An assessment of the importance of traditional livelihoods and beliefs in the protection of sacred forests and thereby conserving wildlife in western Sichuan, China

White eared-pheasant on a monastery wall with Buddhist prayer flags in the background © Wang Nan

A report to the Rufford Small Grants Foundation

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The landscape in Daocheng County, western Sichuan © Wang Nan

1. Background to the proposal

The traditional beliefs and way of life of Tibetan Buddhists have conserved wildlife in Daocheng County for generations by preventing wildlife persecution and protecting their habitats. In the county, sacred groves are found near some monasteries and villages and they provide habitats for several species of pheasant as well as many other birds and mammals. About 30 years ago some of the sacred groves suffered destruction to varying degrees and as they have recovered the number of some pheasant species has increased. At the same time, economic development has resulted in serious over-exploitation of some habitats outside sacred groves.

Daocheng County, which lies in the high plateau of western Sichuan province, south-western China contains several such sacred groves linked to monasteries. Given the dramatic topography solar radiation varies substantially according to the aspect and slope of mountainsides. These features, together with altitude, also determine the vegetation present. The sacred groves and other sites that were the subject of this study were between 3800m-4400m and the habitat is dominated by Hollyleaf-like Oak *Quercus apuifolioides* on south-facing slope and rhododendron *Rhododendron* spp., Balfour Spruce *Picea likiangensis* and Chinese Larch *Larix potaninii* on the north-facing slope. Grassland occurred above 4300-4400m and on some hillsides and plains with strong solar radiation below this altitude. Subalpine shrub and scree also appeared above the altitude. As the rural population in Daocheng County has traditionally cut trees for their own needs and then allowed regeneration, there are forest and shrub of different secondary successional stages. In some cases, the topography resulted in poor forest regeneration and so there is now grassland and shrub below the tree-line, whereas naturally it would only occur in alpine areas. There is some untouched primary far away from human habitation and has long been just too remote to suffer human impact.

We first visited Daocheng monasteries in autumn 2002 and during the winter of 2002-3 and 2003-4 several sacred groves and monasteries in the county were further explored. From December 2006 to February 2007 and from April to June 2007, six (Zhujie Monastery; Suochong village; Zhalang monastery; Xiongdeng monastery; Sangdui village 1 (dominated by oak); and Benbo monastery) were re-assessed and one new site (Sangdui village 2 which is dominated by larch) were visited. These sites were selected as they reportedly benefited from various forms of traditional protection on sacred grove. Taken together, the suite of sites was designed to allow description of all levels of protection afforded to forests that still contained pheasants. They were actively protected by the monks (Zhujie, Zhalang, Benbo and Xiongdeng) or the villagers (Suochong and Sangdui).

In 2002, there were 5656 families and 28,413 people living in Daocheng County, 93.81% of whom were ethnic Tibetans. The income of the Tibetan families comes mainly from stock-rearing, producing milk, collecting Chinese caterpillar fungus and other mushrooms. In recent years, some have started to earn money from manual labour, such as building roads and through starting their own businesses, but the proportion of them is very low.

2. Progress in major activities that were stated in the proposal

The words in italics are those that were contained in the proposal

2.1 Bird surveys

Major activity 1: Bird surveys - December 2006 to July 2007, point count surveys will be carried out in a range of sacred and non-scared forests to record the presence of bird species, during winter and in the breeding season. At each point count location a range of habitat variables will be collected. Comparisons between the two forest types will establish the importance or otherwise of the sacred forests.

Six sacred groves of the seven (Zhujie, Suochong, Zhalang, Xiongdeng, Sangdui 1 and Sangdui 2) were surveyed in Daocheng County in December 2006 to February 2007 (winter) and April to June 2007 (breeding season). The other site (Benbo) was only surveyed in the monastery to record the appearance of pheasants during the past 3-4 years. We selected control sites in the area that were not sacred groves but which were at a similar distance to the closest village and with similar altitude, slope degree, slope direction and habitat type, if possible, to the sacred grove.

Line transect and point count methods were used for the survey. Transect length varied according to the size of the sacred groves and were established along existing forest trails or by walking through the habitat. They were carried out each day from sunrise to 1030 and from 1600 to sunset. The trails that were walked were small forest paths and so had not altered the habitat significantly. When walking along each trail, all sightings of pheasants were recorded. Every 10 min, we stopped walking and spent 20 min point counting pheasants. At each point, all the sightings of pheasant were recorded. The calls and droppings were also noted, but not used in calculating the detection rate. The transect lengths were between 2.6-14.5 km in the sacred groves and their control sites, and the number of point counts in each site ranged from 19 to 34.

Species of birds were recorded in the sacred groves and the control sites. There are three species of pheasants recorded in the sacred groves and the control sites: white eared-pheasant *Crossoptilon crossoptilon*, blood pheasant *Ithaginis cruentus* and Tibetan partridge *Perdix hodgsoniae*.

In the non-breeding season, white eared-pheasant occurred in all of the sacred groves and in three of the control sites (Zhujie, Suochong and Sangdui 1, Tables 1, 2). Both methods revealed that the number of white eared-pheasants detected was higher than in the control sites in five sacred groves (Zhujie Monastery, Zhalang monastery, Xiongdeng monastery, Sangdui village 1, Sangdui village 2), and lower in one sacred grove (Suochong village). Blood pheasant was sighted in only three sacred groves (Zhujie Monastery, Xiongdeng monastery, Sangdui village 2; Tables 1, 2), but its droppings were found in all the sacred groves and the detections were higher in these sites than in the control sites (Tables 1 and 2). Tibetan partridge occurred in one sacred grove (Xiongdeng) and one control site (Tables 1 and 2).

In the breeding season, white eared-pheasant occurred in six sacred groves and four control sites (Zhujie, Suochong, Sangdui 1, Sangdui 2; Tables 3 and 4). In five sacred groves, the detection rates were higher than in the control sites in both survey methods (Tables 3 and 4), although in Sangdui 2 white eared-pheasant was detected more by line

transect survey than by point counts. Blood pheasant occurred in six sacred groves and control sites. The detection rates were higher in five sacred groves than in control sites according to both survey methods (Tables 3 and 4). Tibetan partridge occurred in one sacred grove (Xiongdeng) and four control sites (Zhalang, Xiongdeng, Sangdui 1, Sangdui 2). In Xiongdong sacred grove the detection rate of Tibetan partridge was higher than that of its control site (Tables 3 and 4).

In Zhalang area, two kilometres away from the sacred grove, a group of 30 white eared-pheasants was found in a grass-dominated slope with some big cypress trees, and five groups of Tibetan partridge, totalling 56 individuals, were found in pastures and farmlands in winter. In Suochong village which was in the middle of two sacred groves (Zhujie and Suochong), two groups of Tibetan partridge with 13 and 18 individuals were recorded in village in winter, and two individual were recorded in village in breeding season.

Seventy-seven species of birds were recorded during the point count survey. In spring, we recorded 68 species; in winter, 43 species. In sacred groves, we recorded 64 species; in the control sites, 56 species (Table 5).

Table 1. Detection rates (individuals/km) of pheasants in the sacred groves and control sites by line transect method in winter.

Species	**Sacred or control**	**Site code**					
		1	**2**	**3**	**4**	**5**	**6**
Distance (km)	Sacred	9.5	3.7	9.7	7.6	11.1	3.5
	Control	12.2	4.6	14.5	8.0	8.3	6.9
White eared-pheasant	Sacred	18.5	10.9	5.6	0.4	7.0	18.5
	Control	0	11.6	0	0	0	0
Blood pheasant	Sacred	0	0	0	1.3	0	3.1
	Control	0	0	0	0	0	0
Tibetan partridge	Sacred	0	0	0	1.4	0	0
	Control	0	0	0.9	0	0	0

Table 2. Detection rates (individuals/point) of pheasants in the sacred groves and non-sacred grove habitat by point counted method in winter. Percentage of the points in which the species occurred is given in the bracket

Species	**Sacred or control**	**Site code**					
		1	**2**	**3**	**4**	**5**	**6**
Sample size	Sacred	33	19	31	24	33	19
	Control	29	20	33	25	30	20
White eared-pheasant	Sacred	0.3 (6.1)	1.1 (5.3)	0.8 (9.7)	0 0	1.2 (12.1)	0 0
	Control	0.1 (3.4)	2.1 (10)	0 0	0 0	0.3 (3.3)	0 0

Blood pheasant	Sacred	0.7 (3.0)	0	0	0	0	1.1 (5.3)
	Control		0	0	0	0.2 (3.3)	0
Tibetan partridge	Sacred	0	0	0	0	0	0
	Control	0	0	0	0	0	0

Table 3. Detection rates (individuals/km) of pheasants in the sacred groves and non-sacred grove habitat by line transect method in the breeding season

Species	**Sacred or control**	**Site code**					
		1	**2**	**3**	**4**	**5**	**6**
Distance (km)	Sacred	5.8	2.7	8.2	4.2	9.6	3.9
	Control	7.5	4.0	6.1	5.2	5.8	4.2
White eared-pheasant	Sacred	4.4	6.7	1.2	3.8	6.8	0.5
	Control	0.7	0.5	0	0	0.2	0.5
Blood pheasant	Sacred	0.3	1.9	0	0	2.4	0.5
	Control	0	1.8	0	0	0	0
Tibetan partridge	Sacred	0	0	0	0.5	0	0
	Control	0	0	0	0.4	0	0.5

Table 4. Detection rates (individuals/point) of pheasants in sacred groves and non-sacred grove habitat by point counted method in breeding seasons. Percentage of the points in which the species occurred is given in the brackets

Species	**Sacred or control**	**Site code**					
		1	**2**	**3**	**4**	**5**	**6**
Sample size	Sacred	29	19	34	22	33	22
	Control	29	20	34	24	34	22
White eared-pheasant	Sacred	0.6 (17.2)	0.3 (10.5)	0.3 (11.8)	0.9 (18.2)	0.7 (18.2)	0.1 (4.5)
	Control	0.103 (6.9)	0.1 (10)	0 0	0 0	0.1 (11.8)	0.6 (9.1)
Blood pheasant	Sacred	0 0	0.4 (15.8)	0.1 (2.9)	0.1 (9.1)	0.2 (6.1)	0.1 (9.1)
	Control	0 0	0.350 (20.00	0 0	0 0	0.382 (8.8)	0 0
Tibetan partridge	Sacred	0 0	0 0	0 0	0.136 (9.1)	0 0	0 0
	Control	0 0	0 0	0.0588 (2.9)	0.0417 (4.2)	0.029 (2.9)	0 0

Table 5. List of the birds in point counted survey. SG = sacred grove; C = control site

No.	English name	Latin name	Spring	Winter	SG	C
1	Asian house-martin	*Delichon dasypus*	1		1	1
2	Beautiful rosefinch	*Carpodacus pulcherrimus*	1	1	1	1
3	Besra	*Accipiter virgatus*		1	1	
4	Black redstart	*Phoenicurus ochruros*	1		1	1
5	Black-billed magpie	*Pica pica*	1	1	1	1
6	Blood pheasant	*Ithaginis cruentus*	1	1	1	1
7	Blue-fronted redstart	*Phoenicurus frontalis*	1		1	1
8	Brown accentor	*Prunella fulvescens*	1	1	1	1
9		*Pericrocotus ethologus*	1			1
10	Carrion crow	*Corvus corone*	1	1	1	1
11	Chinese babax	*Babax lanceolatus*	1	1	1	1
12	Chinese fulvetta	*Alcippe striaticollis*	1	1	1	1
13	Chinese thrush	*Turdus mupinensis*	1		1	
14	Collared accentor	*Prunella collaris*		1		1
15	Common raven	*Corvus corax*		1	1	1
16	Common rosefinch	*Carpodacus erythrinus*	1		1	
17	Common stonechat	*Saxicola torquata*	1			1
18	Crested tit warbler	*Leptopoecile elegans*	1	1	1	1
19	Daurian jackdaw	*Corvus dauurica*	1	1	1	1
20	Daurian redstart	*Phoenicurus auroreus*	1		1	
21	Elliot's laughingthrush	*Garrulax elliotii*	1	1	1	1
22	Eurasian bullfinch	*Pyrrhula pyrrhula*		1	1	
23	Eurasian cuckoo	*Cuculus canorus*	1		1	1
24	Eurasian sparrowhawk	*Accipiter nisus*		1		1
25	Eurasian treecreeper	*Certhia familiaris*	1	1	1	
26	Fork-tailed swift	*Apus pacificus*	1			1
27	Giant laughingthrush	*Garrulax maximus*	1	1	1	1
28	Godlewski's bunting	*Emberiza godlewskii*	1	1	1	1
29	Goldcrest	*Regulus regulus*	1		1	
30	Golden eagle	*Aquila chrysaetos*	1	1	1	1
31	Great tit	*Parus major*	1	1	1	
32	Greenish warbler	*Phylloscopus trochiloides*	1		1	1
33	Grey-backed shrike	*Lanius tephronotus*	1		1	1
34	Grey-crested tit	*Parus dichrous*	1	1	1	1
35	Grey-headed Woodpecker	*Picus canus*		1	1	
36	Hill pigeon	*Columba rupestris*	1	1	1	1
37	Himalayan griffon	*Gyps himalayensis*	1	1	1	1

38	Hodgson's redstart	*Phoenicurus hodgsoni*	1		1	
39	Horned lark	*Eremophila alpestris*	1			1
40	Kessler's thrush	*Turdus kessleri*	1	1	1	1
41	Lammergeier	*Gypaetus barbatus*	1	1	1	1
42	Large-billed crow	*Corvus macrorhynchos*	1	1	1	1
43	Lemon-rumped Warbler	*Phylloscopus chloronotus*	1		1	1
44	Northern goshawk	*Accipiter gentilis*	1	1	1	
45	Orange-barred Warbler	*Phylloscopus pulcher*	1		1	
46	Oriental tree pipit	*Anthus hodgsoni*	1		1	1
47	Oriental skylark	*Alauda gulgula*	1			1
48	Oriental turtle dove	*Streptopelia orientalis*	1			1
49	Red crossbill	*Loxia curvirostra*		1	1	
50	Red-billed chough	*Pyrrhocorax pyrrhocorax*	1	1	1	1
51	Robin accentor	*Prunella rubeculoides*	1	1	1	1
52	Rufous-breasted accentor	*Prunella strophiata*	1	1	1	1
53	Rufous-vented tit	*Parus rubidiventris*	1	1	1	1
54	Russet sparrow	*Passer rutilans*	1		1	
55	Saker falcon	*Falco cherrug*		1		1
56	Sichuan leaf-warbler	*Phylloscopus sichuanensis*	1		1	
57	Slaty-backed flycatcher	*Ficedula hodgsonii*	1		1	
58	Spot-breasted scimitar-babbler	*Pomatorhinus erythrocnemis*	1	1	1	1
59	Spotted nutcracker	*Nucifraga caryocatactes*	1		1	
60	Streaked rosefinch	*Carpodacus rubicilloides*	1			1
61	Tibetan partridge	*Perdix hodgsoniae*	1		1	1
62	Tickell's leaf warbler	*Phylloscopus affinis*	1		1	1
63	White eared-pheasant	*Crossoptilon crossoptilon*	1	1	1	1
64	White wagtail	*Motacilla alba*	1		1	
65	White-bellied Redstart	*Hodgsonius phoenicuroides*	1			1
66	White-browed Fulvetta	*Alcippe vinipectus*	1	1	1	1
67	White-browed Rosefinch	*Carpodacus thura*	1	1	1	1

68	White-browed Tit-Warbler	*Leptopoecile sophiae*	1	1	1	1
69	White-capped Water-Redstart	*Chaimarrornis leucocephalus*	1			1
70	White-tailed Rubythroat	*Luscinia pectoralis*	1		1	1
71	White-throated Redstart	*Phoenicurus schisticeps*	1	1	1	1
72	White-winged Grosbeak	*Mycerobas carnipes*	1	1	1	1
73	White-winged Redstart	*Phoenicurus erythrogaster*		1		1
74	Willow tit	*Parus montanus*	1	1	1	1
75	Wren	*Troglodytes troglodytes*	1		1	
76	Yellow-streaked Warbler	*Phylloscopus armandii*	1		1	

2.2 Current and future threat assessment

Major activity 2: Current and future threat assessment – (December 2006 – July 2007) questionnaire surveys of local communities, plus direct observations, will assess the current and future threat levels.

2.2.1 The building of new houses

Although local people conserve white eared-pheasant directly by feeding them and by forbidding hunting of the species, they have not yet woken to conserve its habitat. Although some sacred groves were preserved for religion reasons, and this provided the species with some refuges, logging pressures have been transferred to large areas of unprotected habitat. In some areas, with large resource of forest, a part of the local peoples' income was from selling logs by stealth. In Daocheng, the traditional houses of Tibetan families were double storied and made of stone and wood. They were about 20m×20m in size but were larger if the family had greater income: the size of the house is a measure of wealth. Most of the income of a local family is spent on building a new house, and the old destroyed, even though it would be sturdy enough to last many years. The pillar and roof of a traditional house were made of wood, which were obtained from cutting the forest. Building a big house was the ambition of most local families: when they become wealthy, the first thing they plan to do is build a big house, even if the old one was large enough. This leads to competition between families over the size of their houses. At the same time, big houses need more energy for heating, which results in the cutting of many trees and shrubs for fuelwood. When they are cutting trees and shrubs in the forests, local people make fires for keeping warm and preparing food, which sometimes results in burning the forest. As with other areas of China, Daocheng is becoming wealthy, and local peoples' income has increased quickly in the last 10 years because of mushroom and caterpillar fungus collection. With the increase in income of the local people, the traditional way of life may destroy the habitat of many pheasant species.

2.2.2 Fire wood collection

Previously, local people took the fire wood from the forest using horses. Now, most families have tractors, and this allows them to extract firewood from forest that is further away from their houses than before so that they can make their new big houses warm. Normally, a family cuts 4-6 tractors of fire wood each year, and traditionally, fire wood tend to be a symbol of wealth and local people tend to place it on the top of the wall to show how much they have to their neighbours. Although the local government limits the season of fire wood collecting and make a charge for it, the price did not affect the demand for timber, and illegal cutting occurs. In some villages far away from the forest, local people use yak droppings as fire wood, but in most part of Daocheng, fire wood is the most common fuel used.

2.2.3 Losing local tradition

Tourism in Daocheng began about 10 years ago and has developed quickly. The attention on tourism has led to the provision of comfortable conditions to attract more tourists. Although many parts of Daocheng still maintain the culture of wildlife conservation, the changes have been great in the last 10 years. The culture has been lost in some areas where tourism is well-developed and in some well-educated areas. For the tourists, most of them do not know the local culture, and their behaviour in Daocheng tends to follow their own practice, which affects the local people a lot.

Local culture and the previous (relatively low) standard of living have been ideal for protecting the wild animals in Daocheng County. Before wildlife conservation laws were written, hunting was mainly carried out by those people who did business and worked in offices in Daocheng and were not Tibetan. Conservation of animals by local people was based on their traditional culture and self limitation. In the past 10 years, with the improvement in road conditions, Daocheng has become open to people from other cultures and now local people tend to tolerate modern life. People, especially tourists from other parts of China, have brought new attitudes towards animals. Now, most of the restaurants in Daocheng tend to suit the taste of tourists and the people who are not Tibetan. Some of the restaurants are characterised by particular animal dishes, such as chicken, rabbit and fish. In local culture, Tibetan people should not eat these animals. But, during the time we stayed in Daocheng, we found some young Tibetans who accepted the influence of the outside world and did not see eating these animals as a taboo, and some of them also eat fish although their elders forbid the activity. Traditionally catching fish was not allowed in Daocheng, but some young Tibetan people now catch and eat fish, which may be a sign of change in attitudes to wildlife.

Most of the tourists are attracted by the taste of wild fish without realising that catching and eating it offends local culture. The price of fish is high, especially during the tourist season, which attracts some non-Tibetan fisherfolk who catch fish in some rivers where local people do not allow it.

2.3 Sustainable livelihoods

Major activity 3: Feasibility study of sustainable livelihoods - (December 2006 – July 2007) a plan for sustainable livelihoods will be developed and its feasibility explored. Discussion with rural communities and observation of their daily practices will be used to identify which practices benefit them and wildlife and which do not. We will then hold preliminary discussions to identify which activities are most feasible.

2.3.1 Energy

The arrival of vehicles in Daocheng allows local people to take fire wood back to their houses much easier than previously and the increase in size of the traditional house requires much more fire wood for heating. This increasing demand for energy seems to be destroying the habitat of wildlife. Now local government is developing local hydro-electric projects and has put forward marsh gas and solar stoves to replace the use of fire wood, but these have yet to be accepted by local people because of the technical difficulty and the higher cost than using fire wood. In the neighbouring county to Daocheng, solar energy has been used by setting up a 'greenhouse' to help young yak in winter. In Daocheng, solar radiation was strong, especially in winter: a house in one of the monasteries had south-facing glass wall, which heated the room without the need for fire wood. Therefore using solar energy could be a way to solve the energy problem. We have discussed this with local people, they think that using glass in south-facing walls of houses is a good idea, but they need technical help to build the walls. They are also concerned about its safety. So the demonstration of easy, cheap and safe solar energy in house-building seems an important step to address the problem of increasing use of fire wood.

2.4 Awareness-raising

Major activity 4: Awareness raising – (December 2006 – July 2007). Awareness raising at the local community level, targeted towards tourists visiting the area and local and national government will be undertaken. Posters will be used to attract attention and we will work with local organisations to carry out the work.

2.4.1 Discussions with local people and tourists

During discussions with school teachers and local people in areas where local traditions are strong we found that although some new schools have been set up in Daocheng County, and their condition and the teaching materials are pretty good for study there was no teaching about local traditions apart from that on Tibetan language. People who were well-educated tended to distance themselves from their own culture, and think that the traditional attitude towards nature showed blind faith to some degree. Teaching children about the traditional attitudes towards wildlife in their formal education would be an important part of maintaining awareness of the traditional values and their conservation benefit.

Tourists have so little knowledge of the local culture of wildlife conservation and often offend without realising it. During discussions with tourists, they were interested in the culture and did not want to offend it. So increasing the awareness of tourists towards local culture may well benefit the maintenance of the local tradition on wildlife conservation.

2.4.2 Web site

We have cooperated with a Daocheng tourism website (www.yading.net) to raise awareness about local attitudes towards wildlife and its conservation benefit. Many tourists who have visited the website have learnt about the culture of wildlife conservation, especially of the white eared-pheasant.

This website is maintained by the Association of Yading Nature Conservation, which is a local organisation that is concerned with nature conservation. It was established during our initial studies in Daocheng and since then its members have cooperated with us in establishing contacts with local government officials and publicising Tibetan wildlife conservation to tourists. During this project we collaboratively surveyed a wetland in the county and recorded six to eight breeding black-necked crane *Grus nigricollis*. The organisation is also working us to develop the information centre mentioned below.

2.4.3 Questionnaires

During the work, we maintained good relationships with the local people in Daocheng city and another three villages. We believe that by showing respect to the local culture and its benefit for wildlife conservation, especially white eared-pheasant conservation, we helped raise their self-confidence in these traditions. Consequently, their pride seems to be increased and they are enthusiastic to share more of the tradition with us. For example, there is a tradition of spelling out important Buddhist messages in white stones on the hillsides so that they can be seen far and wide. We have proposed adapting this idea by putting white eared-pheasant designs at several prominent places in the landscape to attract that attention of tourists.

We have also explained to local people that conserving the forest, which is the habitat of white eared-pheasant, is very important. Not only will this benefit the species that has such a special place in their religious beliefs, but it will also benefit other wildlife.

2.4.4 Increasing the awareness of local government

The local government gave us a lot of assistance in our work and think highly of white eared-pheasant conservation. Now, they are keen to discuss with the State Forestry Administration using the name “White eared-pheasant County”. They also have a plan to help us set up an information centre especially for raising awareness about local wildlife culture and white eared-pheasant research.

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