

# Promoting Biodiversity Conservation and Community Development in the Sanjiangyuan Region

Proceedings of a conservation planning meeting,  
with agreed priority action points

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*Planning meeting co-hosted by Plateau Perspectives, Upper  
Yangtze Organization, Government of Zhiduo County and the  
Sanjiangyuan National Nature Reserve Management Bureau*

*September 30 - October 13, 2005*

*THE YANGTZE RIVER HEADWATERS  
SUSTAINABLE DEVELOPMENT PROJECT*



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## ***EXECUTIVE SUMMARY***

One of Plateau Perspectives' main goals for 2005-06 was to launch its conservation work in the Sanjiangyuan region. Environmental protection includes both the protection of biodiversity and the sustainable utilization of the region's natural resources. The main ecosystem in the area is alpine grassland, which

- (1) supports a wide array of wildlife species (e.g., Tibetan antelope, wild ass, wild yak, argali, snow leopard, black-necked crane, etc.);
- (2) provides critical ecological services for millions of people downstream;
- (3) is home to Tibetan herders whose traditional livelihood has been adapted over millennia to the harsh environmental conditions of the Tibetan Plateau region.

In pursuance of its goal to develop a regional development project with joint emphasis on natural resource management and community development, Plateau Perspectives worked together with several local partners to organize a *Biodiversity Conservation Planning Meeting* in October 2005. The meeting was co-hosted by the Upper Yangtze Organization, the Government of Zhiduo County and the Management Bureau of the Sanjiangyuan National Nature Reserve.

Conservation action priorities agreed at the planning meeting will form the basis for future conservation work in Zhiduo and other counties of Yushu Tibetan Autonomous Prefecture. The priority areas for future conservation work include:

- Action 1. Responding to training needs in environmental conservation
- Action 2. Identification of biodiversity hotspots (priority conservation areas)
- Action 3. Assistance given to monitor wildlife and ecosystems, train herders
- Action 4. Organization of a cross-sectoral meeting on grassland management
- Action 5. Assistance given to develop a Community Co-Management Plan
- Action 6. Establishment of a *Tibetan Conservation & Development Centre*

Initially, Plateau Perspectives will focus most of its attention on two established conservation areas of the Sanjiangyuan National Nature Reserve that include a large area of Zhiduo County (they also include parts of other counties): the *Suojia-Qumahe Wildlife Conservation Area* and the *Tongtianhe Forest/Shrubland Conservation Area*.

Main project partners in this conservation work will be the Sanjiangyuan National Nature Reserve together with local communities, the government (at the village, township, county and prefecture levels), and, where applicable, local organizations such as the Upper Yangtze Organization. Together, these agencies plan to collaborate and develop a practical "community co-management plan" that integrates sustainable community development with long-term regional biodiversity conservation. Plateau Perspectives has been particularly commended for its work to improve women's health and education, and will further develop this area of work as part of a broader community co-management plan.



# 1. BACKGROUND

## Plateau Perspectives

Plateau Perspectives is an international non-government organization (NGO) that promotes biodiversity conservation and sustainable community development in the Tibetan Plateau region of China.

Plateau Perspectives' program areas include the Conservation, Education, Health and Income Generation. Equal attention is given to Gender Equity; an important cross-sectoral theme.

Plateau Perspectives (PP) has five distinctive characteristics:

- PP integrates biodiversity conservation and community development
- PP considers the local – environments, cultures and indigenous knowledge
- PP seeks to achieve sustainability in all fields of work
- PP aims to develop successful replicable models of development
- PP develops partnerships with local communities, government and NGOs

All these factors help ensure that the work remains focussed on the local people and their environment. Such a focus is essential to attain long-term success.

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Plateau Perspectives is supported by a prestigious international *Council of Reference*<sup>1</sup> and more than 30 experts worldwide. The Council has 8 members:

- Professor Calvin DeWitt  
*former Professor of Environmental Studies, University of Wisconsin-Madison*
- Sir Brian Heap CBE ScD FRS  
*former Master of St Edmunds College, Cambridge University*
- Dr John Hodges  
*independent consultant, UN Food and Agriculture Organization*
- Sir John Polkinghorne KBE FRS  
*former President of Queens' College, Cambridge University*
- Sir Ghilleen Prance FRS VMH  
*former Director of Royal Botanic Gardens, Kew*
- Mr Matthias Stiefel  
*Executive Director, WSP International*
- Mr David Taylor  
*Director, USAID Office of Transition Initiatives*
- Dr Tony Whitten  
*Senior Biodiversity Scientist, Biodiversity Group, The World Bank*

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<sup>1</sup> More detail on Plateau Perspectives' international *Council of Reference* can be found in [Appendix 1](#).

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Plateau Perspectives' main expertise in China is comprised of the following people:

- Dr J Marc Foggin  
*Director, Plateau Perspectives*
  - Dr Marion Torrance-Foggin  
*Medical Director, Plateau Perspectives*
  - Dr John Sale  
*Biodiversity Consultant, Plateau Perspectives*
  - Dr Walter Willms  
*Resident Scientist, Agriculture Canada*
  - Dr Chris Wood  
*Assistant Professor, Zhejiang University*
- 

Project funds have been raised from private donors and trusts/foundations in Canada, USA, United Kingdom and New Zealand, from the Government of Canada (Social Sciences and Humanities Research Council of Canada) and other sources.

Plateau Perspectives aims to promote conservation and improve human welfare as an expression of practical Christian love for the world.

In Qinghai Province, Plateau Perspectives' main geographic focus to date, work is undertaken closely with the government, local NGOs and local communities:

- to protect the source areas of the Yangtze, Yellow and Mekong rivers
- to promote sustainable livelihoods in this fragile alpine environment
- to enhance the well-being and increase hope of Tibetan pastoralists

Specifically, since its foundation Plateau Perspectives has undertaken several projects, mostly in close collaboration with the local Upper Yangtze Organization, including:

- *Upper Yangtze Project*, with the Biodiversity Working Group, China Council for International Cooperation on Environment & Development (1998 - 2002);
- Partnership in the *Village and Township Doctor Training Program in Shannan Prefecture, Tibet Autonomous Region*, with British NGO Kunde Foundation and the Health Bureau, Shannan Prefecture, Tibet Aut. Region (2000 - 2001);
- *Environmental Education Teacher Training Workshop on the Tibetan Plateau*, with Chinese NGO Friends of Nature (2001, 2002);
- *Health Status and Risk Factors of Nomadic Pastoralists in Southern Qinghai Province*, with University of Montreal and the Health Bureau, Yushu Tibetan Autonomous Prefecture (2001 - 2004); and
- *Yangtze Headwaters Sustainable Development Project*, with the Government of Zhiduo County, Yushu Tibetan Autonomous Prefecture (2003 - present).

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***Plateau Perspectives Canada*** is registered as a non-profit organization by the Canada Revenue Agency (charity no. 88353 0511 RR0001) and incorporated by Canada Customs and Revenue Agency (BN 83622 7678 RC0001).

***Plateau Perspectives Scotland*** is recognized as a charity by the Scotland Inland Revenue's Charities Section (charity no. SC036202).

More information can be found on Plateau Perspectives' website:  
<http://www.plateauperspectives.org>.

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## The Sanjiangyuan Region

### Tibetan Plateau

The Tibetan Plateau covers approximately 2,500,000 km<sup>2</sup>, or around 25 % of China's land area (Table 1). With an average elevation between 4,000 and 5,000 m above sea level (asl), and many mountain ranges over 7,000 m asl, environmental conditions generally are too severe for agriculture and suitable only for pastoralism (animal husbandry). Indeed, 70 % of the region is rangeland, making it one of China's main pastoral areas.

The Tibetan Plateau is important for several other reasons as well:

- It encompasses the headwaters of several important Asian rivers, including the Yangtze, Yellow and Mekong Rivers.
- It is home to several million pastoralists who, like many livestock herders around the world, have long been marginalized because of the remoteness and poor transport access to their grazing lands.
- It provides unique habitats for many internationally endangered species such as snow leopard, Tibetan antelope, wild yak, argali and black-necked crane.
- It is one of the last great wilderness areas of the world, inhabited by Tibetan herders who could be enabled, as important local stakeholders, to steward the grassland resources in sustainable ways for the present and future generations.

Named after the headwaters (or source area) of three of China's greatest rivers – i.e., the Yangtze, Yellow and Mekong rivers – the *Sanjiangyuan Region* is situated in the central part of the Tibetan Plateau, in southern Qinghai Province (Figure 1).

### The Sanjiangyuan's Three Rivers: Yangtze River, Yellow River and Mekong River

The Yangtze River (in Chinese, *Chang Jiang*) is the longest in Asia and third longest in the world. Its source is situated around 4,900 m in southwest Qinghai Province. The river flows southwest through Sichuan and into Yunnan, then turns northeast and east, flowing across central China back through Sichuan, then Hubei, Anhui and Jiangsu provinces to its mouth into the ocean, near Shanghai – a total length of around 6,300 km.

The 5,464 km Yellow River (in Chinese, *Huang He*) is the second longest river in China, after the Yangtze River. Its source is also situated in southwest Qinghai Province, flowing north of the Yangtze River. The Yellow River is the symbol of the Chinese nation and generally recognized as the cradle of Han Chinese civilization itself.

The Mekong River (known in Tibetan areas as *Dza-chu*, and in Chinese as *Lancang Jiang*) is a major river of Southeast Asia. From its source in Qinghai Province, the Mekong flows southeast to the South China Sea, with a total distance of 4,200 km.

Twenty-five percent (25%) of the water in the Yangtze River, 50 % of the water in the Yellow River, and 15 % of the water in the Mekong River come from the

Sanjiangyuan region. The headwaters of these great rivers comprise the primary “water tower” of China and Asia. These freshwater resources, both the rivers themselves and the surrounding extensive Tibetan Plateau wetlands, provide many fundamental ecological services for the nearly 600 million people downstream whose livelihoods depend on these watersheds (Table 2).

However, in recent years shrinking wetlands, declining water levels and increasing desertification have impacted the Sanjiangyuan region. Plants and animals there are now under threat. To address this situation, the State Forestry Administration and the Government of Qinghai Province established the Sanjiangyuan National Nature Reserve in May 2000. The nature reserve’s Management Bureau was later founded in September 2001, and the reserve attained State-level (national) status in January 2003.

**Figure 1. Map of China – with Qinghai Province, Yushu Tibetan Autonomous Region and the Sanjiangyuan’s three major rivers highlighted**



## Sanjiangyuan National Nature Reserve (SNNR)

The *Sanjiangyuan National Nature Reserve* is the second largest nature reserve in the world, as well as the highest and most extensive wetland protected area in the world. It has a population of around 200,000 people living within its 152,300 km<sup>2</sup> – a land area larger than England and Wales combined (see Table 1). The nature reserve comprises the headwaters of the Yangtze, Yellow and Mekong rivers. Nearly 600 million people who live downstream depend on the proper functioning – and hence the long-term protection – of these rivers for their livelihood.

According to the Director of the State Forestry Administration, Mr Wang Zhibao, the establishment of the nature reserve aims to protect the Tibetan plateau ecosystem, with an emphasis on alpine swamp meadow and natural habitat of the unique wildlife in the region, and to promote sustainable economic development in the region.

**Table 1. Land areas, with international comparisons**

	Land area (in km <sup>2</sup> )	International comparisons (in km <sup>2</sup> )			
		World	Europe	Canada (province)	USA (state)
<b>Tibetan Plateau region</b>	2,500,000	Kazakhstan: 2,669,800	7 x Germany: 356,794	Quebec & Ontario: 2,618,451	1.6 x Alaska: 1,530,700
<b>Sanjiangyuan region</b>	320,000	Cote d'Ivoire: 322,460	Poland: 312,685	Newfoundland & Labrador: 373,872	New Mexico: 313,937
<b>Sanjiangyuan National Nature Reserve</b>	152,300	Bangladesh: 144,000	England & Wales: 151,171	3 x Nova Scotia: 53,338	Illinois: 150,007

**Table 2. Catchment areas and human population of the three major Asian rivers**

	Downstream population (in millions)	Percentage of China's population	Percentage of world's population	Catchment land area (in km <sup>2</sup> )	Percentage of world's land area
<b>Yellow River</b> ( <i>Huang He</i> )	107	8.2 %	1.7 %	752,000	0.5 %
<b>Yangtze River</b> ( <i>Chang Jiang</i> )	420	32.2 %	6.5 %	1,809,000	1.2 %
<b>Mekong River</b> ( <i>Lancang Jiang</i> )	60	— <sup>1</sup>	0.9 %	795,000	0.5 %
Total	587	> 40 %	9.1 %	3,356,000	2.2 %

1. Much of the Mekong River flows through Burma, Laos, Cambodia and Vietnam as well as China.

**Box 1. Qinghai News: *Project to protect main river sources launched***

By Guo Xiaohong  
September 1, 2005

According to the [management] overall plan, 3.13 billion yuan (US\$38 million) will be used to replenish 96.58 million mu (16 million acres) of land traditionally used for grazing. Grazing will be prohibited for five years after the replenishment works.

11.2 million yuan (US\$1.38 million) has been earmarked for the protection and restoration of 1.6 million mu (10,000 acres) of wetlands, and 52.3 million yuan (US\$6.46 million) to improve the 5.22-million-mu (86,000 acres) of deteriorating grasslands.

It is hoped that a sustainable balance between environment and social-economy will be achieved in Sanjiangyuan by 2020.

The project also includes infrastructure construction for local farmers and herdsmen, and other ancillary programs.

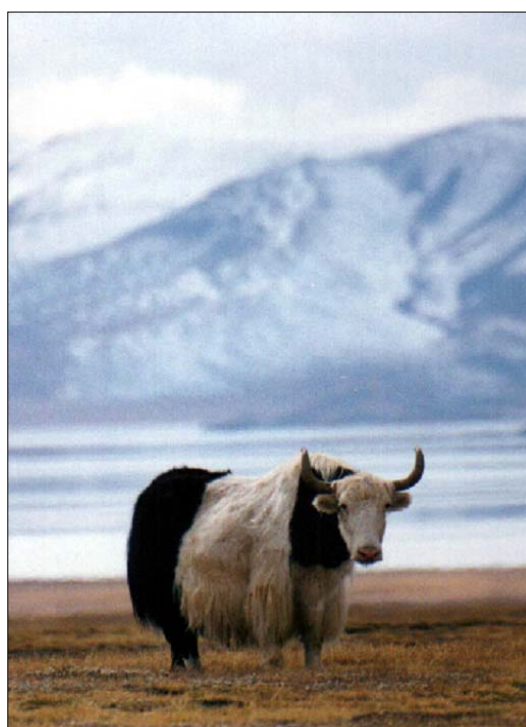
(Source: <http://www.qhnews.com/1028/2005/09/02/35@246114.htm>)

According to [www.qhnews.com](http://www.qhnews.com), a Qinghai Province news and information website, a comprehensive plan for the ecological protection and construction of the region was approved at the *79th Routine Meeting of the State Council* in January 2005. Under the plan, the State will invest about 7.5 billion yuan (US\$924.79 million) for this purpose. Since 2003, a total of 1.23 billion yuan (US\$151.67 million) has been invested in the region by central and local governments. The recently approved plan was launched on August 31, 2005 – a hallmark project of China's Western Development Strategy.

The Sanjiangyuan National Nature Reserve has 18 conservation areas, each with a core zone, a buffer zone and an experimental zone. In the central core zones, measures will be taken to protect endangered animals. Surrounding the core zones are buffer zones designed to promote conservation, yet still available to local herders for limited grazing of sheep and cattle. Outside these, multiple-use experimental zones will be used primarily for scientific investigations and tourism development. The total area of core zone amounts to 31,200 km<sup>2</sup>, the area of buffer zone amounts to 39,200 km<sup>2</sup> and the area of experimental and research zone amounts to 81,900 km<sup>2</sup> (i.e., 20%, 26% and 54% of the nature reserve's area, respectively). The 18 conservation areas also fall into three broad categories of purpose: 8 wetland, 3 wildlife and 7 shrubland and forest conservation areas (Table 3).

**Table 3. Sanjiangyuan National Nature Reserve's 18 Conservation Areas**

<b>Conservation purpose</b>	<b>Conservation Areas</b>	<b>Prefecture name</b>	<b>County name</b>	<b>Protection station?</b>
<b><i>Wetland conservation</i></b>	Xingxing Hai	Guoluo	Maduo	no
	Nianbao Yuzi	Guoluo	Jiuzhi	no
	Dangqu	Yushu	Zaduo	no
	Geladandong	Haixi	Geermu	no
	A'nimaqin	Guoluo	Maqen	1
	Yuegu Zonglie	Yushu	Qumalai	no
	Zhaling-Eling Hu	Guoluo	Maduo	no
	Guozong Mucha	Yushu	Zaduo	no
<b><i>Wildlife conservation</i></b>	Suojia-Qumahe	Yushu	Zhiduo , Qumalai	2
	Jiangxi	Yushu	Yushu	no
	Baizha	Yushu	Nangqian	no
<b><i>Shrubland / forest conservation</i></b>	Tongtian He	Yushu	Chengduo	1
	Dongzhong Batang	Yushu	Yushu	no
	Angsai	Yushu	Zaduo	no
	Zhongtie Jungong	Hainan	Tongde	no
	Duke He	Guoluo	Banma	no
	Maixiu	Huangnan	Zeku	no
	Make He	Guoluo	Banma	no



## *Yangtze River Headwaters Sustainable Development Project*

### Partner organizations

Plateau Perspectives, Upper Yangtze Organization and Government of Zhiduo County

### Geographic location

The *Yangtze Headwaters Sustainable Development Project* (2003-2008) is centred in Zhiduo County, in western Yushu Tibetan Autonomous Prefecture, Qinghai Province, China (Figure 2). In terms of land area, the province is approximately the area of Myanmar; the prefecture the area of Syria; and Zhiduo County the area of Scotland (Table 4).

### General description of project

The overriding goal of this development project is to improve the living conditions of local Tibetan herders and to protect the fragile grassland environment, including many internationally threatened wildlife species. Project activities fall into three broad areas of work: community health, basic education, and environmental protection.

**Figure 2. Map of Zhiduo County and the greater Tibetan Plateau region**



## Community Health

In 2004-05, Plateau Perspectives trained all ~50 village doctors and over 20 women's health workers. Some of the young women also have joined on immunization trips to the remote western parts of the county, a project coordinated together with the county health bureau and epidemic station. Rural health will equally be improved by the establishment of village clinics. These can improve the accessibility of health care services, assist in the implementation of a national health insurance scheme, improve the storage of medicines and provide logistic support for immunization work. They also provide a platform from which health work can be better coordinated at both the village and county levels. Doctor and midwifery training may in the future also be extended into neighbouring counties such as Qumalai County and Zaduo County.

## Basic Education

For several years, Plateau Perspectives and the Upper Yangtze Organization have assisted with the development of village schools, especially in western Zhiduo County. Muqu School was established in 2000 with significant assistance from Plateau Perspectives. This included provision of tents to serve as classrooms and dormitories for three grades, and later (when the community had decided on a permanent location for the village school) Tibetan-style permanent classrooms as well as a kitchen and dining room. Yaqu School was established around the same time, and Plateau Perspectives has equally provided support in various ways – most recently, in the construction of a kitchen and dining area, as well as provision of new bedding material (quilts) for all the students.

**Table 4. Land areas, with international comparisons**

	Land area (in km <sup>2</sup> )	International comparisons (in km <sup>2</sup> )			
		World	Europe	Canada (province)	USA (state)
<b>Qinghai Province</b>	720,000	Myanmar: 678,500	2 x Germany: 356,794	Alberta: 642,317	Texas: 695,673
<b>Yushu Tibetan Autonomous Prefecture</b>	191,178	Syria: 185,180	2 x Hungary: 93,030	3 x New Brunswick: 71,450	Washington: 184,674
<b>Zhiduo County</b>	80,220	United Arab Emirates: 82,880	Scotland: 78,000	New Brunswick: 71,450	South Carolina: 82,898
<b>Suojia Township</b>	11,000	Jamaica: 10,991	Cyprus: 9,250	2 x Prince Edward Isl: 5,660	Connecticut: 12,548

Previously, Plateau Perspectives and the Upper Yangtze Organization also contributed to education through the operation of teacher training workshops with a focus on environmental education. Technical assistance has also been given to local English teachers in the county middle school.

As a result of these projects and activities, children who previously had no access to education are now able to attend school – some having even reached middle school. One-third of the children attending the village schools are girls.

### Environmental Protection

To date, Plateau Perspectives' conservation work has largely been confined to informal training of local Tibetan herders and Upper Yangtze Organization staff in conservation matters and wildlife monitoring techniques. Many discussions have also been had with local leaders, contributing to the establishment of community-protected areas in Suojia Township – each with a different focal wildlife species (i.e., Tibetan antelope, Tibetan wild ass, snow leopard and black-necked crane) or critical habitat (i.e., wetland habitat). Enlisting local community support for conservation, and working with Tibetan communities to support their on-going conservation work, are fundamental for long-term conservation and sustainable development.

Specifically, Plateau Perspectives has already begun to train local wildlife monitoring teams to assist them in their plans to undertake scientific wildlife conservation. Local village leaders have also asked that Plateau Perspectives and the Upper Yangtze Organization assist them to coordinate more closely with the Sanjiangyuan National Nature Reserve. Several wildlife monitoring worksheets have been developed, with special consideration given to the low literacy levels prevalent in the area (Figure 3).

Plateau Perspectives has also helped raise awareness of the Sanjiangyuan region, both nationally and internationally, through workshops and conferences (e.g., Qinghai Biodiversity Conservation Meeting, held in Xining, July 2001; Annual Meeting of the Society for Conservation Biology, held in Canterbury, U.K., August 2003; China Western Development Conference, held in Xian, May 2004) as well as through its partnership with the Biodiversity Working Group (China Council for International Cooperation on Environment and Development) and consequent exposure. Plateau Perspectives' website is regularly visited as well, with over 25,000 webpage hits per month on average.

Finally, in order to further develop its conservation, Plateau Perspectives recently organized a strategic conservation planning meeting with the Sanjiangyuan National Nature Reserve, Government of Zhiduo County and the Upper Yangtze Organization (see [Appendix 2](#) & [Appendix 3](#)). In preparation for the meeting, a 4-day wildlife conservation training workshop was held, which had 16 people in attendance from both local communities and several county government bureaus ([Appendix 4](#)). Following this, Plateau Perspectives staff and two international experts, together with nature reserve staff, undertook a 6-day fieldtrip through western Zhiduo County in order to discuss and improve their understanding of the key issues that must be considered to promote conservation and development in the area ([Appendix 5](#)). Both of these activities gave a foundation upon which to build the third and most important



## 2. PROCEEDINGS OF PLANNING MEETING

### General description of the Biodiversity Conservation Planning Meeting

One of Plateau Perspectives' main goals for 2005-06 is to launch conservation work in the Sanjiangyuan region in Yushu Tibetan Autonomous Prefecture ([Appendix 7](#)). Environmental protection work includes both the protection of biodiversity and the sustainable utilization of an area's natural resources. The term *Sanjiangyuan* means "Three Rivers' Headwaters", referring to the source areas of the Yangtze, Yellow and Mekong rivers in Zhiduo, Qumalai and Zaduo counties, respectively. The initial focus of the planning meeting was Zhiduo County ([Appendix 8](#)), however most discussions and agreed action points can readily be applied to the neighbouring counties as well.

The main ecosystem in the area is alpine grassland, which

- (1) supports a wide array of wildlife species,
- (2) provides ecosystem services for millions of people downstream, and
- (3) is home to Tibetan herders whose livelihood has adapted over millennia to the harsh environmental conditions of the Tibetan plateau region.

In pursuance of its goal to develop a regional project with a joint emphasis on natural resource management and on community development, Plateau Perspectives worked together with several local partners to organize a biodiversity conservation planning meeting in October 2005. The details of this meeting are provided below.

Plateau Perspectives provided the funding for the meeting and related conservation activities. Additional funding for new work emerging from the workshop is also being sought from various sources.

### Training workshop

A 4-day training workshop was led by Plateau Perspectives' Biodiversity Consultant, Dr John Sale. An outline of the subjects taught is provided in [Appendix 2](#), and a list of attendees in [Appendix 4](#).

### Fieldtrip to nature reserve

During the fieldtrip to the nature reserve (Suojia Township), Plateau Perspectives staff and Sanjiangyuan National Nature Reserve Management Bureau staff discussed many important issues. Most importantly, the necessity to work closely with local people became evident – both for conservation matters *per se*, such as wildlife monitoring, as well as to address health and educational needs and wildlife-related economic losses. More income could be generated with improved livestock and rangeland management and veterinary care, and through new avenues such as the development of ecotourism. All of these topics may be addressed in greater detail in future training workshops, and all should be included in the Nature Reserve's community co-management plans. A list of participants is given in [Appendix 5](#).

## Biodiversity Conservation Planning Meeting

Plateau Perspectives first extended a welcome to the planning meeting, followed by an overview of the schedule and desired outcomes of the meeting. All participants introduced themselves. To begin discussions, a 30-minute video on local livelihoods in the project area was viewed.

Plateau Perspectives described what it hoped to achieve from the planning meeting, namely to find ways of better integrating community development and conservation. Specifically, because people's livelihoods are so closely tied to the quality of the land (i.e., grassland resources), and because people's livelihood and income and health are all woven tightly together and inter-connected, environmental protection is necessary to improve local communities' quality of life. In a similar way, providing for people's needs – including both the provision of social services, such as education and health, and income generation – is also a necessary part of the protection of the environment.

The Sanjiangyuan National Nature Reserve Management Bureau expressed a number of similar ideas, and also expressed appreciation for Plateau Perspectives' approach to community development. A main area of common interest is the further development of the concept of *community co-management*, with the goal of promoting conservation in the Sanjiangyuan region. To do this, direct assistance must be given in matters of conservation and resource management as well as income generation for local people. Attention was also drawn to the importance of the health needs of people, especially for women and children. Plateau Perspectives was particularly commended by the nature reserve for its work to improve women's health and education, and was urged to further develop this area of work. Transportation needs and the necessity of finding new income generating opportunities to help offset economic losses incurred due to conservation-based restrictions or increasing wildlife numbers were also highlighted. In every area of work, it was deemed important for everyone to work closely with local people.

The Upper Yangtze Organization described three principles it tries to follow in all its work, namely to work with local people on environmental matters, to serve as a bridge between local people and national and international agencies, and to raise awareness of the value of the source area of the Yangtze River and the Tibetan Plateau region. Established in 1998, the Upper Yangtze Organization has undertaken many projects, including several important conservation projects jointly planned and implemented with Plateau Perspectives. Most recently, three community festivals were created in association with Plateau Perspectives to promote the protection of (and raising environmental awareness of) the snow leopard, Tibetan wild ass and wetland habitat with its associated rich avian fauna. In the case of two of the three festivals, they were purposely situated at the site of a village school and a community clinic, which have been developed specifically with the concept of "community centre" in mind – that is, each is intended to grow into a multiple-purpose community centre where education, health promotion and environmental conservation are all carried out. In this way, both the Upper Yangtze Organization and Plateau Perspectives intend to establish an effective way of partnering with local Tibetan communities in regional conservation efforts – these community centres have the potential to serve as bases for an indigenous *Biodiversity Conservation Network*.

Other aspects of the Upper Yangtze Organization's work were also introduced to the planning meeting participants.

Throughout the meeting, all of the attendees participated well and contributed much information and new insights into the present environmental situation in the region. Following the introductory comments outlined above, Dr Sale gave a presentation on the biological, economic and social considerations in biodiversity conservation. In this presentation, biodiversity was defined (i.e., the variability of all living organisms, estimated at between 5 and 30 million species, the majority of which are still unidentified) and several indicators of biodiversity were enumerated including species richness, concentrations of rare species, habitat quality and the integrity of ecological processes. At the national level, China is the second richest country in the world in terms of mammal species (500 species) and sixth "richest" for bird and reptile species (1329 and 376 species, respectively). The value of biodiversity includes direct use values (e.g., consumptive uses such as food, medicine, fibres; and non-consumptive uses such as ecotourism), non-use values (e.g., ecosystem services such as control of soil erosion and carbon sequestration), and nature's intrinsic value, which is reflected in many of the world's religions. The key message of the presentation was that biodiversity is part of the *natural capital* underpinning the livelihoods of the rural poor of the world, and that *underlying economic and social pressures* are probably much more important aspects of conservation than strictly biological factors. There is therefore need for collaboration between conservation and development agencies in addressing common causes of poverty and biodiversity loss. Linking the two is best done through environmental *management*, as opposed to strict wildlife *protection*, so that biodiversity can be maintained in ways that promote the welfare of local people.

On the second day, an outline of information needed to properly manage key wildlife species was given – a list of what species are present, how abundant each species is, and whether the abundance of each species is changing over time (i.e., trend analysis). For conservation purposes, it also is important to understand the seasonal changes in each species' distribution, key habitat requirements, food preferences, special conditions required for reproduction, whether a species can bring damage to human life or property, and what human activities may harm the species.

Mammals and birds of special interest in the *Suoja-Qumahe Wildlife Conservation Area* are all State-level protected species, particularly the Tibetan wild ass, Tibetan antelope, wild yak, argali, snow leopard and black-necked crane.

Key threats and conservation needs were also discussed for each main habitat. From the subsequent detailed discussions – ranging from the topic of global warming to traditional grassland management practices to national legislation on protected areas, etc. – all workshop participants agreed several important areas for future work. These strategic areas are described in greater detail in the following section.

Following the above discussion of key threats and needs for each habitat type, which continued into the third day, the group spent time considering the potential benefits of Plateau Perspectives establishing a *Tibetan Conservation & Development Centre* (Ch. *Qingzang Gaoyuan Huanjing yu Fazhan Jiaoyu Zhongxin*), and reviewing all the possible conservation action points that had been proposed to date. Altogether, the essential topics raised over the course of the three-day workshop, and actions agreed

by Plateau Perspectives, the Sanjiangyuan National Nature Reserve Management Bureau and other workshop participants as important and worthy of consideration, are listed in the next section under six separate headings.

A detailed schedule of the meeting is provided in [Appendix 3](#), and a list of meeting participants is provided in [Appendix 6](#).



### **3. STRATEGIC CONSERVATION PRIORITIES agreed at the *Biodiversity Conservation Planning Meeting***

Geographic focus of conservation work (for agreed action points, see below)

The broad geographic region of concern is the Sanjiangyuan region, which comprises all of southern Qinghai Province. Within this large region, Plateau Perspectives is at present focused on Yushu Tibetan Autonomous Region – where it already has project work – however, it may be able to expand if a specific request is made (e.g., to assist with integrated conservation and development work in the Anyemaqen Mountain area of Guoluo Tibetan Autonomous Prefecture).

In the shorter-term, however, the conservation priorities described below will initially be undertaken in the two conservation areas of the Sanjiangyuan National Nature Reserve where

- (1) Environmental Protection Stations have already been built<sup>2</sup> and
- (2) that include parts of Zhiduo County, where Plateau Perspectives and partners are presently implementing the collaborative *Yangtze River Headwaters Sustainable Development Project*.

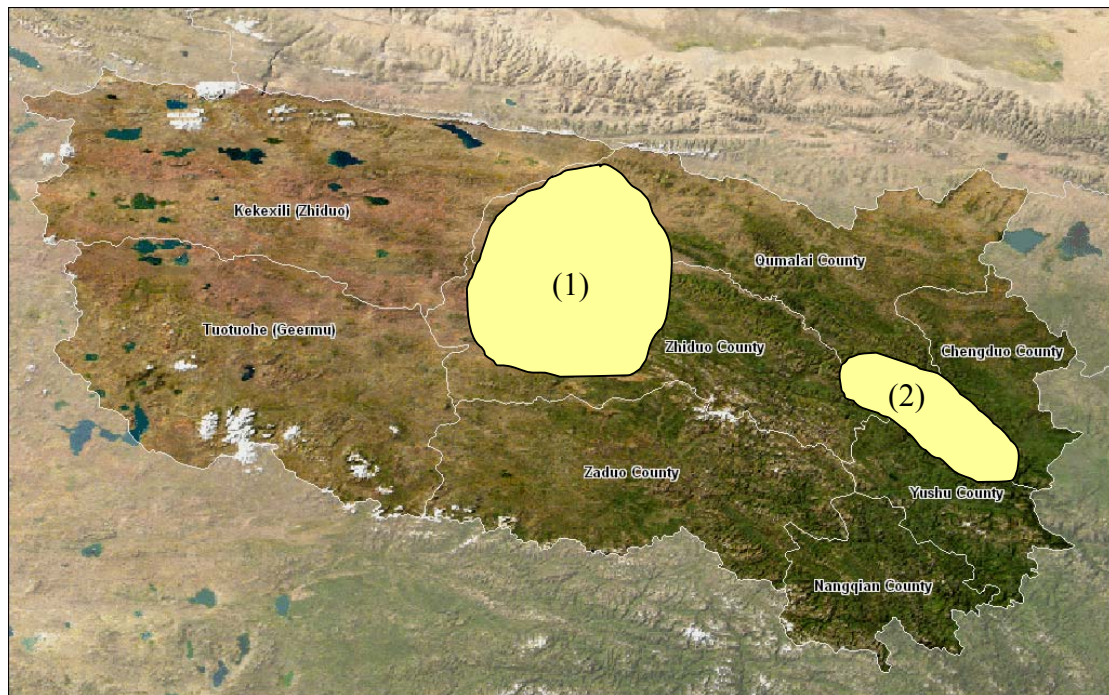
These two conservation areas are the *Suojia-Qumahe Wildlife Conservation Area* (with two environmental protection stations) and the *Tongtianhe Forest/Shrubland Conservation Area* (with one environmental protection station). These conservation areas also include a large area of Qumalai County (cf. the *Suojia-Qumahe Wildlife Conservation Area*) and Chengduo County and Yushu County (cf. the *Tongtianhe Forest/Shrubland Conservation Area*) (Figure 4).

Because the hosts of the planning workshop hold a common view that conservation and community development should be integrated as much as possible – that is, that local people's livelihoods and welfare must be considered, as well as the conservation of the natural environment and its ecological processes – a strong emphasis will also be placed on *Community Co-management* of the Sanjiangyuan region's resources. In this regard, much community-based conservation work has already begun in Suojia Township, in western Zhiduo County, from which a number of important lessons have been drawn (see [Appendix 9](#)). Suojia Township should therefore continue to receive special (though not exclusive) attention in the coming months and years, in order to compare and contrast its experience with work undertaken in other areas where there has been less community involvement. Attention should equally be given to other ecologically important areas where local communities have begun to participate with the government in addressing conservation priorities, largely through the development of other local NGOs (e.g., other wetland areas in Qumalai and Zaduo counties).

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<sup>2</sup> In total, the Sanjiangyuan National Nature Reserve has 18 different conservation areas, however only three of these have associated Protection Stations (as of November 2005).

**Figure 4. Map of Yushu Tibetan Autonomous Prefecture, with six counties and outline of two Conservation Areas: (1) the *Suojia-Qumahe Wildlife Conservation Area*, and (2) the *Tongtianhe Forest/Shrubland Conservation Area***



## **Action 1. Responsive training for nature reserve staff, NGOs, government bureaus**

From the planning meeting and from earlier meetings between Plateau Perspectives and the Sanjiangyuan National Nature Reserve Management Bureau, it is clear that conservation-related professional training will play a very important role in future work. Plateau Perspectives has contact and good relations with many international experts, as well as a high profile and supportive international *Council of Reference* that shall be able to assist in raising various forms of support, as necessary.

It was suggested and agreed at the planning meeting that training should not be in the classroom only, but include significant practical, field-based components as well.

Important topics:

- Identification of mammals, birds, plants in the field
- Identification of animal signs (animal tracks, scat, etc.)
- How to collect and analyze wildlife information / data
- How to manage protected areas, how to monitor wildlife
- Community development / rural development
- Project planning, management and evaluation
- Geographic Information Systems, use of GPS
- Database design, data analysis, computer training

**Implementation schedule:** Training workshops to be planned and organized on a case-by-case basis, in response to expressed needs. Local NGOs, government bureaus and the Sanjiangyuan National Nature Reserve Management Bureau can all make specific requests. A workshop on how to design an effective *Community Co-management Plan* should be one of the first priorities (see Action 5). All training workshops (and other activities) would also be facilitated by the establishment of a *Tibetan Environment & Development Centre* (see Action 6).

## **Action 2. Identification of main biodiversity hotspots in Zhiduo County**

To facilitate conservation work generally, it would be best to focus initially on only two or three “hotspots” in Zhiduo County, and later apply what has been learned to a broader geographic area. At least two main habitats should be included, grassland and forest. To help in this, a distribution map of key wildlife and wild areas in the project area should be created, including an indication of where wildlife distribution and local herders’ use of the grassland overlap. Because of the favourable cultural landscape for conservation, sacred mountains and other important cultural sites should be clearly indicated on the hotspot map as well as other basic features of the landscape such as towns and roads. Simple recommendations (e.g., location of roads) may also be made.

**Implementation schedule:** The creation of a biodiversity and conservation map for Zhiduo County should begin as soon as possible. Plateau Perspectives already has the necessary GIS software available and much of the baseline geographic data (which is either public domain and free on the Internet, or has been purchased from ASIAN<sup>3</sup>).

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<sup>3</sup> The *Asian Spatial Information and Analysis Network* (ASIAN) provides support for academic and applied research using Geographical Information System (GIS) databases for Asia, especially China.

Known basic information should now be compiled into a GIS, and a draft map created and then distributed to all the planning meeting participants for review.

### **Action 3. Monitoring wildlife and grassland, with local community members**

In selected areas – for example, in wildlife hotspots or localities where there is good community support for biodiversity conservation – environmental monitoring should be initiated. In time, such monitoring activities should be incorporated into an overall management plan (there may be a unique plan for each of the 18 different conservation areas) *and* involve local communities in data collection, data analysis and relevant decision-making. Many aspects of wildlife monitoring are general in nature, however in some instances species-specific plans should be made. Such monitoring work can form the basis of further environmental education in the area as well as contribute regularly to a database of observations that can assist the nature reserve to make informed wildlife management and conservation decisions.

Important subjects:   Wetland birds (as an indicator of changes in wetland habitat)  
                              Predators of the pika (such as wolf, foxes, cats, birds of prey)  
                              State protected species (including Tibetan wild ass and argali)  
                              Grassland quantity and quality (with use of exclosure fences)  
                              Extent of shrubland, and resident and migratory bird species  
                              Wildlife in juniper woodland (including musk deer, leopard)

To achieve the above, it was agreed that it would be valuable to set up a working group consisting of the Sanjiangyuan National Nature Reserve, local and international NGOs and local herders to develop appropriate monitoring schemes – such schemes being essential for the future management of wildlife species and habitats.

Monitoring of wildlife and grassland can be done in two ways: by teams of experts, or recruiting local herders to make note of observations according to agreed schedules and worksheets. To undertake such work, herders would need to be provided with binoculars, notebook, pencil, and possibly an appropriate subsidy. Herders would be formed into teams, each also to include a wildlife expert (e.g., from national and/or international NGOs) that would provide regular training and field-based supervision. Plateau Perspectives can provide funding, and also provide on-site assistance to help design scientific monitoring schemes, organize training workshops, give supervision and support to local herders, and if necessary also undertake expert wildlife surveys.

Finally, some key questions of wildlife biology and grassland conservation may best be answered by working closely, over a period of time, with a small number of local herders who are recognized by their own community as “successful herders” – both in terms of the number and quality of their livestock and the condition of their grassland.

**Implementation schedule:** Ad hoc wildlife observations should be made on every trip in the area, undertaken in the context of the on-going Yangtze River Headwaters Sustainable Development Project, as well as in the context of trips aimed specifically to address conservation or environmental education matters. Local monitoring teams should be established as soon as possible (cf. Jiongqu wildlife monitoring team) and offered appropriate training in wildlife survey techniques and data collection. With

regard to monitoring grassland vegetation, with a special emphasis on examining the relative impact of domestic livestock on grassland species composition and structure, several locations should be selected and livestock exclosures set up before the start of the next vegetative growing season. In some instances, exclosures could be set up on the grassland managed by village schools (e.g., Yaqu school), so that children may be given a unique opportunity of environmental education by examining the grassland.

#### **Action 4. Organization of meeting to examine grassland management practices**

Participants of the planning meeting deemed that it would be very useful to organize a separate discussion session on grassland management and conservation. This would allow time to focus on many important grassland issues. Representatives from several departments should be invited to attend, including the provincial Grassland Bureau, Animal Husbandry Bureau and Agriculture Bureau. Plateau Perspectives agreed that it could help organize such a meeting.

**Implementation schedule:** A meeting on grassland management and conservation should be organized and held in Xining or a similar venue, sometime between 18 and 24 months from now. Background documents should be prepared and initial grassland exclosure experiments conducted prior to the meeting.

#### **Action 5. Development of a community co-management plan to integrate all activities**

There is a clear need to draw together all the activities described above into an overall plan, a *management plan*, coordinated by the Sanjiangyuan National Nature Reserve. Furthermore, community co-management – that is, working together with local people and communities toward the same conservation goals – is central to the success of this venture. *Community co-management* also must include specific assistance given to local communities' development needs (i.e., basic human needs such as health care, income generation, education, etc.). A sample community co-management plan for a nature reserve working with community participation is given in [Appendix 10](#).

Key issues to consider:	national legislation
	conservation priorities
	wildlife monitoring, with focus on trend analysis
	training needs for nature reserve staff, local NGOs, etc.
	tourism development (as a means of income generation)

One of the main needs that was repeatedly discussed during the conservation planning meeting was the need for “wildlife monitoring.” Because local people are good allies in conservation, keen to participate, and because of limited staff in the nature reserve, all workshop participants deemed that engaging the support of local people in wildlife monitoring would be a good way to gather valuable wildlife data, and cost-effective. Specifically, the establishment of local wildlife monitoring teams would help further the nature reserve's and local people's shared conservation goals.

The local Upper Yangtze Organization has been promoting this idea for several years, together with Plateau Perspectives, however it is now time to ensure that such work is conducted scientifically. The Management Bureau of the Sanjiangyuan National Nature Reserve and other participants of the meeting agree that this approach should be adopted. It was also agreed that cooperation among all agencies is essential. Such wildlife monitoring should form an integral part of a nature reserve management plan.

If requested, Plateau Perspectives can conduct a training workshop on how to design a management plan, including *community co-management*, for part of the nature reserve – such as Zhiduo County, or the Suojia-Qumahe Wildlife Conservation Area.

**Implementation schedule:** A community co-management plan for the Sanjiangyuan National Nature Reserve (or for one or more of its 18 conservation areas) should be further developed as soon as possible. However the details of this have yet to be determined by the nature reserve's Management Bureau.

### **Action 6. Establishment of a *Tibetan Conservation & Development Centre***

To facilitate the above activities, the establishment of a training centre was proposed by Plateau Perspectives and discussed by the workshop participants. Everyone agreed that the building of such a centre would make a valuable contribution to conservation and sustainable development in the region. A name for the centre was proposed, the *Tibetan Conservation & Development Centre* (Ch., *Qingzang Gaoyuan Huanjing yu Fazhan Jiaoyu Zhongxin*). It should also be linked to local community centres (e.g., as already begun in Jiongqu and Muqu villages), thus becoming the head office of a *Biodiversity Conservation Network* with many community-based satellite stations.

The main purposes for this training centre are:

- To serve as an *Environmental Education & Information Centre* for the region
- To provide conservation and wildlife training for herders serving as monitors
- To provide vocational training for herders who have recently moved to town
- To provide continuing professional development for village health workers
- To model innovations in environmental management and income generation
- To coordinate conservation research activities in the project area
- To facilitate Plateau Perspectives' project management
- Accommodation for visiting experts, etc.

Two locations were discussed, Zhiduo county town and Suojia township. For practical reasons (e.g., power supply, phone and internet, accessibility), it was decided that the centre should be built in or near the county town. It was equally suggested that if office space could be provided within Plateau Perspectives' centre for Sanjiangyuan National Nature Reserve staff, then similar facilities could be provided in return to Plateau Perspectives in the conservation station that has already been built in Suojia township. If the centre is built near the county town, it may be possible to include within the area of rented land some shrubland along the Nyecha River (a tributary of the Yangtze River). This shrubland could be fenced for protection and restored, used

for environmental awareness and other educational purposes, and be a regular bird observation site.

While the centre may be built in phases, ultimately it should include the following:

- Meeting room, with video capabilities
- Training room, with capacity for 15-20 people
- Exhibition hall on wildlife and ecosystems, history and culture, health
- Offices for Plateau Perspectives, also for Nature Reserve and local NGOs
- Conservation and development library, with reading lounge, internet access
- Simple laboratory (e.g., to examine water quality, press plants, etc.)
- Accommodation, as necessary

Depending on land available to build the centre, and the necessary funding, an area of shrubland can be fenced, some grassland fenced, and a bird observatory (blind) built. Altogether, this training centre should be promoted as an educational gateway to the region and a platform for learning, scientific investigation and wildlife conservation.

**Implementation schedule:** The *Tibetan Conservation & Development Centre* should be established as soon as possible, but is dependant on raising necessary funds to begin the first phase of construction. In the meantime, agreement on lease of land must be reached and detailed plans made for content as well as for architectural style.



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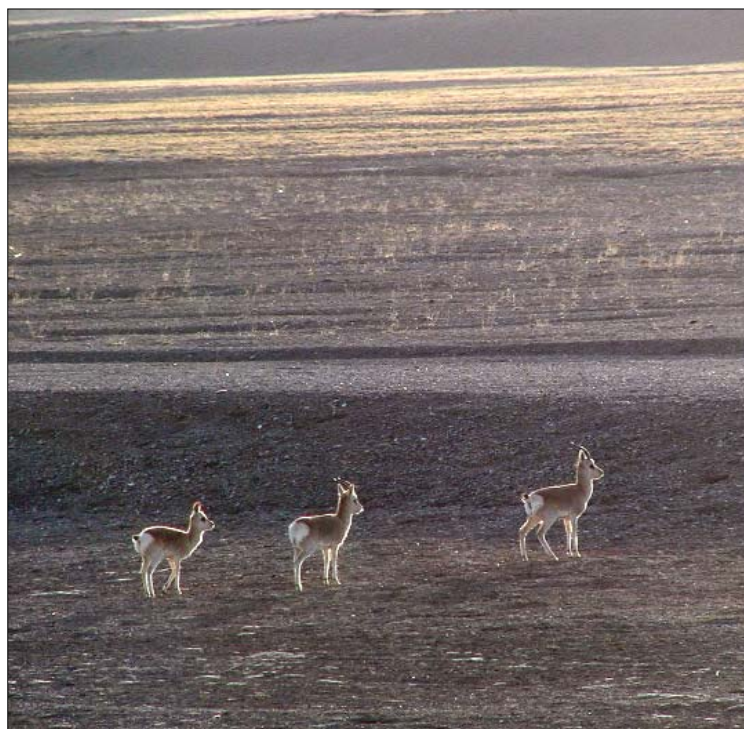
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## 7. Acknowledgements

We would like to extend a warm “thank you” to four good friends and colleagues who have made this environmental work possible – Dr John Sale (UK), Dr Charles Warren (UK), Dr Walter Willms (Canada) and Dr Chris Wood (UK). Each has contributed in significant ways in the lead-up to the planning meeting described herein. We sincerely hope they will be able to continue working with Plateau Perspectives as we now move into the implementation phase of this exciting work.

The Upper Yangtze Organization (UYO), especially Wenzha, and many other friends and colleagues in Zhiduo County have equally made this conservation work possible, both by introducing us to the area and by welcoming us into their homes and families. To all these people, we also would like to express our sincere gratitude. We especially thank Zhaduo, Baolei, Nyima, Denzin, Drashi, Shiamba, Onde and many others.

The Government of Zhiduo County, and the Foreign Affairs Offices of Yushu Tibetan Autonomous Prefecture and of Qinghai Province, have also given genuine support to Plateau Perspectives’ work in the region. We thank them for this.

It has equally been a pleasure for us to work with good colleagues in the Management Bureau of the Sanjiangyuan National Nature Reserve, including Director Li Ruofan, Basang Lhamo and Li Wenyuan. We thank them, and wish for many good years of successful cooperation in the future.

The entire Plateau Perspectives team must also be thanked for its tremendous work over the past few months, which has made the *Yangtze River Headwaters Sustainable Development Project* as a whole successful, and the conservation planning meeting also a good success. We have learned a lot through the process, and feel confident that we are now well on the way to establishing a good regional long-term biodiversity conservation project in the Sanjiangyuan region – a special part of our global heritage – for this, special thanks are due in particular to Selwyn Yeoman, Caiwang Chujie (Hudson), Marion Torrance-Foggin, Liu Lingjun (Larry) and Tarshin.

A final note of appreciation is also given to our generous supporters in the UK, who have contributed the necessary funds to begin this exciting venture of protecting and stewarding the natural environment.

**Dr J Marc Foggin**

Director, Plateau Perspectives

## **8. List of appendices**

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Appendix 2. Letter of invitation to training workshop and planning meeting

Appendix 3. Detailed schedule for the conservation planning meeting

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Appendix 7. Fact and figures: Yushu Tibetan Autonomous Prefecture

Appendix 8. Fact and figures: Zhiduo County (general)

Appendix 9. Case Study: Community innovations in environmental management

Appendix 10. Sample outline of nature reserve community co-management plan

## Appendix 1. Plateau Perspectives' Council of Reference

### Professor Calvin DeWitt

Calvin DeWitt is a retired Professor of Environmental Studies, University of Wisconsin-Madison, and former President of the Au Sable Institute. He is a physiological ecologist and ecosystems ecologist with a focus on wetland ecosystems. At Au Sable Institute he administers a programme that serves 60 Christian colleges and universities in North America, India, and Africa with courses in Christian environmental stewardship.

In the area of interface between ecology and Judeo-Christian environmental ethics he is co-author (with Sir Ghilleen Prance) of *Missionary Earthkeeping* (1992) and author of *Caring for Creation: Responsible Stewardship of God's Handiwork* (1997).

### Sir Brian Heap CBE ScD FRS

Sir Brian Heap is a former Master of St Edmunds College, Cambridge University, and a Fellow and Foreign Secretary of The Royal Society. He is an eminent animal biologist and until recently was Director of the Babraham Institute, Cambridge, and Director of Science, UK Biotechnology and Biological Sciences Research Council. He is also the UK representative on the NATO Science Committee, and has worked with the World Health Organization in China. Professor Heap holds doctorates from Cambridge, Nottingham and York, has published extensively and holds distinguished awards for his scientific work.

### Dr John Hodges

Dr John Hodges was responsible for animal breeding and genetic resources in the Food and Agriculture Organization (FAO) of the UN where he had wide experience of development agriculture. Previously he was Professor of Animal Genetics at the University of British Columbia, Canada and earlier taught at Cambridge University, UK. He is the former Head of the Production Division of the Milk Marketing Board of England and Wales. He has degrees in agriculture, livestock production and genetics from Reading and Cambridge Universities (UK) and in business administration from Harvard University (USA).

Dr Hodges is co-author of the book *Tropical Cattle: Origins, Breeds and Breeding Policies* (1997). Having analysed the history of genetic gain and livestock in the tropics he recommends an alternative approach to improving quality of life by greater use of indigenous breeds and working together with the local cultures of livestock producers.

Since 1990, Dr. Hodges has worked with the governments and agricultural leaders in Central and Eastern Europe to restructure agriculture. He writes and speaks on Ethics, Genetics and Agriculture examining their influence on the future development of society in Developing Countries and in the West.

### Sir John Polkinghorne KBE FRS

Sir John Polkinghorne is an Anglican priest, the former President of Queens' College, Cambridge University, and former Professor of Mathematical Physics at Cambridge University. Dr Polkinghorne resigned his chair in physics to study for the Anglican priesthood. After completing his theological studies and serving in parishes, he returned to Cambridge. During this time, he wrote a series of books on the compatibility of religion and science. These include *Quarks, Chaos and Christianity* (1994), and most recently, *Belief in God in an Age of Science* (2000) and his Gifford Lectures, *The Faith of a Physicist*. Dr Polkinghorne was the recipient of the 2002 Templeton Prize.

### Sir Ghilleen Prance FRS VMH

Sir Ghilleen Prance was for eleven years Director of the Royal Botanic Gardens, Kew, until his retirement in 1999. Prior to this he was Senior Vice President for Science of the New York Botanical Gardens and Founding Director of the Garden's Institute of Economic Botany. He is an expert on the flora of the Amazon rain forests, having led annual expeditions there over a period of twenty-five years and described more than 450 Amazonian plants new to science.

Sir Ghilleen was trained as a plant taxonomist and spent over 8 years on fieldwork and botanical exploration in Amazonian Brazil. He has a world-wide interest in the sustainable development of rainforest ecosystems and conservation generally; as well as being author of 19 books and editor of a further 14 books, he has published over 400 papers of both scientific and general interest on plant systematics, plant ecology, ethnobotany and conservation.

### Mr Matthias Stiefel

Mr Stiefel works in Geneva as Executive Director of WSP International, a private organisation affiliated with the UN, which uses action-research and consensus building methodology to assist local and national actors in war-torn societies in consolidating peace and rebuilding their countries. It also assists the UN and the international community in better supporting them in this task. In the early 1970s he was a freelance journalist and consultant in Southeast Asia. In 1986 he resigned from employment with the UN to spend five years as a farmer on a traditional dry-land subsistence farm in the Algarve, motivated by the desire to gain practical field experience of development issues. Mr Stiefel is also an International Trustee (Chair) of A Rocha International.

### Mr David Taylor

Mr David Taylor is Director of the USAID Office of Transition Initiatives. Prior to USAID, Mr. Taylor served in the private non-profit sector with ADRA International for 24 years and World Vision for 10 years.

In his current role as Director of USAID/OTI, Mr Taylor's tasks include that of providing assistance to ordinary citizens in fragile, failing or recovering states. His office has partnered with thirty countries over the past ten years, and is currently active in ten countries. In several instances they have supported conservation projects when environmental issues were identified as key factors in the fragility of the state.

### Dr Tony Whitten

Dr Tony Whitten is Senior Biodiversity Specialist for the East Asia and Pacific Region at the World Bank in Washington, D.C., where he attempts to achieve the conservation of forests, wildlife, karst biota, and freshwater biodiversity by whatever means. He has written over a dozen books on the ecology and natural history of Indonesia, and works throughout the East Asia region from Mongolia to New Guinea. Dr Whitten manages stand-alone conservation projects, research/capacity projects, a regional project on faiths and the environment, and environmental assessment on other World Bank projects.

## Appendix 2. Letter of welcome to the training workshop and planning meeting

Welcome to this event, jointly convened by Plateau Perspectives, the Upper Yangtze Organization, Sanjiangyuan National Nature Reserve Management Bureau, and the Government Zhiduo County. We value your contribution and hope that our discussions in the days ahead will enable us to better achieve the goals of the *Yangtze River Headwaters Sustainable Development Project*.

We extend a special welcome to our international guests: Dr John Sale, a biodiversity conservation specialist from the UK; Dr Walter Willms, a grassland ecologist and environmental management specialist from Canada; and Dr Chris Woods, a conservation biologist from the UK. We welcome all the other participants as well, from the high grassland areas all the way to Xining.

The complete calendar of events includes a 4-day training workshop on wildlife ecology and how to monitor wildlife populations; an 5-day fieldtrip to key wildlife and conservation sites throughout Zhiduo County; and a 3-day meeting of agencies and local representatives to identify conservation priorities in Zhiduo County, and to agree an initial plan of action for their achievement. It is our hope that the training and fieldtrip will help inform discussions during the planning meeting, and thus lead to better decisions.

### ABOUT YOUR HOSTS:

**Plateau Perspectives (PP)** is an international NGO with staff and advisors from Canada, USA, UK, New Zealand, China and other countries. PP's goal is to support *grassroots initiatives in conservation and sustainable development in the Tibetan Plateau region of China*. PP works from the conviction that human wellbeing and the state of the environment are inseparable, and also that decisions made together with local people will lead to better and more sustainable socio-economic development and biodiversity conservation initiatives.

Plateau Perspectives has worked in Zhiduo County since 1998 and signed an agreement in August 2003, with the Government of Zhiduo County and the Upper Yangtze Organization, to jointly execute the *Yangtze River Headwaters Sustainable Development Project*.

Plateau Perspectives' work to date has included training teachers and local herders in conservation issues and wildlife monitoring techniques; educational initiatives such as the establishment of village schools; and medical initiatives such as health worker and village doctor training, the construction of community health centers and supporting local immunization programs.

The **Sanjiangyuan National Nature Reserve (SNNR)** was created in 2000 and received national status in 2003. The SNNR Management Bureau is charged with protecting the region's grassland resources as well as realizing sustainable development of the environment, economy and society.

**Upper Yangtze Organization (UYO)** was established in Zhiduo County in 1998, registered with the Civil Affairs Bureau. They have undertaken many projects to date, including both conservation and community development work. Plateau Perspectives is one of their main international partners.

The **Government of Zhiduo County**, together with the Foreign Affairs Office of Yushu Tibetan Autonomous Prefecture, has welcomed Plateau Perspectives to be involved in local development and conservation through the *Yangtze River Headwaters Sustainable Development Project*.

**Part I – Wildlife training workshop (schedule and topics)***Sept 30 - Oct 3, 2005*

- |            |   |
|------------|---|
| Day 1 (AM) | Human/Wildlife Conflict - its causes and why we need research/data to plan management that reduces/eliminates conflict  |
| Day 1 (PM) | Identifying wildlife for study purposes - a simple introduction to observing sign (tracks, scats etc) to identify which mammals are using an area; how to identify birds. |
| Day 2 (AM) | Understanding mammalian 'lifestyles' - body size, feeding styles, niche, social organisation etc.   |
| Day 2 (PM) | Monitoring vegetation: a) Woody plants (trees/shrubs) b) grassland plants (grasses, herbs)  |
| Day 3 (AM) | Monitoring mammals - simple census techniques I   |
| Day 3 (PM) | Monitoring mammals - simple census techniques II  |
| Day 4 (AM) | Monitoring human use of habitats  |
| Day 4 (PM) | Conservation management of endangered species   |

**Part II – Pre-meeting fieldtrip (basic itinerary)***October 5 - 10, 2005*

- |       |   |
|-------|---|
| Day 1 | From Zhiduo to Yaqu School                  |
| Day 2 | From Yaqu School to Muqu                    |
| Day 3 | From Muqu to Suojia town                    |
| Day 4 | Visit wetland near Suojia town              |
| Day 5 | Visit SNNR Environmental Protection Station |
| Day 6 | Return to Zhiduo                            |

**Part III – Biodiversity Conservation Planning Meeting***October 13 - 15, 2005*

Zhiduo County, located at the source of the Yangtze River, is the main core zone of the Sanjiangyuan National Nature Reserve. Due to its geology, geography and biology with special characteristics, the natural conditions, the fauna and the flora have all attracted a great deal of attention from the Chinese Government and from scientific circles. In addition, this area – called the ‘Source of Life’ – needs the devotion and care of both local and external stakeholders in order to make a better place for future generations. To protect this unpolluted natural area is one of the most significant projects for future generations, the responsibility not only of the local people but also of society as a whole.

Environmental protection and development are two of the most significant topics today, and they are inextricably connected to human welfare. Since last century, many people have worked on these topics in Zhiduo County (for example, Suonan Dajie and his colleagues) and to this day there are many people still undertaking conservation and environmental protection work, not only from the government but also from local and international NGOs as well as local nomads. However, in order to better plan projects and programs in the future, the international NGO *Plateau Perspectives* and local NGO *Upper Yangtze Organization* have jointly organized the “Biodiversity Conservation Priority Planning Meeting” which will begin on September 30, 2005. Several national and international experts, some government officials, local NGO members and local herders will all be invited to this planning meeting.

### Appendix 3. Detailed schedule for the conservation planning meeting

#### BIODIVERSITY CONSERVATION PLANNING MEETING

##### TIMETABLE

<b>DAY 1</b>	9:00 – 9:30	Opening welcome: Plateau Perspectives Zhiduo County Upper Yangtze Organization Sanjiangyuan National Nature Reserve
	9:30 – 9:45	Overview of workshop schedule, and desired outcomes: Day 1: Biodiversity conservation in local context Day 2: Overview of Zhiduo/Yushu, and threats/needs Day 3: Planning for future conservation action by PP Outcome 1: Enhanced understanding of threats/needs Outcome 2: Action plans agreed by 2 or more participants
	9:45 – 10:45	Introductions: Who's who?  What interest do participants have in discussing "biodiversity conservation" (e.g., improved livelihoods, habitat and wildlife protection, ecological research, etc.)
	10:45 – 11:00	Tea break
	11:00 – 11:30	Listen to local herders' opinions: Muqu participatory video
	11:30 – 12:00	Group discussion: List some key "issues" we should be addressing over the next three days, re biodiversity and resource management
	12:00 – 15:00	Lunch and break
	15:00 – 16:00	Presentation by Dr John Sale: <i>Biological, Economic &amp; Social Considerations in Biodiversity Conservation</i>
	16:00 – 16:30	Presentation by SNNR, with Q&As: <i>Nature reserves in China, with a focus on the SNNR</i>
	16:30 – 16:45	Tea break
	16:45 – 17:15	Presentation by UYO: <i>Community participation in conservation in Zhiduo county, recent history and current activities</i>
	17:15 – 17:45	Presentation by Dr Marc Foggin: <i>Intro to Plateau Perspectives' work in Zhiduo County, Yushu Tibetan Autonomous Prefecture: Integration of environmental protection and human development</i>
	17:45 – 18:00	Free discussion
	18:00 – 20:00	Supper and break
	20:00 – 22:00	Videos (optional)

**DAY 2****WORKSHOP: Description of environment, wildlife, local herders' livelihoods**

- 9:00 – 10:00 Township reps: Overview of Zhiduo habitats, wildlife, income, etc.
- 10:00 – 10:45 Information collected and available from national / int'l research  
What other environmental information still needs to be collected?
- 10:45 – 11:00 Tea break
- 11:00 – 12:00 Local NGOs' present work, future hopes and plans:  
Sanjiangyuan Environmental Protection Association  
Upper Yangtze Conservation & Develop. Organization  
Other NGOs from Qumalai, Zhiduo and Zaduo counties
- 12:00 – 15:00 Lunch and break

**WORKSHOP: Description of key threats, prioritization of conservation needs**

- 15:00 – 16:30 Conservation threats and needs (discussion led by Dr John Sale)
- 16:30 – 16:45 Tea break
- 16:45 – 17:45 Conservation threats and needs (continued)
- 17:45 – 18:00 Free discussion
- 18:00 – 20:00 Supper and break
- 20:00 – 22:00 Videos (optional)

**DAY 3****WORKSHOP: Guided planning for PP's future biodiversity conservation and environmental management in Yushu Tibetan Autonomous Prefecture / SNNR**

- 9:00 – 9:30 Summary of discussions to date
- 9:30 – 10:45 Training needs – possible actions  
Research needs – possible actions  
Publication needs – possible actions
- 10:45 – 11:00 Tea break
- 11:00 – 12:00 Discussion of proposed establishment of a *Centre for Conservation & Sustainable Development*, as well as further development of a regional *Biodiversity Conservation Network* (c.f. village projects)
- 12:00 – 15:00 Lunch and break
- 15:00 – 16:30 Community needs that could be linked with environmental work  
Income generation: the potential role of eco- and cultural tourism
- 16:30 – 16:45 Tea break
- 16:45 – 18:00 ACTION PLANS: What actions can be agreed now (in principle)?  
What further discussion is needed for other actions? (when, where)
- 18:00 – 20:00 Supper and close of meeting

#### **Appendix 4. Final list of participants at training workshop (Oct 30 - Sep 3, 2005)**

Dr John Sale	Workshop lecturer / trainer, and Plateau Perspectives, Biodiversity Consultant
Caiwang Chujie (Hudson)	Plateau Perspectives, Translator
Li Wenhua	SNNR Management Bureau
Pubu Tsering	SNNR Suojia-Qumahe Protection Station
Sonam Nyima	Upper Yangtze Organization
Chunam	Upper Yangtze Organization
Suo	Vice-Governor, Zhiduo County
Muqu Village Community Representatives (4 people)	
Jiongqu Village Community Representative (1 person)	
Animal Husbandry Bureau of Zhiduo County (1 person)	
Forest Bureau (Wildlife Protection) of Zhiduo County (2 people)	
Animal Husbandry Station of Qumahe Township, Qumalai County (2 people)	

## **Appendix 5. Final list of participants on pre-meeting fieldtrip (Sep 5-10, 2005)**

Dr Marc Foggin	Plateau Perspectives, Executive Director
Dr Walter Willms	Agriculture Canada, Resident Scientist
Dr Chris Woods	Zhejiang University, Assistant Professor
Caiwang Chujie (Hudson)	Plateau Perspectives, Translator
Tarshin	Plateau Perspectives, Driver
Li Wenhua	SNNR Management Bureau
Pubu Tsering	SNNR Suojia-Qumahe Protection Station
Luo Tserang	Muqu Village, Community Representative
Gongjeb	Jiongqu Village, Community Representative
Abjia	Yaqu Monastery, Driver

## **Appendix 6. Final list of participants at the planning meeting (Sep 13-15, 2005)**

Dr Marc Foggin <a href="mailto:foggin@plateauperspectives.org">foggin@plateauperspectives.org</a>	Plateau Perspectives, Executive Director 0971 - 732 0922                      138 9724 7874
Dr John Sale <a href="mailto:johnsale@aol.com">johnsale@aol.com</a>	Plateau Perspectives, Biodiversity Consultant (+44) 1691 791404
Dr Marion Torrance <a href="mailto:torrance@plateauperspectives.org">torrance@plateauperspectives.org</a>	Plateau Perspectives, Medical Director 0971 - 732 0922
Dr Walter Willms <a href="mailto:willms@agr.gc.ca">willms@agr.gc.ca</a>	Agriculture Canada, Resident Scientist (+1) 403 317 2218                      (+1) 403 381 9404
Dr Chris Woods <a href="mailto:wopod1@yahoo.com">wopod1@yahoo.com</a>	Zhejiang University, Assistant Professor 0571 - 8717 6515                      134 8611 6854
Mr Selwyn Yeoman <a href="mailto:yeoman@plateauperspectives.org">yeoman@plateauperspectives.org</a>	Plateau Perspectives, Project Manager
Mr Caiwang Chujie (Hudson) <a href="mailto:hudson@plateauperspectives.org">hudson@plateauperspectives.org</a>	Plateau Perspectives, Translator
Mr Liu Lingjun (Larry) <a href="mailto:larry@plateauperspectives.org">larry@plateauperspectives.org</a>	Plateau Perspectives, Xining Office Secretary
Mrs Basang Lamo	SNNR Management Bureau, Vice-Director 0971 - 812 9617                      138 9724 9306
Mr Li Wenhua	SNNR Management Bureau, Project Officer 0971 - 812 9617                      138 9749 0480
Mr Pubu Cairen	SNNR Suojia-Qumahe Station, Director 0976 - 889 1625                      139 9736 2285
Mr Wenzha Xuri	Upper Yangtze Organization, Vice-Director 0976 - 889 1982 / 1068                      138 9756 3880
Mr Cicheng Renqing (Lewis) <a href="mailto:1980lewis@163.com">1980lewis@163.com</a>	Norserve, Project Manager 0976 - 882 9101                      0976 - 864 2278
Mr Li Deqing	Snowland Great Rivers Assoc., Project Officer 0976 - 882 9066                      131 0751 6884
Mr Zhaxi Duojie	Snowland Great Rivers Assoc., Gen. Secretary 0976 - 882 9068                      138 9716 1833
Mr Zhijia	Conservation International, Project Officer 0976 - 882 9066

## Appendix 7. Fact and figures: Yushu Tibetan Autonomous Prefecture

### Physical geography

	Total land	Altitude	Population
Yushu County	15,671 km <sup>2</sup>	3,710 m	76,000 people
Chengduo County	14,743 km <sup>2</sup>	3,825 m	39,000 people
Zhiduo County	80,757 km <sup>2</sup>	4,193 m	23,000 people
Zaduo County	35,809 km <sup>2</sup>	4,080 m	35,000 people
Nangqian County	12,230 km <sup>2</sup>	3,660 m	59,000 people
Qumalai County	38,744 km <sup>2</sup>	4,233 m	21,000 people
Total	197,954 km <sup>2</sup>	--	253,000 people

### Precipitation (mm)

	Annual	Spr	Sum	Aut	Win	Jan	Jul
Yushu County	482.3	74.2	291.3	106.8	9.9	3.8	103.5
Qingshuihe <sup>1</sup>	509.7	81.0	304.6	107.7	16.4	5.7	115.2
Zhiduo Co.	401.7	47.6	255.0	91.3	7.6	2.7	95.8
Zaduo Co.	525.6	66.8	326.9	116.1	15.7	5.9	111.2
Nangqian Co.	524.1	66.0	334.4	115.3	8.2	2.7	121.3
Qumalai Co.	404.5	55.8	252.3	88.1	8.2	2.6	94.6

*1. Qingshuihe is a township (xiang) of Chengduo County, situated at 4,415 m above sea level.*

### Temperature (Celsius)

	Annual	Spr	Sum	Aut	Win	Jan	Jul
Yushu County	3.2	3.7	12.1	3.5	- 6.6	- 7.8	12.9
Qingshuihe <sup>1</sup>	-5.0	-4.5	5.4	-4.3	-16.2	-17.0	6.4
Zhiduo Co.	-1.6	-1.4	8.3	-1.3	-12.0	-13.2	9.2
Zaduo Co.	0.3	0.5	9.7	1.1	-10.0	-11.3	10.6
Nangqian Co.	4.0	4.5	12.5	4.6	- 5.3	- 6.5	13.2
Qumalai Co.	-2.4	-2.0	7.7	-2.1	-13.1	-14.3	8.7

*1. Qingshuihe is a township (xiang) of Chengduo County, situated at 4,415 m above sea level.*

### Population (1999)

	<u>Families</u>	<u>Population</u>	<u>Rural</u>	<u>Urban</u>	<u>Migrant</u>
Yushu County	16,172	75,500	72.5%	25.5%	2.0%
Chengduo County	8,099	39,106	89.3%	11.0%	0.7%
Zhiduo County	5,202	22,854	88.2%	11.5%	0.3%
Zaduo County	6,899	34,898	91.5%	7.8%	0.7%
Nangqian County	9,630	59,066	92.1%	6.3%	1.3%
Qumalai County	4,576	21,272	88.2%	11.8%	0%

### Grassland area and livestock (1999)

	<u>Useable grassland</u>	<i>Number of livestock</i>		
		<u>Yak</u>	<u>Sheep</u>	<u>Horse</u>
Yushu County	86.9 % of county	205,800	256,900	10,000
Chengduo Co.	95.0 % “	120,600	218,700	5,500
Zhiduo Co.	61.1 % “	134,900	334,100	6,800
Zaduo Co.	91.9 % “	141,100	290,200	10,600
Nangqian Co.	67.2 % “	165,600	257,500	13,500
Qumalai Co.	88.9 % “	125,000	405,500	5,700

### Economic situation (CNY, 1999)

	<u>Total GDP</u>	<i>Primary industries</i>			<u>Per-capita income in rural areas</u>
		<u>Farming</u>	<u>Forestry</u>	<u>Herding</u>	
Yushu County	58,282,000	16,198,000	239,000	41,845,000	777
Chengduo Co.	26,316,000	7,122,000	181,000	19,013,000	705
Zhiduo Co.	33,762,000	1,158,000	0	32,604,000	791
Zaduo Co.	41,315,000	7,901,000	0	33,414,000	783
Nangqian Co.	45,880,000	18,863,000	100,000	26,917,000	641
Qumalai Co.	39,885,000	32,000	0	39,853,000	889

## **Appendix 8. Fact and figures: Zhiduo County (general)**

Situated in the heart of the Tibetan Plateau, Zhiduo County encompasses the highest-altitude populated area in the Yangtze River watershed. The total area of the county is 80,757 km<sup>2</sup>, twice the size of Switzerland. However about half of this area constitutes a largely unpopulated alpine desert steppe, administered by the State Forest Bureau as the Kekexili National Park. The average elevation is over 4,500 m above sea level, ranging from 3,900 to 6,860 m above sea level.

Zhiduo County was established in 1953. It is located 192 km from the capital of Yushu Tibetan Autonomous Prefecture, Jiegu (Jyekundo), and 1,003 km from the provincial capital, Xining.

In administrative terms, the county is divided into six townships (or sub-county units, also known as the former communes), each of which is further divided into villages and sub-villages (the former communes' brigades and work units, respectively). Altogether the county has 20 villages and 68 sub-villages. A sense of community is still present at the township level and below, particularly in remoter parts of the county. The six townships are: Dangjiang (当江 乡), Lixin (立新 乡), Zhiqu (治渠 乡), Duocai (多彩 乡), Zhahe (扎河 乡) and Suojia (索加 乡).

According to official statistics, the population of Zhiduo County is approximately 23,000 people. Ninety-eight percent (98%) of the population is Tibetan, and over 90 percent of the people are nomadic pastoralists (livestock herders) who jointly manage over 475,000 head of livestock, mostly sheep and yak. The average population density throughout the entire county is 0.28 people per square kilometre.

The environment is primarily semi-arid and arid grassland, interspersed with ecologically important wetland areas. Some smaller areas of scrub can also be found in riparian zones (i.e., on the banks of streams and rivers). Large areas of the county are covered by bare rock and snow.

The traditional way of life – nomadic pastoralism – has been developed over hundreds of years. During this time, local herders have acquired intricate ecological knowledge about their environment. A wide variety of livestock and rangeland management practices have enabled them to survive in an extremely harsh environment, including a seasonal mobility of herds and a flexible and opportunistic approach to every aspect of their traditional pastoral livelihood.

Today, however, as in many Tibetan areas, the level of socio-economic development remains low. Among pastoralists in Qinghai Province as a whole, around 65 percent of men and 95 percent of women are illiterate. Few nomad children have access to even basic education. Road conditions are poor, and with limited access to vehicles, transportation is basic at best. This limits opportunities for economic development. Limited access to information – which itself is tied to low levels of education, and correlated with low levels of health – also means that what economic opportunities are available to herders may often be missed because of the herders' lack of literacy and/or numeracy. The local health situation is equally striking, in some places with over one-quarter of infants dying before one year of age. Simple access to rural health care services also remains poor in some townships and villages.

## **Appendix 9. Summary of community innovations in environmental management**

### **Natural Resource Management in the Tibetan Plateau, China**

#### ***Project objectives***

Wildlife management, leading to broader natural resource management with a strong educational component

#### ***Project results***

- Enhanced public participation of local inhabitants in planning and implementation processes of wildlife management
- Strengthened communication links between the community, the government and international partners
- Wildlife population increasing as a result of the self-imposed hunting ban and UYO's efforts to educate the people about biodiversity and resource management
- Initiatives for basic education and vocational training are gaining foothold. About 30% of the community's children nowadays receive basic education
- Environmental and health needs assessment being undertaken as a foundation for long-term development plans in Suojia

#### ***Participating organizations***

Upper Yangtze Organization, other NGOs, Chinese government, and international organizations

#### ***Background of the community***

Suojia, a community of four villages near the centre of the Tibetan plateau, is comprised almost exclusively of pastoralists, nearly 4000 people. Few have had basic education, and over 95% of the women are illiterate. The average income is relatively low, and the quality of people's health, especially that of women and children, is extremely poor. The people manage their own land, and over 95% of them herd livestock, mostly sheep and yak.

#### ***Environmental issues***

- Environmental conditions on the Tibetan plateau are generally too severe for agriculture and are favourable only for pastoralism.
- The grassland vegetation is changing, partly due to regional climatic changes, unsustainable grazing practices, and severe soil erosion.
- When mobility is removed from grazing systems, as introduced through new government policies, there is an increased risk of grassland degradation that can result in large-scale environmental and human hazards.
- There is a decrease in the number of wildlife, due to illegal hunting.

#### ***Approaches toward community innovation***

- Establishment of a grassroots organization promoting community involvement in local environmental management, as well as networking and collaboration with government decision makers and international partners
- An active role of local leaders in environmental conservation
- An active role of external facilitating organizations

## ***Elements of innovativeness***

### **Multi-stakeholder partnerships**

The UYO was founded by local herdsmen in the 1990's and capitalizes on maintaining and building relationships within the local community as well as with government agencies and external advisors. It combines the ability to mobilize the community with building local capacities, and the establishment of a joint long-term vision.

The UYO formulated a multiple-use land management plan in collaboration with the community and local government, including local nature reserves, protected areas and conservation zones. The success of this initiative is founded on the continuous consultation with local pastoralists.

Suojia's Ecological Protection Committee (EPC), composed of local herders, serves as wildlife monitor and environmental extension service. This form of community participation is already being copied in neighbouring communities, and is regarded as a model to enhance regional conservation plans.

Basic education with a strong emphasis on environmental education is advocated by the UYO. After discussions, the community decided that formal education was critical for their children's future. The education component became a community-driven project, including management plans and areas such as primary health care, veterinary care, and rangeland management.

### **Leadership**

In the 1980's, environmental protection began with a local community leader participating in a semi-official anti-poaching patrol. He was killed in a gun battle with poachers, but in 1998 his relatives and friends established the UYO and thus continued his legacy.

### **Involvement of an external facilitating organization**

UYO and its first international partner, Plateau Perspectives (Canada), jointly introduced the notion of public participation for community development. Suojia's Ecological Protection Committee (EPC) succeeded largely due to Plateau Perspectives' support, including training and equipment necessary for wildlife monitoring activities.

## ***Barriers to innovation***

Officials still sometimes question the legitimacy of the non-governmental sector. Receiving acceptance or even support for UYO's work is still a delicate process.

Participation is still interpreted widely, with a broad range from mere information to active involvement of local communities.

## ***Factors contributing to sustainability***

Possibilities for the local community to develop plans reflecting their needs and capacities and implementing these with support from higher government authorities. Whether the local community will be able to build a genuine long-term partnership with the government and other stakeholders remains to be seen.

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### **Source:**

*Innovative Communities: People-centred Approaches to Environmental Management in the Asia-Pacific Region* (eds. Velasquez, J., Yashiro, M., Yoshimura, S., & Ono, I.), UNU Press. Innovative Communities Project, United Nations University (UNU), Global Environment Information Centre (UNU-GEIC). September 2005.

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## **Appendix 10. Outline of a Management Plan for a Nature Reserve involving Community Participation**

### **Part I. Background information**

1. **Introduction:** location, area, date of declaration, legal status, general facts
2. **Regional analysis:** geography of region, climate, demography, settlements, economy, communications (roads, railways, airports), map of region
3. **Resources of the reserve:**
  - 3.1. **Physical resources:** topography, drainage (rivers, lakes), geology, soils, minerals
  - 3.2. **Wild living resources:** flora, vegetation types (map), rare plant species or communities; fauna (major animal species and their distribution – map); recent extinctions – reasons, if known
  - 3.3. **Human resources:** history of humans in region, present ethnic/cultural groups, socio-economy (cultivation, pastoralism, hunting, seasonal activity patterns, attitudes to wildlife, trading), education/vocational training
4. **Statement of Significance:** (based on above information) simple statement as to why the area should be conserved i.e. landscape, floral, faunal and cultural values of the reserve area

### **Part II. Management design**

1. **Management objectives:** conservation objectives first (habitat & wildlife population restoration), followed by socio-economic, research & education.
2. **Boundaries and zonation:** description of boundaries & management zones, with map and set of objectives for each zone.
3. **Work programme:** (on 5-year basis, with bar charts etc where applicable):
  - 3.1. **Protection:**
    - 3.1.1. Boundary demarcation (if needed)
    - 3.1.2. Education re rules for each zone (listed in appendix)
    - 3.1.3. Training in law enforcement, e.g. grazing regulations
    - 3.1.4. Anti-pollution measures
  - 3.2. **Research and monitoring:** (involving reserve staff and selected locals)
    - 3.2.1. Aims: support management; ecology of habitat and key species
    - 3.2.2. Training in research methodologies

- 3.2.3. Habitat monitoring – vegetation, erosion, water quality
- 3.2.4. Distribution, abundance, ecological requirements, mortality factors of key wildlife species
- 3.2.5. Monitoring of wildlife populations to show trends
- 3.3. **Education:** (for locals and visitors to the reserve)
  - 3.3.1 Aims: understanding of conservation values of the reserve and how to enhance/maintain them while increasing economic benefits to local people
  - 3.3.2 Grassland ecology and management
  - 3.3.3 Improved livestock management (health, breeding)
  - 3.3.4 Development of environmental education programmes for schools & training of teachers
- 3.4. **Socio-economic activities:**
  - 3.4.1 Improved livestock marketing
  - 3.4.2 Development of local crafts & their marketing
  - 3.4.3 Introduction of eco-tourism (accommodation, transport, guides, information centre, etc.)
- 4. **Resources required:** (for implementation of the above programme)
  - 4.1. **Infrastructure:** buildings, roads, bridges etc
  - 4.2. **Staffing:** law enforcement, research/monitoring, education
  - 4.3. **Transport:** vehicles (jeeps, trucks, motor cycles)
  - 4.4. **Finance:** year-by-year budget for each of the above categories; summary budget. Clear indications of sources of each type of funding, including contributions by relevant NGO's.

**NOTES:**

1. *Plan must be drawn up in full consultation with all stakeholders.*
2. *When completed it should be approved by the highest relevant authority and used as the authorised basis for all future actions affecting the reserve*
3. *Annual work plans based on the Management Plan should be drawn up by the reserve authority*
4. *The plan should not 'be set in concrete' but should be updated as necessary in full consultation with all stakeholders*

