ECOSYSTEM-BASED ADAPTATION THROUGH SOUTH-SOUTH COOPERATION

GOOD PRACTICE CASE STUDY

Farmers' Seed System Enhancement and Traditional Knowledge Revitalization for Climate Change Adaptation of Mountainous Farming Communities in Southwest China

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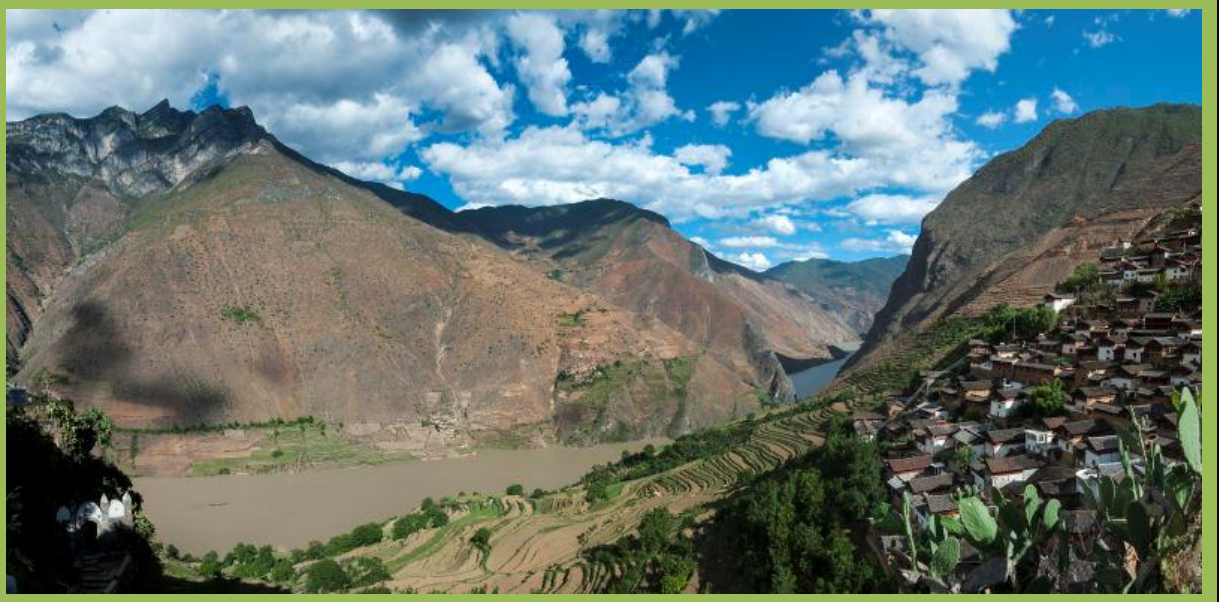

The Stone Village © Song Yiching

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The sustainability of agriculture in the Stone Village depends heavily on its irrigation system and diversified landraces, which play important roles in the livelihoods and spirituality of the villagers. In recent years, traditional farming in the Stone Village has been facing many challenges due to the rapid economic development process and the negative impacts of climate change. In particular, the native crops and traditional seeds planted and saved by local farmers were losing and traditional farming knowledge is also diminishing at an alarming speed.

To respond to the challenges of rapid economic development and climate change, and to raise local farmers' awareness on environmental and climate vulnerability, this project targeted two thematic areas:

- in-situ conservation, management and sustainable utilization of landraces
- collaborative and participatory platform for farmers and external agencies

Project outcomes

- establishment of in-situ conservation mechanism for enhancing local seed system, including participatory plant breeding (PPB) trials and establishment of community seed bank (CSB) led by farmers
- formation of participatory learning groups, including farmers, supported by researchers from the Centre for Chinese Agricultural Policy (CCAP) and Guangxi Maize Research Institute (GMRI) and facilitators from Farmers' Seed Network (FSN)

This case study highlights the traditional agricultural heritage, as practiced at the Stone Village that could help to protect and revitalize traditional food crops, seeds and resilient farming and food systems. All of these would contribute to enhancing the global understanding on Ecosystem-based Adaptation (EbA) that emphasises local wisdom and knowledge systems.

Key lessons

- The farming system in Stone Village shows how indigenous people manage and make use of natural resources in a sustainable way and their knowledge system reflected in their livelihoods and spirituality.
- A holistic approach, including plant breeding, community development and indigenous culture conservation, can enhance natural resources management and traditional culture enhancement for climate change adaptation.
- Traditional knowledge management practices can be strengthened by joint efforts from public and private external parties that support and facilitate the community-led preservation of local management systems.
- In order to promote a community-based agrobiodiversity management and sustainable use which utilise both traditional knowledge and modern science, a supportive seed policy is needed to provide incentives and recognition for both farmers and scientists at local and national levels in order to protect smallholder farmers' interests on in-field conservation of seeds and promote agro-ecological farming practices and related diversified food systems.

GOOD PRACTICE DESCRIPTION

LOCATION: Stone Village in Lijiang City, Yunnan Province, China

IMPLEMENTATION PERIOD: January 2015 - December 2016

OPERATIONAL BUDGET: US$ 20,000

KEY STAKEHOLDERS: community leaders, women groups, public plant breeders, researchers, and NGOs

Background information and climate change vulnerabilities

The Stone Village, located in the Jinsha River Valley, has an agro-mountain culture of rich biological, cultural, and linguistic diversity. It has over 1,300 years of mountain farming history and the Naxi people manage the landscape using a traditional system of crop diversification and water management practices that are adapted to the surrounding natural conditions. The sustainability of agriculture in Stone Village depends heavily on its irrigation system and diversified landraces, which play vital roles in the community members' livelihoods and spirituality.

In recent years, traditional farming in the Stone Village has been facing challenges from climate change, resulting in negative impacts on livelihoods and traditional culture of community members. An increased incidence of droughts, delayed rainy season, and pests has been observed by farmers. Compared to 20 years ago, the rainy season is now delayed from April to June and ends in October instead of September – an overall reduction of a month. Nowadays, the peak rainy season months are June, July and August. In the last 10 years, drought had occurred almost every year and lasted for 1 to 2 months, usually in May and June. The unstable rainfall pattern and drought resulted in putting off sowing seeds. Moreover, these extreme climate events brought about multiple effects of high temperature and pest outbreak, causing farmers to suffer loss from crop failure.

Climate change is imposing further burden on farming communities and having a growing impact on daily lives of villagers, who must now deal with unstable water resources and harsher growing conditions, as well as out-migration and shrinking agricultural labour. One of the most important changes is the decline in rainfall. Drought shrivels maize crops, leaving farmers to wait for the July rainfall. Sometimes, farmers experience irregular floods in the same season. In September 2014, continuous rainfall damaged a large area of nearly-matured maize, devastating the harvest.

In addition, traditional crop varieties were losing, and traditional farming knowledge was declining. Based on the baseline survey results, the main causes for the disappearance of traditional crop varieties and indigenous knowledge were the promotion of hybrid seeds, transition to chemical agriculture and the unpredictable micro-climate along Jinsha River, all these factors obviously reduced resilience for community when facing the challenge of climate change.

To combat the challenges of rapid economic development and climate change, and to raise local farmers' awareness on environmental and climate variability, this project aimed to achieve the following objectives in a multi-stakeholder participatory approach:

- Conservation and sustainable use of diversified crop landraces
- Farmers' participatory learning and collective capacity building

Intervention technologies

- Participatory Plant Breeding (PPB): PPB is a set of tools to strengthen agrobiodiversity as well as enhance collaboration between scientists and farmers. PPB was applied in the Stone Village to involve farmers to conduct trials on maize, legume, peanut and vegetables, on the basis of yield, taste, use and key agronomic indicators, to identify and select crop varieties adaptive to local circumstances and culture. Later on, the samples of tested varieties were brought to store in the community seed bank. Moreover, traditional knowledge was recognized and integrated in the process of PPB.
- Walking Workshops: Walking Workshop is a peer-to-peer action learning tool for farmers. As an alternative approach to the prevailing top-down learning method, it encourages participants to observe and dissect a wild range of topics in the field, where more complex and concrete situations exist. This learning-by-doing approach promotes in-field investigation, to increase the likelihood that farmers will improve their understanding and practices. With the walking workshop methodology, farmers in the Stone Village discussed possible tools and solutions for seeds management, traditional knowledge and practices. Traditional ritual was also restored and documented during a workshop.
- Farmers School: The Stone Village has developed routine training and learning system within the community, to invite experts to share different topics including video documentation, integrated pest management and post-harvest management.
- Market Linkage: The ecological agricultural products such as ham, liquor and geranium aroma were carefully designed and packaged by external contractors, to build market linkage with the urban consumers. Farmers in the Stone Village were encouraged to get involved in conservation of the landraces and agroecology.

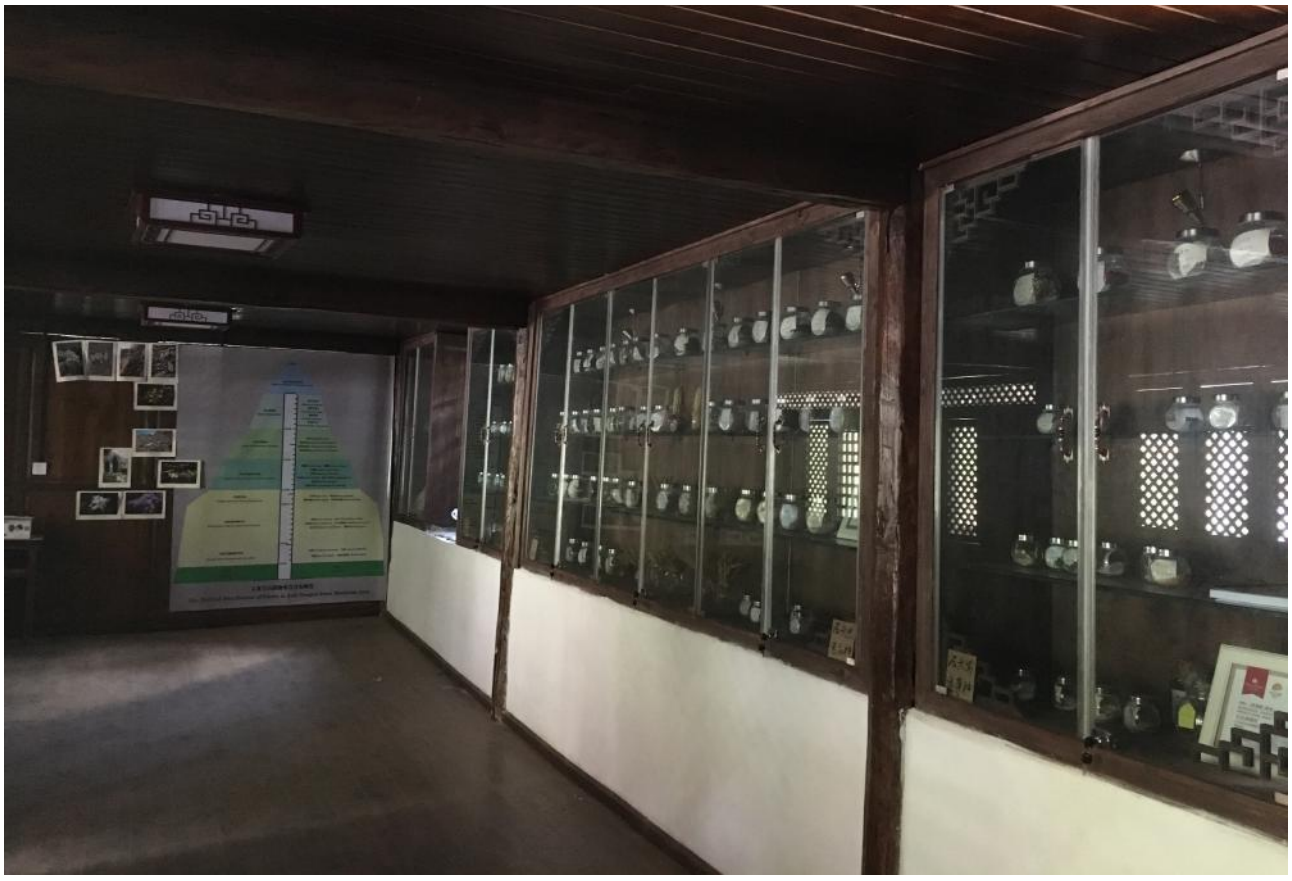

Figure 1: Community seed bank in the Stone Village © Tian Milin

Description of the results

Through the project implementation, a community-based workgroup, consisting of farmers and researchers, has been formed. Main achievements have been made in community seed system enhancement and traditional knowledge documentary. Specific outputs are as below:

- A community seed bank was established in the Stone Village, with 113 local varieties collected. A women group is in charge of renewing and making use of these seeds. As part of the PPB, the farmers' group in the Stone Village conducted different in-field trials on seeds improvement and Zhang Xiuyun, Li Ruizhen and other women farmers made use of maize germplasm from Peru [1]and GMRI to improve and develop new hybrid varieties. Mu Yichang, He shanhao and He Xiuqin set up seeds fields to grow and select plenty of crops and seeds. The landraces improved, and *in-situ* conserved through PPB and CSB can assist the farmers to be well adaptive to the extreme climate events such as drought. Moreover, farmers are in favour of the water-saving crop varieties as well.
- The participatory documentation on irrigation system was conducted, and the main findings were displayed to villagers in the Workshop and Farmers School to raise their awareness on how to collectively preserve and use the irrigation system continuously.

Figure 2: Woman farmer breeder, Ms. Zhang Xiuyun, in the Stone Village © He Baopu

[1] Potato Park in Peru is partner community of Stone Village. Facilitated by the International Network of Mountain Indigenous People (INMIP), farmers from the Stone Village were supported to exchange seeds and traditional knowledge with members of the Potato Park.

GOOD PRACTICE ANALYSIS[†]

Knowledge building

How has the project built upon or applied the findings of specific research projects? How has the project actively contributed to international understanding on Ecosystem-based Adaptation?

The Stone Village is a living laboratory for exploring and exchanging knowledge and experiences. The project provided platform for local farmers from the Stone Village and researchers from GMRI and other institutes to work together in applying both knowledge and technologies in modern plant breeding science in combination with the experiences and knowledge of community members. Walking workshop and farmers school approaches were used during the project to promote interactive learning and exchange of knowledge between mountainous areas in China and Peru. As a result, key members' awareness on conservation and sustainable use of traditional seeds had been raised. Therefore, they continued to keep and exchange seeds within community through seed bank in which the number of varieties increased from 108 to 113. In order to keep the seed bank's seeds active, the women management group has established "seed fields" in a few identified households to grow the seeds from the bank. Seeds, therefore, have been moving between the bank and the field and exchanged among farmers and communities. The PPB trials also extended from staple food to herbs and vegetables. All activities mentioned above are still well in operation even after the project closed, because they effectively help the farmers to reduce operating costs by using community resources and social capital. In May 2017, indigenous people from the Potato Park in Peru were invited to attend a workshop and go on a field visit to analyse the similarity and differences between the two communities, and how traditional farming heritage can help to protect and revitalize traditional food, agriculture, seeds and water systems to enhance the global understanding on Ecosystem-based Adaptation.

Community participation and inclusiveness

Has the project consulted with local communities in the formulation, implementation and decision-making process? How were gender issues incorporated? Explain how the project mobilized local interest and ownership in order to ensure its activities responded to the needs of local beneficiaries.

In terms of inclusiveness, the project involved multiple stakeholders – from both public and private sectors, e.g. researchers and social enterprise – during its implementation. Farmers in the Stone Village joined the project activities through farmers school, walking workshops, and various meetings. Researchers contributed their knowledge and techniques in the process of developing PPB and CSB, while social enterprise supported farmers by supplying their agricultural products to urban consumers as a new approach to preserve and make use of local crop varieties.

In addition, women in the Stone Village play an important role in guarding and utilizing seeds within community. Female farmers actively engaged in the PPB trials and seed bank management. They exchanged seeds and related knowledge and experiences with each other through women groups, farmers school activities or social media. They are also good at creating

[†] This analysis is based on the "principles of good practice" developed by the EU/FP7-funded project AfriCAN Climate (2011-2014). These principles represent critical cross cutting issues shared by the majority of climate change projects, regardless of focus, scope and scale. They are intended to encourage critical reflection and help project developers and decision-makers draw out relevant lessons. Source: http://africanclimate.net/en/good-practice/8-principles-good-practice

innovative healthy and nutritious recipes using local crops and traditional food culture. Gender inclusion is critical to the preservation of traditional knowledge systems, in particular those related to local food system and crop varieties.

Building local capacities

How has the project ensured that local capacity was built during implementation phase? Explain how training programmes were integrated into core project activities and the measures taken to assure that built human capacity is maintained beyond the project's lifetime.

The project provided walking workshop and farmers school training activities for local farmers on plant breeding, seed saving, and participatory documentation of irrigation system in the Stone Village. To ensure that capacity building activities would be in accordance with the needs of farmers, facilitators and experts from CCAP and GMRI designed those training courses based on a baseline survey and field visits, aiming at planning and monitoring projects on climate change adaptation by focusing on agroecology promotion, seed saving and pest management. These community-based practices and intervention technologies can be applicable to other mountainous areas with similar bio-cultural landscapes in developing countries.

References

[1] Smallholder farming systems in southwest China.Yiching Song, Yanyan Zhang, Xin Song and Krystyna Swiderska.IIED.2016

[2] Stone Village Declaration.INMIP. 2016-05-23

[3] Mountain communities call for stronger action to counter climate change.2016-06-23. https://www.iied.org/mountain-communities-call-for-stronger-action-counter-climate-change