team to publish a book, which summarises the work experiences in rural areas and the application of constructing earth building projects in these years, has now been separated into two books. One of these aims to summarise the research and practical works of 1U1V systematically and theoretically in order to provide guidance to people who work in rural areas. The second one is an anti-seismic rammed earth construction manual, including soil sampling and analysis, construction methods, construction tools and construction designs, supplemented with step-by-step video tutorials which allow users to learn this kind of construction technology intuitively, so as to benefit more villagers and construction practitioners. The book series is scheduled to be published at the end of 2020.

The Research and Development Centre for Rural Vitalisation in Yunnan

Artisan training:

The team conducted a 2-day artisan training in mid-November of 2019. Villagers from Fumin and Wuding Counties of Yunnan and Miyi County of Sichuan gave positive feedback after completing the training. In the meantime, more villagers and related people who are interested in our training have consulted about the next training schedule. Unfortunately, the training in the first half of this year was suspended due to the outbreak of COVID-19. The team now target to re-open the training in October or November after the epidemic is under control, to be held 1-2 times a month according to the number of applicants.

Salon:

The team organised salons in November and December of 2019, with about 120 people participating each time. Students and teachers convened around a campfire to listen to speakers share their experiences on rural development. Once the COVID-19 outbreak is under control, the team will plan to organise a salon every month so that supporters from different sectors have more opportunities to discuss rural development and vitalisation. It is conducive to better development of rural work. Event previews and information will be announced on the Wechat of 1U1V.

Promotion & Publicity

Awards

The post-earthquake reconstruction demonstration project of Guangming Village received the Grand Award (Completed Projects – Residential Building) in the New Buildings Category in Green Building Award 2019. It was also accredited with a Special Citation on UN Sustainable Development Goals for its contribution to the development of sustainable built environment.

Documentary:

1U1V's reconstruction demonstration project in Hetaoping Village in Yunnan will be featured in the China Central Television documentary "Reinventing Hometown". The editing work is almost completed and it is now under post-production and scheduling arrangement. It is expected to be broadcast by the end of 2020.

Exhibition:

The 1U1V team has been invited to collaborate with the artists, Cao Minghao and Chen Jianjun, to participate in the 13th Shanghai Biennale in April 2021. The design and preliminary preparations for the exhibited works are currently in progress.

Public Lectures:

Prof. Edward Ng gave public lectures in November 2019 and January 2020 at Open University of Hong Kong and Chinese University of Hong Kong respectively to introduce the work and philosophy of the 1U1V team.

Publications:

Wan, L., & Ng, E. (2020). High Science and Low Technology for Sustainable Rural Development. *Architectural Design*, *90*(4), 74-81.

Liu, X., Wan, L., Chi, X., & Zhou, L. (2020) Women's Participatory Construction in Rural China. Paper presented in the 35th International PLEA Conference (PLEA 2020), A Coruña, 1st-3rd September 2020 (selected as one of commended papers).

Tian, F., Bai, W., Zhou, L., Liu, X., Wan, L., Chi, X., & Ng, E. (2020). Analysis and Countermeasures of Problems in Pure Soil Construction——Take the Research and Development Centre for Rural Vitalization in Yunnan China as an Example. Paper presented in the 35th International PLEA Conference (PLEA 2020), A Coruña, 1st-3rd September 2020.

Others

Patent:

While the team has been carrying out research on rammed earth construction technology, the team has also applied for Chinese national patents for both construction tools and construction technology that will help promote the research outcomes.

Title of the invention: A two-way restrained rammed earth wall formwork (Inventors: Prof Bai, Mr Zhou and Dr Chi)

Title of the invention: A construction method of joint settlement of ring beams and rammed earth walls (Inventors: Prof Bai, Mr Zhou and Dr Chi)

The Technical Regulations for Modern Earth Building in Rural Areas of Sichuan Province:

The team accepted the invitation from Miyi Construction Bureau in 2018 to carry out a new demonstration project in Hetaoping Village as one of the three demonstration projects for modern earth building under the Department of Housing and Urban-Rural Development of Sichuan Province. In the meantime, "The Technical Regulations for Modern Earth Building in Rural Areas of Sichuan Province" has passed the expert review in April 2019 (Prof Bai of 1U1V team is one of the expert panel members) and the building code has already been announced in the end of 2019.

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