

Case Study

CLIMATE ADAPTATION PLANNING for Bangliang Gibbon Nature Reserve and adjacent communities, Guangxi China

Key words: climate change adaptation, cao vit gibbon (*Nomascus nasutus*, CVG), Bangliang Gibbon Nature Reserve (BNR)

Synopsis

The Bangliang Gibbon National Nature Reserve (BNR) was established in 2009 specifically for the purpose of protecting the **cao vit gibbon** (*Nomascus nasutus*), also known as the eastern black crested gibbon. The cao vit gibbon is classified as Critically Endangered with the only surviving population located along the China-Vietnam border. The landscape is a mosaic of karst mountains, tropical forests and agricultural land. This area has experienced extreme weather, decreasing rainfall, increasing temperature and frequent drought in the past 15 years which has implications for the conservation of the gibbon as well as for the livelihoods of local farmers. Fauna & Flora International (FFI) has been cooperating with BNR to develop climate adaptation strategies to help build the resilience of the biological diversity and ecosystem services that the gibbon needs for its survival, and surrounding agricultural communities need for their ongoing livelihoods.

Through a series of workshops and community surveys with our local partners, Bangliang Nature Reserve and Dali University, we have developed a climate adaptation plan for the project site. The project has promoted a greater understanding of climate change among local communities, nature reserve staff and cao vit gibbon researchers. Adaptation strategies including gibbon habitat restoration and diversified livelihoods for those living around the reserve have been identified, as have knowledge gaps such as potential phenological responses of tree species to a changing climate. As a result, a programme of long-term monitoring of the cao vit gibbon and key tree species has been established.

This project will contribute to the long-term conservation of the cao vit gibbon, which is a flagship species for subtropical karst forest ecosystems. It has allowed key stakeholders to consider potential climate change impacts and integrate this thinking, including possible responses, into a biodiversity conservation action plan which will increase the climate-resilience of both natural ecosystems and agricultural landscapes.

This project will contribute to the long-term conservation of the cao vit gibbon, which is a flagship species for subtropical karst forest ecosystems. It has allowed key stakeholders to consider potential climate change impacts and integrate this thinking, including possible responses, into a biodiversity conservation action plan which will increase the climate-resilience of both natural ecosystems and agricultural landscapes.

Location

Bangliang Gibbon National Nature Reserve is located in the south of Jingxi County, Guangxi province, China. The reserve's landscape is a typical subtropical karst forest ecosystem and is one of the most biodiverse areas in China. The nature reserve covers an area of 6,530 ha and is surrounded by agricultural communities. About 10,000 people from five key villages of Zhuang ethnic groups live closest to the gibbon habitat and their main livelihoods are farming and livestock. Conversion of karst forest into farmland was the main driver of gibbon habitat degradation before the establishment of the reserve, which has since prohibited these activities. Biological studies have shown that the remaining gibbon habitat areas are small and of low quality after sustained periods of farming and extraction. The remaining habitat is not sufficient to allow the cao vit gibbon population to recover and expand.



Since FFI rediscovered the cao vit gibbon in 2002, we have undertaken a number of measures to reduce the threats to the species including establishing community patrol groups, reducing fuel wood use, and raising awareness in local communities. Now, **the primary long-term requirement of the species is to increase its available habitat so its population can expand.** FFI and BNR have cooperated with other stakeholders on habitat restoration in Jingxi since 2010, these include the local forestry bureau, Agricultural Bureau, Environmental Protection Bureau, Weather Bureau and Border Defence. However, climate change has the potential to negate these gains and further reduce the amount of suitable habitat available.

Background to FFI’s climate adaptation planning approach

There is now strong evidence for the reality of climate change as both a current phenomenon and as a future threat, and it is clear that many natural systems will be seriously affected. Although significant impacts from climate change may be some decades away in many areas, climate change adaptation planning is being seen as increasingly important, to enable local stakeholders to formulate practical ‘no regrets’ measures that reduce potential risks to natural landscapes and the goods and services they provide. The aim of climate change adaptation planning is to build and enhance resilience to change, through a process that teases out key impacts that are likely to be experienced and deduces which of these can be actively managed, and how.

Fauna & Flora International (FFI) has put together a package of resources and developed a toolkit specifically to assist site-level climate adaptation planning. We are convinced that while high-level predictive modelling and policy change is essential to tackling the global issue of climate change, so too are small-scale, local level initiatives, to help people make informed decisions in their immediate environments.

This work has been moving forward as part of FFI’s work within the British American Tobacco Biodiversity Partnership (BATBP). Over the five years 2011-2015 FFI is piloting the climate adaptation planning tool at site level, and refining the approach specifically in the context of complex agricultural landscapes. This is with the aim of building stakeholder capacity at the local level to increase landscape resilience and maintain biodiversity and natural systems.

Adaptation Planning for Bangliang Gibbon Nature Reserve and adjacent communities, Guangxi, China

The project team began by undertaking a review of the literature and available resources, identifying the regional climate scenarios for the project sites and also identifying the vulnerabilities of the cao vit gibbon, and local communities. A considerable amount of information was collated and knowledge gaps were identified. Information gathered was updated through consultations with experts and community interviews.

It was decided that the strategic focus of the project in Bangliang should be **on the conservation of cao vit gibbon with the nature reserve and local community stakeholders.** The climate adaptation conservation action plan for the cao vit gibbon and local community was developed and regularly updated during the course of the project.



FFI china staff, Li xiaoya, discusses the project site vulnerabilities to climate change with local community representatives. (Photo:Wu Huiying/FFI China Programme)

Participatory tools and approaches were used and made available across the project team. After a series of workshops and community interviews, the likely impacts of climate change on the cao vit gibbon and local communities were discussed and updated. “No regrets” adaptation strategies were discussed with all the local related stakeholders in a series of climate adaptation workshops and the key concepts of vulnerability, resilience and adaptive capacity for both people and biodiversity, were introduced to Bangliang nature reserve staff and local community stakeholders.

Throughout the project FFI and Bangliang Nature Reserve have collaborated with other relevant local institutions, such as the local forestry bureau and agricultural bureau. Cao vit gibbon experts, climate research centres, agronomists and local government have also participated in the project.

The process of climate adaptation planning trialled the use of **the FFI resources and tools**, following the translation of their original format and guidance into Chinese. The FFI Climate Adpatation Planning process has built the capacity and confidence of FFI’s China Programme team to share their knowledge of climate adaptation planning more widely. **Participatory tools**, such as the Climate Vulnerability and Capacity Analysis Handbook, were used to facilitate discussions on climate scenarios and potential impacts of climate change on local livelihoods and agriculture, alongside potential adaptation solutions. This process allowed the project team to develop the **climate adaptation plan for Bangliang Gibbon Nature Reserve and adjacent communities, Guangxi, China**. The plan will remain a living document, to be revisited and updated on an ongoing basis.



FFI china staff, Wu Huiying, discusses the project site vulnerabilities to climate change with Bangliang Nature Reserve staff and cao vit gibbon researchers. (Photo:Li Xiaoya/FFI China Programme)

Results

The project team’s workshops and discussions confirmed that cao vit gibbon habitat restoration and sustainable livelihoods for local communities are priorities for climate change adaptation in Bangliang. Significant knowledge gaps were also identified, particularly around the phenology of karst forest plants and the cao vit gibbon’s response to climate change.

The gibbons eat different food species in different seasons, and there is the potential for ‘de-coupling’ of the gibbon and its food plants if their responses to climate change differ, affecting food supply and potentially resulting in an increase of birth intervals for the gibbon, and a population decline. General climate change predictions in Bangliang are that temperatures will rise and changes in seasonality are likely to result in colder winters and hot, dry summers. A new direct threat to the cao vit gibbon seems to be extremes in weather – a recent study of the cao vit gibbon discovered a rise in infant mortality after an ice storm.

The main livelihood for the communities in Bangliang nature reserve is agriculture, including rice, sugar cane and tobacco. These livelihood strategies have a high demand for water and fertilizer and are susceptible to typhoons / tropical storms. Local people reported that pest threats to rice cultivation have increased in recent years and were keen to address this livelihood vulnerability; however, there were not sufficient resources to take this further under the scope of this project. In addition, there is currently only limited capacity among these communities to adapt to farming alternative crops. This is an issue that FFI will incorporate into future project planning as the project evolves. As a first step, FFI China and Bangliang Nature Reserve have started to introduce Chinese medicine cultivation to local communities as a potential additional livelihood option to increase their income. A Community Development and Nature Resource Conservation Agreement has been established with villagers to develop diversified livelihoods and increase resilience to climate change.



Habitat restoration: Bangliang nature staff planting the fruit tree of cao vit gibbon in the nature reserve. (Photo:Yang Jiqin/FFI China programme)

Knowledge gaps, such as the responses to climate change of the plants in Bangliang Nature Reserve, were identified. In response, a long-term monitoring programme for indicator trees has been established to improve the understanding of the impact of climate change in the reserve. Long-term behaviour monitoring

of the cao vit gibbon was also established to track the species' response to climate change. The climate change adaptation planning process also identified the need for habitat restoration to use a high diversity of tree species to provide food for the cao vit gibbon at different times of year.

The climate change adaptation planning project and tools were shared with related researchers and stakeholders in an international symposium in China and also within the FFI China programme. The climate change adaptation plan was also introduced to local and regional decision-makers and provided a useful case study for policy makers, including at the provincial and national levels.

Lessons learnt

The climate adaptation planning for Bangliang Gibbon Nature Reserve and adjacent communities has provided invaluable insights which will help shape the conservation approach in the reserve in the future.

- **Introduction of climate concepts**

The introduction of climate change concepts to conservation practitioners has been a really important part of the project. Most local conservationists were not aware of climate impacts on biodiversity conservation and traditional conservation strategies do not take climate into account. For habitat restoration, before we introduced the climate adaptation project the local nature reserve was only planting one species of tree to increase food availability for the cao vit gibbon. Now, BNR are planting more species to increase food availability at different times, and to promote biodiversity and forest resilience.

Throughout the process of climate adaptation planning, including climate adaptation workshops and community interviews, **regular discussions and updates of the collected information are needed.** Multiple visits to - and meetings with - the community are also important to ensure all stakeholders understand the concepts of climate adaptation and the strategy that is being developed. When introducing climate change concepts, consistent use of terminology with stakeholders is important to **avoid confusion.**

- **Need for fine-scale data where there is high variability in ecosystems i.e. micro-climates**

The **high level of variation in the micro-climate of karst forest ecosystems** means that **more accurate, fine-scale data on climate conditions is needed.** Most of the data and information used in the project were large-scale data relating to Guangxi Province or, at best, Jingxi County. However, the project found local variations in climate between different villages within the project area. Developing climate adaptation plans at a finer scale would therefore be appropriate in this area. It will be easier to get the fine scale survey data through cooperation with research institutions.

- **Involvement of government stakeholders**

Stakeholders at the project site have very little awareness around climate change and the local government does not currently take climate change impacts into account. However, the climate adaptation plan needs the participation of all stakeholders in order to be effective. Establishing collaborative relationships between different departments and with the government's climate change initiatives at the highest level is important for success. Strengthening cooperation with the Guangxi Climate Centre to inform related policy, and the introduction of a climate adaptation planning process to other FFI sites is recommended.

- **Long-term support and monitoring**

The establishment of a long-term climate change monitoring programme and the monitoring of biodiversity and local community agriculture systems are critical for the project site. Climate adaptation planning is a long term process and should be reviewed and updated regularly, using the results of site-level monitoring. However, such monitoring programmes need to be adequately supported and resourced. Developing the **capacity of local stakeholders in climate change adaptation is also vital.**

Want to find out more?

Contact:

Li Xiaoya,
Project Manager, China
Fauna & Flora International
xiaoya.li@ffichina.org

Zhang Jialin
Project Officer, China
Fauna & Flora International
zhangjialin@ffichina.org

Tan Wujing
Nature Reserve Director
Bangliang Gibbon Nature Reserve
twj99@163.com

Fan Pengfei
Cao vit gibbon Specialist
Dali University
fanpf1981@gmail.com

Links to additional relevant tools and case studies:

FFI Tools:

- Fauna & Flora International .2013. Adaptation Planning Tools
- Fauna & Flora International .2013. Tools for Participatory Approaches

National Plans and Data:

- Brady NC, Weil RR.1996. The Nature and Properties of Soils. Prentice-Hall Inc.
- Fan Pengfei, Yan Lu, 2007. The cao vit gibbon population survey in Bangliang forest, Guanxi, unpublished data.
- Fan Pengfei, Fei Hanlan, Matthew B. Scott, Zhang Wen, Ma Changyong. 2011. Habitat and food choice of the critically endangered cao vit gibbon (*Nomascus nasutus*) in China: Implications for conservation. *Biological Conservation* ,144 2247 - 2254.
- GFIPI (Guangxi Forest Inventory & Planning Institute),2010. Comprehensive investigation report of Guangxi bangliang cao vit gibbon natural reserve. Guangxi, China.
- He Jieli, Zou Lvliu, Zhang Yingyi *et al.*2012. Climate adaptation strategy of biodiversity conservation in Guangxi.
- Huang Meili, Lin Zhenming, Qiu Pingzhu, etc. 2008. Global warming and its influences on agriculture in China. *Journal of mountain agriculture and biology*, 27: 200-206.
- IUCN. 2012. IUCN Red List of Threatened Species, Version 2012.2 [OL].
- Ju Hui, Lin Erda, Zhong Xiuli. 2000. Impacts of climate change on forest ecosystem. *Eco-agriculture Research*, 8: 20-22.
- Liang Qiongfang, Lu Yaofan, Ling Li, *et al.* 2010. Climate Characteristic of Jingxi County in Nearly 50 Years. *Journal of meteorological research and application*, ,31:21-23.
- Mittermeier R, Wallis J, Rylands A. 2012. Primates in Peril: IUCN/SSC Primate Specialist Group (PSG), International Primatological Society (IPS), Conservation International (CI), and Bristol Conservation and Science Foundation, Bristol, UK. 40pp.
- Paul Insua-Cao, Li Xiaoya, Dine M, Fan Pengfei, Li Xiankun, Wei Yigang, Tran Quoc Hung, Nguyen the Cuong, Yan Lu, 2012. A framework for transboundary restoration of the habitat of the Cao Vit Gibbon *Nomascus nasutus* in the forest of Trung Khanh and Jingxi [M]. Fauna & Flora International, Hanoi, Vietnam and Nanning, China
- Wan Guojiang *et al.* 1995. Carbonatite and environment. Earthquake Publishing House.
- Wang Shijie, Ji Hongjun, Ouyang Ziyuan *et al.* 1999. Preliminary research on carbonate soil forming by weathering [J]. *Science in China (D)*. 29(5): 441-449.



- Wu Jianguo. 2008. The Advances of study on effects of climate change on the terrestrial biodiversity . The Chinese Research Academy of Environmental Sciences, 10: 60-68.
- Yuan Daoxian and Cai Guihong. 1988. Karst environmental science. Chongqing Publishing House, Chongqing.

Project Outputs:

- Fauna & Flora International *et al.* 2014. *Climate Adaptation Plan for Bangliang Gibbon Nature Reserve and adjacent communities, Guangxi, China*