

## FOSTERING “LITTLE GREEN GUARDS” THROUGH A COLLABORATIVE PARTNERSHIP TO CREATE AN EFFECTIVE CONSERVATION EDUCATION PROGRAM FOR RURAL CHILDREN IN GUIZHOU, CHINA

Chia L. Tan<sup>a</sup>, Yeqin Yang<sup>b</sup>, Kefeng Niu<sup>b</sup>, Lei Shi<sup>b</sup>, Weiyong Zhang<sup>b</sup>, Isidoro Riondato<sup>c</sup>, Cristina Giacom<sup>c</sup>, Emilio Balletto<sup>c</sup>, Marco Gamba<sup>c</sup>, John A. Phillips<sup>d</sup>

<sup>a</sup>San Diego Zoo Institute for Conservation Research, San Diego Zoo Global, [ctan@sandiegozoo.org](mailto:ctan@sandiegozoo.org)

<sup>b</sup>Fanjingshan National Nature Reserve Administration

<sup>c</sup>Dipartimento di Scienze della Vita e Biologia dei Sistemi, University of Turin, Italy

<sup>d</sup>LVDI International

### ABSTRACT

San Diego Zoo Global (USA), Fanjingshan National Nature Reserve Administration (China), and the University of Torino (Italy) have partnered in a collaborative effort to promote environmental sustainability and biodiversity conservation in Guizhou, China. The objectives of the partnership are twofold: (i) train researchers and wildlife professionals using a multidisciplinary program that employs the latest methods and tools in order to deepen their understanding of wildlife and the environment, and (ii) foster positive attitudes and behaviour toward wildlife in rural children through a creative education program called the Little Green Guards. A recent development of the education program is the Little Green Guards Club for children whose houses border nature reserves. During club meetings, staff of the three cooperating institutions and volunteers participated in teaching English and natural history lessons. Club activities included animal themed art projects, games, movies, and field trips designed to cultivate empathy for animals and appreciation for nature in these children. Evaluations conducted before and after implementation of the education program showed a significant increase in children’s knowledge of and affection for wildlife, and sometimes coincided with positive behavioural changes toward native species. Here we feature our collaborative effort in China as a model which can be adopted in other geographic regions where species and habitat conservation must become a top priority. We will discuss the role of Universities in critical assessment of previous experiences in order to enhance the effectiveness of cooperation with other development stakeholders (e.g. governmental and local authorities, civil society and NGOs, foundations and private companies, and local associations).

### INTRODUCTION

China is most notable for being the world’s most populous country with over 1.3 billion people [1]. As a result of recent economic expansion, China now leads the world in consumption of natural resources and their pollution by products [2,3]. While the country’s thriving economy makes daily international headlines, little attention has been paid to China’s rapidly disappearing wildlife species and the natural places where they occur. For much of the western world, wildlife conservation in China does not appear to be a critical issue as the international symbol of all Chinese wildlife, the giant panda (*Ailuropoda melanoleuca*), shows signs that its population number is either stable or, in the case of the captive population, on the rise. On the other hand, to most Chinese, wildlife conservation is a non-issue because wildlife and wild places, unless exploitable, possess no tangible benefits [4]. According to the latest IUCN Red List assessment, China ranks in the top ten countries having the most number of threatened species [5]. These diametric opinions highlight the large disconnect that exists between the lay and the scientific communities. How do we bridge this gap to ameliorate the current wildlife situation in China? This paper focuses on this key question, the question that provided the impetus for creating the *Little Green Guards* program.

### THE BASIS FOR THE *LITTLE GREEN GUARDS* PROGRAM

Founded in 2011, the *Little Green Guards* is a conservation education and outreach program for children living in remote communities bordering Fanjingshan and Mayanghe nature reserves in Tongren City Prefecture, Guizhou Province, China. Fanjingshan and Mayanghe nature reserves each hosts a unique assemblage of flora and fauna, and are part of the United Nations Educational Scientific and Culture Organization’s (UNESCO’s) World Network of Biosphere Reserves of the Man and the Biosphere (MAB) Programme. Specifically, Fanjingshan is home to over 6,000 animal and plant species; many are rare and relict, the most prominent being the Guizhou snub-nosed monkey (*Rhinopithecus brelichi*) that only occurs here as a single global population of about 700 animals [6]. Mayanghe, dominated by

limestone hills, also harbors a rich diversity of over 2,000 animal and plant species. The main target species for protection in Mayanghe is the Francois' langur (*Trachypithecus francoisi*), estimated at about 730 individuals, or roughly 70% of the total global population [7]. Due to small population size and limited range, these two Endangered monkeys [8] are far more vulnerable to extinction than the giant panda (Figure 1).



**Fig. 1** - Threatened primate species in Guizhou, China: Guizhou snub-nosed monkey *Rhinopithecus brelichi* (large, right photo), Francois' langur *Trachypithecus francoisi* (small top, left photo) and Tibetan macaque *Macaca thibetana* (small bottom, left photo). Credits: San Diego Zoo Global/Fanjingshan National Nature Reserve Administration.

## RURAL COMMUNITIES AND EDUCATION IN GUIZHOU

The rural communities immediately adjacent to Fanjingshan and Mayanghe nature reserves are densely populated by ethnic minorities such as the Miao, Tujia and Dong groups. These communities are considered to be at or below the poverty level [9]. All families we surveyed here have multiple children, generally 3-4, but some have as many as 9. Moreover, in many households the children are largely under the care of illiterate grandparents or other adult relatives while their better educated, albeit absent parents, labour in large cities (C. Tan et al. unpubl. data). As with past generations, the current youth have extremely limited economic and educational opportunities. Due to financial hardships at home and the state of education system in these rural areas, most young people stop their schooling after the nine-year compulsory education (K. Niu et al. unpubl. data).

The state-run education system in China has a number of shortcomings, most notably those that can be attributed to an unequal distribution of funding and human resources, and a rigid national examination metric for admission to high schools and universities. These inequities create a vicious cycle whereby rural inhabitants continuously remain an underprivileged class because of a lack of social advancement primarily due to poor education. It has been our experience that the quality of education decreases the farther the school is located from an urban center. By virtue of their remoteness, rural schools are extremely under-funded and under-resourced. The poor standard of living in villages coupled with the lack of any financial incentives from the central government pose an insurmountable challenge for rural schools to recruit and retain quality educators.

The nationally set curriculum for the nine-year compulsory education is meant to prepare students for the highly competitive high school and university entrance examinations. At the primary school level, the subject emphasis is on reading, writing and arithmetic. In the case of Tongren rural schools, the curriculum is heavily weighted toward Chinese and Mathematics. For example, a weekly lesson plan for the second-grade at one of the local schools contains 30 class periods, of which 13 are devoted to Chinese and 7 to Mathematics. Subjects such as Physical Education, Moral Principles and Daily Conduct, and Local Course (with topics related to culture, history, and geography of this area) are scheduled during 6 other periods. Even though there may be a class period separately allocated to Music and Drawing, the school usually has no funding for purchasing equipment or supplies for the students, and in general, these class periods are taken up by additional Chinese or Mathematics lessons. As part of China's education reform [10], English is taught in urban primary schools starting at about the third grade. However, rural primary schools do not include a foreign language in their curriculum because they lack educators capable of teaching the subject.

Since biology is not part of the primary school curriculum, the concept of biodiversity conservation is unknown to

the rural children. The *Little Green Guards* program, therefore, is an endeavour aimed at enriching the standard curriculum. Benefits to local residents, especially the education of children, frequently accrue when conservation efforts attain international recognition. As such, the *Little Green Guards* program may help rural children gain upward mobility by offering them extracurricular learning opportunities and allow them to escape from poverty in the future.

## **THE BASIS FOR INTERNATIONAL PARTNERSHIPS**

The growing complexity of global social and economic problems, especially in developing countries in Asia and Africa, has dramatically hindered biodiversity education efforts intending to fundamentally change traditional attitudes and behaviours toward over consumption of natural resources. This situation has created an urgent need for formal cooperation among private institutions, local governmental agencies and universities to work in synergy thus creating conservation programs that generate broader impacts. In the case of the *Little Green Guards* the synergy is dynamic. San Diego Zoo Global and LDVI International spearheaded the creation of educational materials and provided support for school activities, as well as recommending capable professionals and allocating financial aid. The governmental partners, Fanjingshan National Nature Reserve and Mayanghe National Nature Reserve, provided local knowledge and the human resources necessary to transform the program content into locally appropriate messages resulting in effective conveyance to the intended audience. University personnel, who have an expertise in providing capacity building and professional training, have further contributed to the effort by distilling complex biodiversity topics into an easily understood format.

Given the economic and educational deficiencies in rural Guizhou, we face many challenges when conducting our *Little Green Guards* program. The expertise of our international team helps us solve these problems at different levels. Specifically, San Diego Zoo Global and LDVI International work closely to create an overall education framework that includes tailored lessons in combination with thematically related activities aimed at increasing schoolchildren's knowledge of and affection toward local wildlife species. Fanjingshan National Nature Reserve Administration plays a pivotal role in coordinating in-country program activities and providing liaison support among local and international partners. To help build the capacity of reserve personnel, the University of Torino is a key partner for providing scientific input and training to ensure the program's sustainability. All partners actively fundraise to support program objectives and publicize our work through different channels.

## **IMPLEMENTATION**

In 2011 the *Little Green Guards* program founders, Chia Tan and Kefeng Niu, worked with Lei Shi and two volunteers from Guiyang universities, Bing Yang and Tianyou Yang, in developing and implementing the inaugural activities. An emphasis was placed on raising awareness of endangered species at Fanjingshan and Mayanghe nature reserves, particularly the two flagship species: the Guizhou snub-nosed monkey and the François' langur. The program was implemented at two schools. Since the students (and teachers) had not been introduced to conservation education topics, it was important that they gained positive experiences from this first exposure. In the classroom, we used simple narratives and slides to describe the basic biology of charismatic local fauna and flora. We also incorporated animal-themed games, songs, and drawings to cultivate an interest in wildlife in these children. To begin connecting them with wildlife found in their "backyard", the older students (fifth and sixth graders) participated in guided field trips to see the local monkey species (Figure 2). Identical pre- and post-program questionnaires were used to evaluate the impact of this outreach and education effort. Students were asked whether or not they have heard about the local nature reserve. They were also asked whether or not there are any monkeys in the forest, and if so, describe what kind. Additionally, we used this opportunity to evaluate third- and sixth-graders' general knowledge of and attitudes toward a variety of animal species, both domesticated and wild. This information helped us design appropriate and effective conservation education modules for subsequent program activities. We deemed our first school event a success because all of the children were sad to see us leave when the four-day program ended.



**Fig. 2** - Connecting Guizhou rural schoolchildren with monkeys found in their “backyard” through guided field trips. Credits: San Diego Zoo Global/Fanjingshan National Nature Reserve Administration/ Mayanghe National Nature Reserve Administration.

We learned from our pilot program that knowledge of wildlife was lacking in these rural children. We also discovered major deficiencies in China’s education system in these rural settings. When we returned to the local schools the following year, we had developed a complete module, called “My Habitat”, to teach children the relationship between wildlife species and their required habitats (Figure 3). This module (3 versions based on grade levels) contained the lesson, associated exercises, and thematically related activities such as songs, art projects, and the student evaluation. At one of three local schools where we administered the program, we organized a schoolyard concert for the local community that was attended by over 400 residents and government officials. Students performed ethnic dances choreographed by their teachers, as well as singing a chorus pledging to conserve wildlife. We also showcased students’ artwork produced during our program period to inform family members about the local wildlife species (Figure 4). Our efforts attracted the attention of local television stations, television documentary film production companies, and online media companies. Also, our volunteers, partners, and sponsors multiplied at this time, and we were able to enlist support from Chinese corporate sponsors to help defray program costs.



**Fig. 3** - Fifth graders of Kaiwen Primary School learned about local wildlife species and their habitat in Fanjingshan. Credits: San Diego Zoo Global/Fanjingshan National Nature Reserve Administration.



**Fig. 4** - Look Grandma, I painted this monkey mask! – A proud first grader presented her artwork to her grandmother before the schoolyard concert at Kaiwen Primary School. Credit: D. Cui, Beijing Zoo.



**Fig. 5** - World-renowned entomologist, Professor Emilio Balletto shared his love for butterflies with Little Green Guards Club members in Niujiadong Village. Credit: K. Niu, Fanjingshan National Nature Reserve Administration.

## FUTURE PLANS

The *Little Green Guards* program has been proven successful in terms of effectiveness in the overall design and execution of its education and outreach components. Aimed to maximize the program’s sustainability and lasting impact, we propose to:

- 1) develop set curriculum (six lesson modules) that concentrates on the biology and protection of native species and their habitats for eight target schools (approximately 1,100 students) near Fanjingshan and Mayanghe nature reserves. We will work with conservation educators to create biologically - sound, age – appropriate modules following the guidelines of Tongren Unified School District for Local Course (or “Di Fang Ke”). The main purposes of Local Course are to increase students’ awareness and understanding of native wildlife, and to instill a sense of pride about their natural heritage and a responsibility for its stewardship. Similar to the module developed for “My Habitat”, each new module will contain teacher’s instructions, the topic lesson, related activities to enhance learning, and student evaluation.
- 2) conduct workshops to train educators (approximately 75 teachers) from the program target schools on how to implement modules and integrate them into existing Local Course. As conservation biology training for teachers in rural schools is nonexistent, the goal of the workshops is to introduce teachers basic conservation education techniques, discuss the module contents, and assist module implementation in class. Besides providing a “how-to” guide, the workshops will empower teachers to be role models and conservation advocates.
- 3) establish Biodiversity Conservation Learning Centers to further communicate the purpose and value of protecting local wildlife species to the community. We will select three schools closest to reserves’ core protected areas and help each school transform a classroom into a Biodiversity Conservation Learning Center. The room will be furnished with audiovisual equipment, books, visual displays and students’ artwork. Also at the school entrance, we will create a biodiversity mural and install an interpretative panel to disseminate information regarding the endangered wildlife species in the area. The mural and interpretive panel will educate not only the students and teachers but also community members and visitors.
- 4) recruit and train student volunteers from universities in Guizhou to conduct outreach events in rural and urban settings. To reach a wide audience and create locally relevant messages to promote pro-conservation attitudes and behaviours, we will recruit volunteers, especially students from Guizhou teacher’s colleges. We will develop a volunteer program coordinated by nature reserve staff. We will speak at recruitment events and provide volunteers with the techniques and tools needed to be affective and effective wildlife conservation ambassadors. Trained volunteers will assist with outreach efforts at target schools and other venues. The experience may inspire some recruits to teach in rural schools where access to quality education is lacking.

The Little Green Guards is the first program in China to recognize that conservation education initiatives, in order to be successful, need to be uniquely tailored to citizenry of different socioeconomic levels, with the most need being in

the indigenous communities that rely heavily on the natural resources of protected areas. Through the proposed activities and continued cooperation among local and international partners, and the Tongren Unified School District educators, we can ensure that rural schools neighbouring nature reserves play a pivotal role in educating a new generation of responsible citizens who can become guardians of their native wildlife treasures. Additionally, through their children we can begin to transform the feelings, motivation and commitment of other family members toward native species and habitat conservation. Thus, we believe the Little Green Guards can be a model which can be adopted in other geographic regions where species and habitat conservation must become a top priority.

## ACKNOWLEDGMENTS

Our program would not be possible without the support and assistance of the following people and organizations: B. Yang, T. Yang, R. Feng, N. Yang, G. Zhang, D. Cui, D. Sun, Mr. Jin, Y. Qiu, Y. Zeng, X. Dong, X. Zhi, V. Hale, A. Ang, teachers of Dabaoçun, Taohuayuan, Kaiwen, and Banpotai Primary Schools, C. Ishee and Family, Anonymous Donor, Margot Marsh Biodiversity Foundation, the Offield Family Foundation, San Diego Zoo Global, San Diego Zoo Volunteers, the Ocelots, V. and H. Bord, J. Opdycke, B. and T. Durler, Fanjingshan National Nature Reserve Administration, Mayanghe National Nature Reserve Administration, the Forestry Department of Guizhou Province, Guizhou Environmental Protection Bureau, Guizhou Foreign Experts Bureau, the State Administration of Foreign Experts Affairs, International Primatological Society, Wuhan Sante Cableway, Shenzhen Sea Sky Land Technologies, LVDI International, and the University of Turin.

## REFERENCES

- [1] *The World Factbook* 2013 - 14. Washington, DC: Central Intelligence Agency, 2013. <https://www.cia.gov/library/publications/the-world-factbook/index.html>.
- [2] S. A. Hajkowicz, H. Cook, and A. Littleboy, *Our Future World: Global megatrends that will change the way we live. The 2012 Revision*. CSIRO, Australia, 2012.
- [3] R. E. Stern, *Environmental Litigation in China: A Study in Political Ambivalence*. Cambridge University Press, 2013.
- [4] R. B. Harris, *Wildlife conservation in China: Preserving the habitat of China's Wild West*. 342 pp. M. E. Sharpe, Armonk, New York, 2008.
- [5] IUCN, *The IUCN Red List of Threatened Species, Version 2013.1* : Table 5 Threaten species in each country. Last Updated: 08 July 2013. <http://www.iucnredlist.org>. Downloaded on 08 September 2013.
- [6] Y. Yang, X. Lei, C. Yang, D. Sun, Y. Qiu, R. He, W. Zhang, *Fanjingshan research: ecology of the wild Guizhou snub-nosed monkey*. 186 pp. Guizhou Science Press, Guiyang (in Chinese with English abstract), 2002.
- [7] Mayanghe National Nature Reserve Administration. Mayanghe National Nature Reserve inventory survey, unpublished report. 2003.
- [8] IUCN, *The IUCN Red List of Threatened Species, Version 2013.1*. <https://www.iucnredlist.org>. Downloaded On 08 September 2013.
- [9] X. Peng, China's demographic history and future challenges. *Science* 233:581-587, 2011.
- [10] M. Cortazzi, and J. Lixian, eds, *Researching Cultures of Learning: International Perspectives on Language Learning and Education*. Palgrave Macmillan, 2013.