

The studies on the conservation of the musk deer and habitat in Dafengding National Nature Reserve (DNNR) of China.

Final Report

Submitted by

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CONTENTS

1. Summary
2. Studying area and working site
3. Forest musk deer habitat in DNNR
 - 3.1 About forest musk deer
 - 3.2 Wild population and habitat surveying of Forest musk deer in DNNR
 - 3.21 Habitat surveying of Forest musk deer in DNNR
 - 3.22 Population surveying of Forest musk deer in DNNR
 - 3.3 Threats to forest musk deer in DNNR
 - 3.31 Deforestation and forest fragmentation in DNNR
 - 3.32 Illegal hunting in DNNR
 - 3.33 Livestock in DNNR
4. Social economical surveying in DNNR Yi communities
 - 4.1 Methodology:
 - 4.2 Results and discussion
 - 4.21 The human element:
 - 4.22 Livestock
 - 4.23 Source of energy in DNNR
 - 4.3 Community attitudes to forest musk deer and nature conservation
 - 4.4 Alternative production styles
 - 4.41 Bee-breeding (apiculture)
 - 4.42 Ecological pig farming
5. Environmental education and education improvement
 - 5.1 Status of the education in DNNR
 - 5.2 In schools
 - 5.3 In communities
 - 5.4 Paper publishing and report composing
6. Financial report
7. Acknowledgement
8. Main References

1. Summary

This report derives from the field project generously supported by Rufford Small Grant program (Ref: 162.01.05) which was implemented in one year 2005 to 2006. The aim of project was to quantify the habitat status of musk deer and such flagship species as giant panda and red panda, the illegal poaching and the illegal musk trade on the local market, and make clear the relations among the above variables. Furthermore, on the basis of the researching results, the DNNR Bureau was advised how to develop the more scientific managing system, and help local authority to allot the limited managing human, financial resources more reasonably.



Meng Xiuxiang DNNR (2005, Photo by Sete Erda)

Through the field working, we have surveyed 121 sampling belts, in which the cues of musk deer (eg. Latrines sites) were found, and the average population density was 1.23 deer/ Km². When the incidence of musk deer was identified, the characteristics of habitat were quantified, including 30 variables such as slope, canopy, elevation etc., on the basis of which, the habitat preference of forest musk deer was decided. Overgrazing by domestic livestock is a widespread problem throughout the DNNR, which can result in severe depletion of the forest understorey, leaving no shrubs for forest musk deer to browse during winter when snow covers the ground. Furthermore, the conflict among wildlife conservation, Yi community and the managing authority was very severe because of the damage from the flourish wild pig population. During field surveying, the landed vertebrate fauna in DNNR was surveyed, too.

Throughout public community presenting work, we publicized the concept of nature conservation, the value of endangered animals etc. We visited 300 Yi households door by door to collect the information about their living and production system, and discuss with them to explore the potential substitute production styles to reduce the pressure on the musk deer population and its habitat from their conventional production.

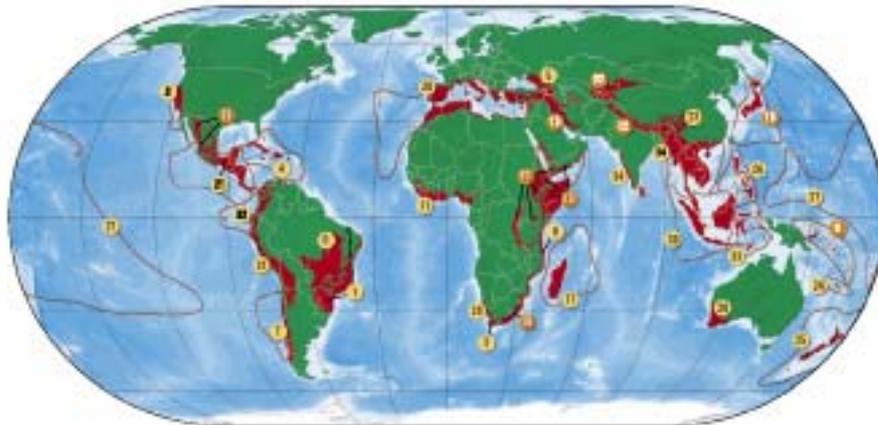
We educate premature to value and conserve wildlife and its habitat through our lecturing at the local prime school and some public presentation such as specimen exhibition, scientific video playing etc, to publicize the conservation of musk deer and habitat among local Yi Nationalities community.

2. Studying area and working site

This project was carried out in 2005 to 2006 in the area Dafengding National Natural Reserve (DNNR). DNNR of Sichuan Province is in mountainous region of southwest China (Fig.1, Fig.2, Fig.3), which is one of international 25 hot spot critical ecosystem conservation regions, namely the Mountains of Southwest China, (23rd hotspot, Conservation International, www.conservation.org), and with dramatic variations in climate and topography. This region supports a wide array of habitats including the most endemic-rich temperate flora and fauna in the world. The musk deer (*Moschus berezovskii*), golden monkey (*Rhinopithecus roxellana*), giant panda (*Ailuropoda melanoleuca*), red panda (*Ailurus refulgens*), and a number of pheasants (eg, Blood Pheasant, *Ithaginis cruentus*) are among the threatened species endemic to this hotspot. Dam construction, illegal hunting, overgrazing, and wood gathering are the primary threats to biodiversity in this region.

DNNR is a science and nature reserve with an area of 331 Km² and with altitude from 1240~3835 meter, and locates from 103°05' to 103°20' E and from 28°36' to 28°45'N, which was established in Meigu County, Sichuan with ratification of the State Council in 1978. In DNNR, the humid climate of subtropical monsoon is very clear, and winter is relatively dry, sunny. The annual average temperature is 10.2 ° C, with an annual rainfall of 1,089 mm, and 80% relative humidity frost-free period is 280~230 days.

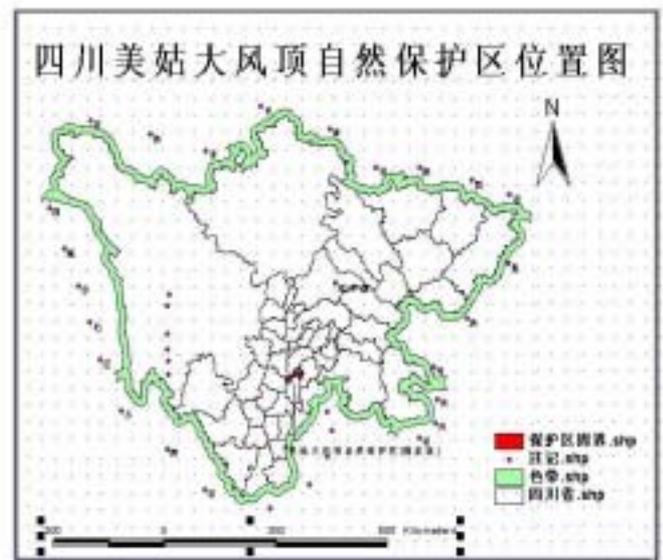
Moreover, DNNR is very special that there are totally 30, 000 Yi Peoples distributed in the nature reserve (Yi People is one of the 55 minorities in China). Yi People is the native nationality to the Liangshan region, of which SNNR is the core distributive area. For a long time, however, the potential impacts from the conventional production of Yi People has been not been assessed.



(Fig. 1. DNNR locates in 23rd biodiversity hotspot. CI, www.conservation.org)



(Fig.2 Location of DNNR in China)



(Fig.3 Location of DNNR in Sichuan Province)

3. Forest musk deer habitat in DNNR

3.1 About forest musk deer

Musk deer (*Moschus* spp.) are shy, solitary animals famous for the musk secreted by the adult male. Musk has been one of the oldest raw materials used in perfumery and traditional medicine in Asia, representing one of the most valuable scented animal products, even more expensive than gold (Green, 1986; Shrestha, 1998).



Forest musk deer (*Moschus berezovskii*) (Fig. 4), commonly known as Zhang Zi in Sichuan Province, is a small solitary forest ungulates, which is also the largest population of 6 species of musk deer, a body length 600~800mm, average weight about 7 kg, the adult male musk deer have the musk pod. Musk is not only an most important component of traditional medicine in China and some other Southeast Asian countries, but also were the high valued raw material for the production of perfume and the same time.

(Fig.4 Forest musk deer)

In the 1970s and 1980s, especially after the 1980s, due to the dramatic increase in demand for musk, coupled with high international smuggling, forest musk deer hunting in the distributive area has increased. The vicious killing of years has made wild forest musk deer resources to be seriously damaged. At present, the wild forest musk deer has been endangered world-wide because of hunting and habitat loss (Homes, 1999, 2004), and nowadays all 6 species of musk deer have been classified in China as Category I protected animals, and listed in the IUCN Red List of Threatened Species and in Appendix II of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora).

3.2 Wild population and habitat surveying of Forest musk deer in DNNR

3.21 Habitat surveying of Forest musk deer in DNNR



(Fig.5 Feces of Forest musk deer, Photo by Meng)



(Fig.6 Surveying at feces site of forest musk deer, Photo by Meng)

Forest musk deer is typical forested ungulates and is very shy, solitary, and lives in mountainous terrain covered by dense forests, which makes it very difficult to observe and survey directly in the field, however, the feces that it left are an effective indicator of habitat selection and population surveying (Fig.5, Fig. 6).

Dueser and Shugart (1978) created a detailed sampling technique combining plots of various sizes and shapes, as well as small transects, which later proved to be applicable for most terrestrial vertebrates (Morrison et al. 1992), so we adopted this method to quantify the habitat of forest musk deer and made some modifications in design variables, and the quantified variables listed in Tab. 1.

Tab. 1 Variable Definition and description in habitat surveying

1.	Canopy: Canopy of overstory vegetation in the 400-m ² plot
2.	Slope: Slope of the plot, from 0° to 90°; every 10° is a category;
3.	Slope aspect: Aspect of the plot, four categories: east-facing (45–135°), south-facing (135–225°), west-facing (225–315°), and north-facing (315–45°)
4.	Slope position: Position of the plot on the hillside; three categories: upper (>2700 m), middle (2000~2700 m), and lower (<2000 m);
5.	Vegetation type: Six categories: mixed evergreen and deciduous broadleaf forest, mixed conifer and broadleaf forest, conifer forest, shrub, grassland, and bare land
6.	Bamboo density: Average number of culms in bamboo plots;
7.	Bamboo height (cm) : Average height of culms plots
8.	Tree density: Average number of trees in two 20-m ² rectangular transects;
9.	Tree size (cm): Average diameter at breast height (DBH) of the trees nearest the center in each plot;
10.	Tree dispersion (m): Average distance to the trees nearest the center in each plot;
11.	Shrub density: Average number of shrubs in transects;
12.	Shrub size (cm) :Average DBH of the shrubs nearest the center in each plot
13.	Shrub dispersion (m) :Average distance to the shrubs nearest the center in each plot
14.	Tree-stump density: Average number of tree stumps (>15 cm in diameter) in each plot
15.	Tree-stump size (cm): Average diameter of the tree stumps (>15 cm in diameter) nearest the center in each plot;
16.	Tree-stump dispersion (m): Average distance to the tree stumps (>15 cm in diameter) nearest the center in each plot;
17.	Fallen-log density: Average number of fallen logs (>15 cm in diameter) in each plot;
18.	Fallen-log size (cm): Average diameter of the fallen logs (>15 cm in diameter) nearest the center in each plot;
19.	Fallen log dispersion (m): Average distance of the fallen logs (>15 cm in diameter) nearest the center in each plot
20.	Herb-cover proportion (%): Proportion of herb-cover area in the plot;
21.	Water-source dispersion (m): Estimated straight-line distance from the sampling plot to the nearest water source
22.	Concealing condition (m): Mean greatest distance looking eastward, southward, westward, and northward at a height of 1.0 m at the center of the sampling plots
23.	Open-land proportion (%): Proportion of land area without bamboo cover in the plot



(Fig.7 Habitat- Coniferous forest, *Photo by Meng*)



(Fig.8 Habitat- Shrub, *Photo by Meng*)

Coniferous forest is the most preferable habitat of wild forest musk deer, and it inclined to be present at the mixed coniferous and broad-leaved forest in spring and autumn, but love living in the dark conifer forest in summer, and winter living in the coniferous forest and the broad-leaved forests of the sunward area(Fig.7, Fig. 8).

During field surveying, when some cues (Fig. 9, Fig. 10) such as pellets, tail-rubbing sites etc were quantified, a sampling plot (400 m²) would be designed and the variables would be quantified and recorded.

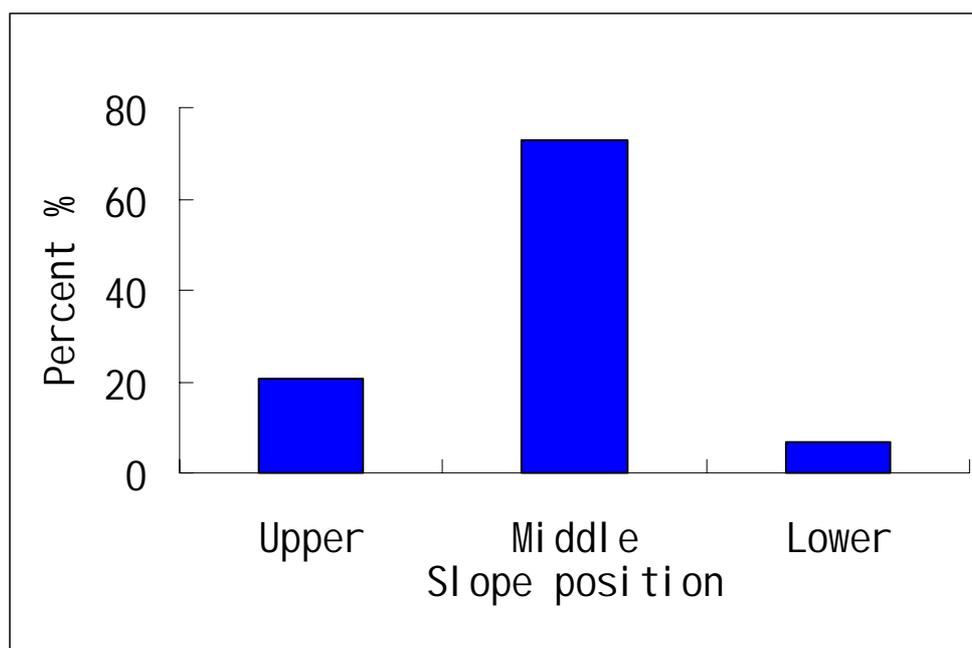


(Fig.9 Defaecating site of musk deer, *Photo by Meng*)



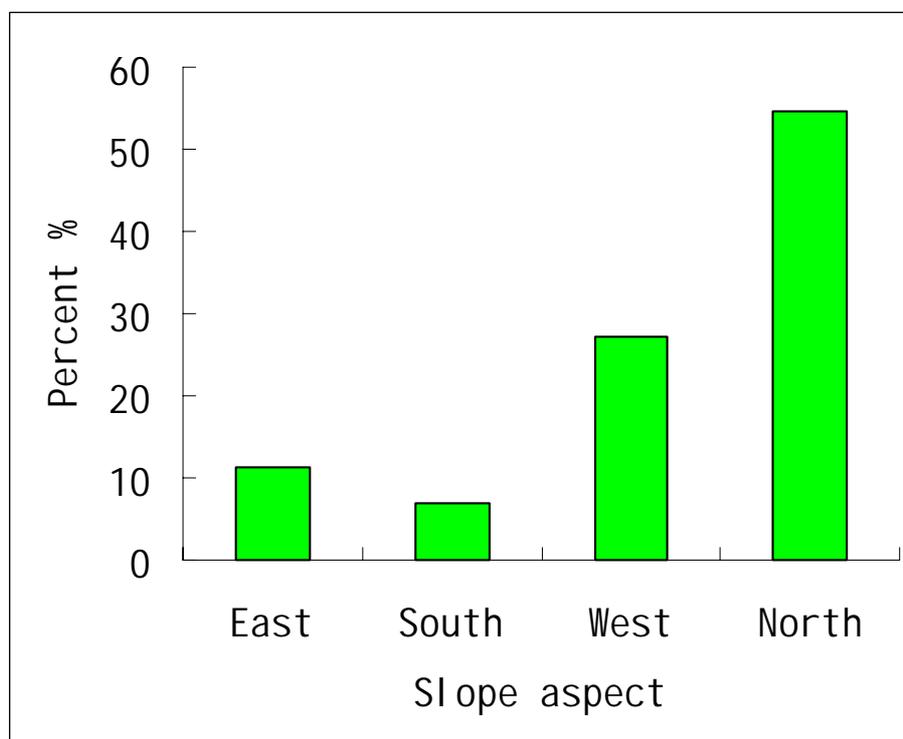
(Fig.10 Pellets of musk deer, *Photo by Meng*)

Data analyses were done with SPSS 11.0, and some nonparametric methods such as the Kruskal–Wallis test were utilized to explore the potential differences in habitat selection of forest musk deer populations, and PCA (Principal Component Analysis) was used to decide the main influencing factors which impose the huge impacts upon the habitat utilization of wild forest musk deer in DNNR.



(Fig.12 The slope aspect of habitat of forest musk deer)

Our results showed that, in DNNR, most of the forest musk deer habitats of (72.7%) were lied the middle slope (Fig. 11) because of the high intensity of husbandry at upper slope (above 2700 m) and farming at lower slope (below 2000). Moreover, 54.5% of sampling sites was north faced (Fig. 12), and the average slope aspects was 231° , which demonstrated that forest musk deer preferred the north and west faced slope in summer.



(Fig.11 The slope position of habitat of forest musk deer)

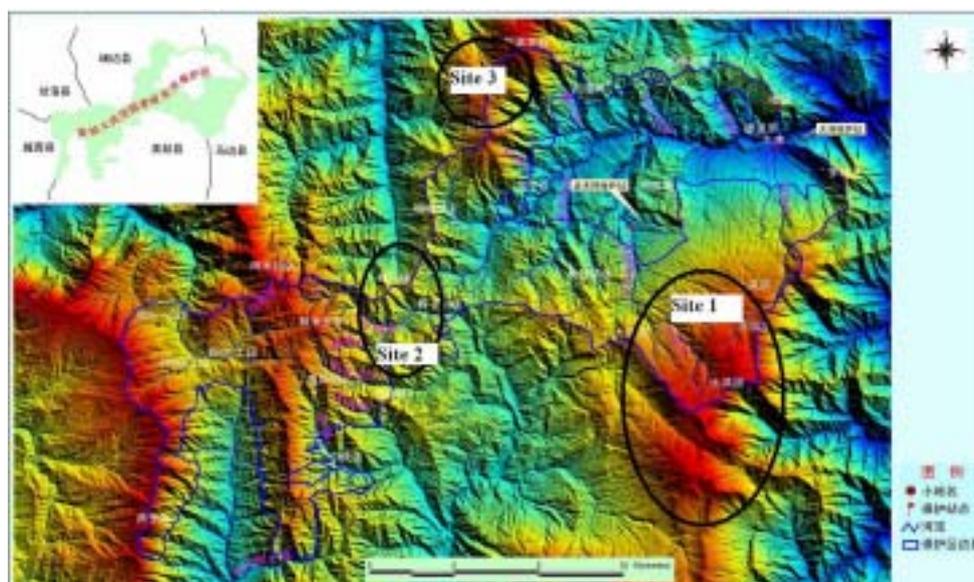
The PCA results were showed in Tab. 2. The human activities is the first key factors influencing the habitat utilization of wild forest musk deer, and geographic factors such as slope aspects was important variables, moreover, the density of fallen-log and tree-stump density, and the percent of rocks in plots were key influencing factors which could impose huge influence upon the habitat utilization of wild forest musk deer in DNNR.

Tab. 2 The principle influencing factors in habitat selecting of forest musk deer

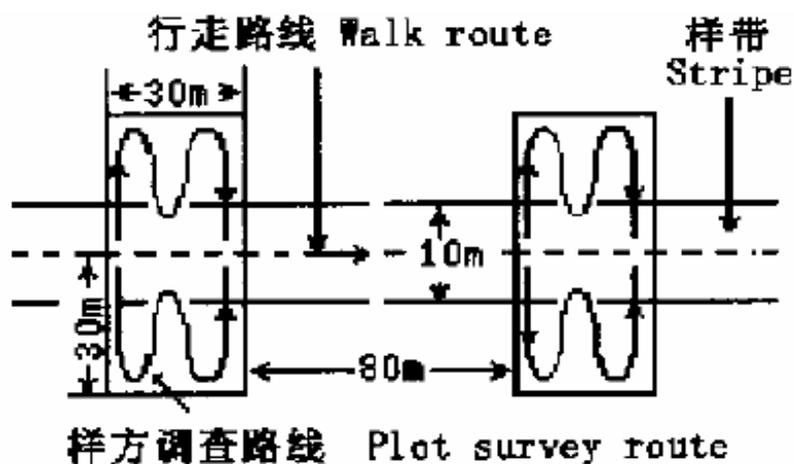
Component	Variables (average)	Factors	(%)
1	Slope position (1.86 ± 0.51) ; Human activity (2.73 ± 0.79)	Human influencing	36.332
2	Slope aspects (230.91 ± 119.35)	Terrain	17.315
3	The (0.17 ± 0.08)	Ground	10.859
4	Rock percent (0.18 ± 0.11)	Rock	10.157

3.22 Population surveying of Forest musk deer in DNNR

We conduct the forest musk deer surveying at Dafengding (Site 1), Ribowo (Site 2) and Yezheba (Site 3) to compute the forest musk deer population in DNNR (Fig. 12), and the sampling line method and inverse line transect method ((Fig. 13)) were used to decide the density of forest musk deer population. The field work resulted in the discovery of the approximate number of forest musk deer in DNNR is 321, the density is , 0.97 deer /Km², and the musk deer population is most abundant Dafengding (the density is 1.72 deer /Km²), where there are the most preferable habitat.



(Fig.12. The working sites in forest musk deer population surveying)



(Fig.13. The surveying method of population surveying)

3.3 Threats to forest musk deer in DNNR

3.31 Deforestation and forest fragmentation in DNNR



Although, the Chinese government announced the permanent cessation of deforestation in 1998 and all staff of forestry enterprises will move towards an afford station policy in the future. This positive step will improve the prospects for musk deer survival over its entire range. However, the conventional productive efficiency of Yi in DNNR is very low and Yi peoples live in absolute poverty, so that local Yi peoples have been deforesting to earn their life and reclaiming spacious but low efficiency land to plant, and the core region of natural reserve has been coming to be reduced and the habitat of musk deer has become degraded, fragmented, even lost (Fig. 14).

(Fig.14. Deforestation site, Photo by Gong Yihua)



(Fig.15. Firewood of DNNR household, Photo by Meng)



(Fig.16. Yi girl and her father, Photo by Meng)

Forest musk deer inhabit forested mountainous landscapes, and nearly all the activities occur in forest. Deforestation causing forest fragmentation is a severe threat to the musk deer's long-term survival. Forest fragmentation not only restricts the available habitats, but weakens the viability of isolated metapopulations. Deforestation causing forest fragmentation is a severe threat to the musk deer's long-term survival. Forest fragmentation not only restricts the available habitats, but weakens the viability of isolated meta-populations. In DNNR, the habitat destruction has undoubtedly influenced the survival of forest musk deer of DNNR, and contributed to the reduction of some populations and, in the long term, may be as serious a threat. Habitat destruction in China has mainly resulted from deforestation.

Generally, the rooted reason for the local deforestation is poverty (Fig. 15; Fig. 16), so the economic development of the local households will directly improve the musk deer habitat conservation.

3.32 Illegal hunting in DNNR



(Fig.17. Musk sac)

The Chinese government now pays much more attention to wildlife protection. It has launched a series of laws and regulations to preserve rare animals and their habitats, such as the Wildlife Protection Law, the Forestry Law and the Environmental Protection Law and so forth. The enacted laws protect musk deer populations to a certain extent. However, illegal hunting has been existing in distributive area including DNNR. Musk deer was illegally killed to harvest the musk sac (Fig.17) which is of high market value.

Relatively, the poaching pressure in DNNR is strong, and there exist the illegal secret musk trading at the local timed market. Traditionally, musk deer are hunted with hand-made guns, traps and dogs in order to obtain the male's musk sac. In the last two decades, poachers have begun to use modern guns and snares and the usual snare consists of a simple iron or steel wire laid in a circle, which is set along the path in an area of known musk deer activity, and tightens when the animal steps on it. In this way, large numbers of males, females and fawns are killed by snares, even though only males in breeding condition have any musk. With the expansion of snare use, the death rate of musk deer has shot up, and all species have been forced to the edge of extinction.



(Fig.15. Team member and snare, photo by Sete Erda)



(Fig.16. Team member and snare, photo by Qumu Jinyong)

3.33 Livestock in DNNR

Furthermore, musk deer habitat degradation in DNNR also results from agricultural or animal husbandry activities (Fig. 17; Fig. 18; Fig. 19). These human activities can impose disturbance to musk deer, and the domestic herds can compete the food and land with musk deer, and so can affect the musk deer's normal activity such as seasonal migration. In DNNR, the nomadic husbandry practices play a key role in influencing the seasonal migrations of forest musk deer.

Firstly, it may mean that musk deer inhabiting protected areas become involved in conflicts with neighbouring farmers, risking being shot, speared or poisoned as predators (or perceived predators) of livestock and game, and potentially undermining population viability. Secondly, it may mean that, if conflicts can be resolved, large areas of land dedicated to commercial or subsistence livestock farming have the potential to support globally important populations of musk deer in the long term. Hence, resolving conflicts with farmers is a high priority for musk deer conservation



(Fig.17. Yi girl and her shep, photo by Meng)



(Fig.18. Local nomadic gig farmin, photo by Qumu Jinyong)



(Fig.19. Disappeared habitat of forest musk deer, photo by Meng)

4. Social economical surveying in DNNR Yi communities

4.1 Methodology:

The surveys were conducted by the integrated methods of ethnological, anthropological, economical and human ecological methods, in which door by door semi-structured surveying, inquiring at the local timed market and interviewing with local Yi peoples and local authorities etc were utilized to collect the information and data of the social economical structure and status in DNNR. Moreover, our team member used to participate into the local productivities to find the influencing factors limited the local economical development, and investigations were combined by means of questionnaire surveying to find relevant information of local households (Fig.19; Fig. 20)



(Fig.19. Questionnaire recording in Yi village, photo by Bu)



(Fig.20 Questionnaire recording in the field, photo by Man Yan)

4.2 Results and discussion

4.21 The human element:

The (Longwo Township) is in Dafengding Nature Reserve, There are nine villages such as BaJueRuoA, Jian Erzhuo, JueMu, Longwo, LuoMuGan, NengHe, PingYiLuo, YiDa, YiWuWo in the surveying study area, namely DNNR.

The total current population is 4,193 and 925 families including 98 percent of Yi Nationality (Fig. 21; Fig. 22), which is the native people, and others is Han, Mongolia and Hui Nationality. More than 90 percent of people are farmers, and almost people in this region do not speak Chinese but their own languages.



(Fig.21 Typical Yi Peoples. photo by Zhang)



(Fig.22 Yi Children, photo by Hui)

In the traditional, native Yi people resided in the DNNR mountains, who earned their life by farming, picking, hunting, logging and nomadic husbandry. Since the establishment of nature reserve, hunting and logging are prohibited and they lost part of plowland, but due to the lack of alternative forms of economic systems, the community economical structure has not changed and community living has not improved much, so the conventional productive systems have impose tremendous disturbance upon the forest musk deer and its habitat, and caused to the habitat fragment even loss, at last, the big conflict has lied between nature conservation and local communities.

4.22 Livestock

Based on collected data, the status of local socio-economical structure of the Yi communities in DNNR was analyzed (Tab.3).

Tab.3 The proportion of mainly livestock in Wahou (%)

Villages	Pig	Poultry	Goat	Sheep	Horse	Cattle	Yak
JueMu	4.57	6.83	2.12	7.19	7.07	1.65	70.67
YiDa	13.49	67.46	15.87	*	0.79	2.38	*
YiWuGu	20.70	46.32	26.32	*	*	6.67	*
JianErZhou	22.35	34.5	13.44	26.88	*	2.69	*
BaJiuNuoA	22.55	43.14	27.45	*	1.96	4.90	*
LongWo	28.68	28.28	27.46	*	0.82	14.79	*



(Fig.23 Potato and riverside farmland. photo by Meng)



(Fig.24 Alpine range in core of DNNR, photo by Meng)

The results showed that the productive and living system of DNNR Yi communities have been very traditional, of which, the productive efficiencies were very low, and the living pattern was primitive and the use of nature resources is not enough, however, the resources consumption made negative impact on surrounding ecological environment of DNNR. Generally, the land use was very simple and coarse, even the soil of some special forested area is unsuitable to plant, on which, the landscape has been deforested and potato has been planted (Fig.23).

In DNNR, every village lies at the higher altitude and only 10-30% of the farmland is arable, for example, in Longwo, the current farmland is 859 acres, of which, only 1.93 acres is arable at relatively lower altitude, however, Yi people distributed in every area and cultivated maize and potato, and buckwheat was planted at higher altitude. In PingLuo, another village of DNNR, with the average elevation of 2800 meter, the proportion of cultivatable land was very low. In Yogo village which lies at 1800 m above sea level, a total of 400 acres of farmland was planted, and in Long Hung Village, 470 total acres of farmland has been used.

At sub-alpine forested and meadow belts, the capacity of farming livestock was overloaded, however, the using of pastoral land was inadequate at relatively lower mountain meadow (below 2500 m), which is abundant with bushes and grassland, but the use is inadequate.

Due to the long-term excessive herding and grazing with primitive methods, alpine pastures in the core area of DNNR has been damaged severely (Fig.24), and large tracts of grassland has been degraded and even desertification phenomenon has been happened. Grazing livestock lead to high pressure on the vegetation, and wildlife habitat has been destroyed at some extent, which will speed the population extinct of such endangered animals as forest musk deer, giant panda and red panda ((Fig.25; Fig.26))



(Fig.25 Livestock in DNNR, photo by Ren)



(Fig.26 Livestock in core, photo by Ren)

4.23 Source of energy in DNNR

Tab. 4 The average amount of energy of each year in Wahou:

	<i>BaJueNuoHa</i>	<i>JueMu</i>	<i>NengHe</i>	<i>YiDa</i>	<i>YiWuGu</i>
Wood (kg / a)	10715	2500	9250 ~ 9500	10000	10000
Coal (kg / a)	0	100	0	0	0
Electricity (kg / a)	0	630	383.3	0	495.3

In DNNR, another influencing factor of habitat loss is large gathering of the fuel wood. DNNR is located in the hinterland of Liang Mountains and with the characteristics of high-altitude and lower average temperature, so the fire wood must be spent to get heat and energy in almost whole day and year (Fig. 27), moreover, the traditional Yi was built on three pieces of rocked station on the ground,, in which the consumption volume of firewood is high (Tab 4).Because of the large amount of wood consumption (Fig. 28), the vegetation surrounding villages has been severely damaged, and the forest decline has gradually eroded internal to the core area of nature reserve. Nowadays, in order to reduce the fire wood consumption, some alternative energies have been tried and utilized in some Yi communities of DNNR, In JuMu village, the electricity, coal and other alternative energy usage has been encouraged by government and nature reserve, so the fire wood consumption of this village is significantly lower than other villages. So, we want to demonstrated that, the exploration and use of appropriate alternative energy is the ultimate method to mitigate the wood consumption..



(Fig.27 Livestock in DNNR, photo by Ren)



(Fig.28 Livestock in core, photo by Meng)

4.3 Community attitudes to forest musk deer and nature conservation

Through our interviewing, all of the residents said that they have been supporting the wildlife conservation if their living will not be influenced, and most of them knew that such endangered wildlife as forest musk deer is protected animal and the hunting is illegal practice, and 75% of local people agree to protect wild animals.

Because the wild boar (*Sus scrofa*) is abundant in DNNR, which damaged the crops and plants (Fig. 29, Fig. 30), 80% of Yi people do not accept wild boar, and 20% of the villagers want to hunt wild boar to mitigate hazards caused by boars, but only 40% of Yi people knew the wild boar is protected and 20% of the people is not clear.

The harm from the wildlife such as wild boar, monkey (*Macaca mulatta*) etc. was measured to be 80%. Most of the villagers declared that their corn loss from wildlife should be compensated by nature reserve or local government, but now, the effective ecological compensation system has not been established because of the shortage of fund, policies, even compensative criteria, so the huge conflict has been lied among wildlife, local communities and nature reserve, which will do harm to the nature conservation and the welfare of local Yi people.



(Fig.29 Wild Boar)



(Fig.30 Team surveying boar harm, photo by Erbu)

Furthermore, we found that 60% of the Yi population were aware of the nature protecting policies and related regulations, and 20% do not understand the nature management, and 10-20% said they were somewhat agree. No one said he were dissatisfied with. Generally speaking, most of the local Yi residents understand and support the protection policy. Moreover, 60% of farmers said about the harm caused by wildlife, and 80% of the residents demonstrated that the related authorities have not taken measures do deal with or compensate the caused damages, which would influence the good relationships among wildlife, Yi peoples and managing authorities.

In Longwo village of DNNR, the local Yi villagers were organized into nongovernmental organization to prevent illegal poaching, picking up, and putting out forest fire. If there is incidence happened, they could respond quickly. Half of the interviewed population think that the managing policies of DNNR should be more lenient, and the financial remedies should be given to compensate the loss caused by wildlife including wild boar.

4.4 Alternative production styles

In our social-economical surveying, We visited Yi People door by door to collect the information about their living, production etc., and discuss the potential substitute production style with them to reduce the pressure on the percent species from their conventional production (Fig.31, Fig.32), which including the planting of medicinal materials, farming of economical animals and traditional Yi articles etc., then we found the following two production styles should be appropriate, and could improve the living of local Yi communities.



(Fig.31, Discussion with Yi, Photo by Meng)



(Fig.32, Discussion with officials, Photo by Meng)

4.41 Bee-breeding (apiculture)

Bee-breeding is the traditional production of local Yi communities, only that the breeding methods is very primitive, but the honey is of very high quality (Fig.33; Fig.34), so the efficiencies and production scale is low. So, if the local communities could be trained to improve the methods and production of bee breeding, then this production style should be profitable to reduce the local poverty.



(Fig.33, Traditional Bee-breeding, Photo by Meng)



(Fig.34, Honey of DNNR, Photo by Meng)

4.42 Ecological pig farming

Traditionally, the local pig farming is free style, and the pigs was not in captivity, and some female pigs mate with male wild pigs, then the hybrid pigs known as "ecological pig" will be born. Because of no hormones, no drug residues, tenderness, fragrant and sweet, nutrient-rich, low fat content and medicinal health effects and other unique features of the new century "green food.", the market price of the ecological pig is very high (100 Yuan/kg of ecological pig, but 8 Yuan/kg of common pig) , so if the market could be developed, the ecological pig farming will be very profitable to the local Yi communities, and then the local poverty could be reduced and the damages caused by wild boars would be effectively limited.

5. Environmental education and education improvement

5.1 Status of the education in DNNR

Extensive surveying was conducted to explore the relationship of education to such factors as family income, cost of living, household size etc. historically, Yi people would not make their child go to school owing to the poverty, and the school is very simple (Fig.34; Fig.35).

The proportion of illiterate child at local Yi people is up to 70%, but since 2005, the policy of "Tuition freeing and accommodation subsidy" has attracted some Yi family to let their child go to school. However, because the teacher at the local primary school and middle school were lack of enough training, so the teaching effect was not good enough.

To improve the environmental consciousness and education level of local communities, we conducted the many activities in school and villages for a long time (For 2 month, and 10 hours working every day).



(Fig.35, Baby setter, Photo by Meng)



(Fig.36, A school, Photo by Meng)



(Fig.37, Six years old, Photo by Meng)

5.2 In schools

To improve the education level of the pupils and the local teacher, we set up classes in DNNR for 2 months, we lectured the language, English, maths and the environment conservation, and the audiences included the students, pupils, officials and the Yi farmers. The felt pleasant to our lecturing activities and told us, they have got much knowledge from our lecturing and understood many nature conservation policies. Furthermore, in order to strengthen the friendship of us, we prepared literature repertoire performed at their traditional “Torch Festival”(Fig. 38; Fig. 39; Fig. 40).

At last, we erected an grant named “Panda Award” to improve the education. Every semester, 20 excellent local Yi students will be awarded with 200 Yuan (Fig.41).

Through varieties of publicizing and teaching activities, we not only knew the problem existed in the local environmental and general education, but also make us harmonize with people in the poor minority region and help them raise environmental protection consciousness.



(Fig.38, Environmental education, Photo by Meng)



(Fig.39, Environmental elevation, Photo by Meng)



(Fig.40, Photo presenting, Photo by Meng)



(Fig.41, Contract of education award)

5.3 In communities

We conducted the environment publicizing in Yi communities, of which, the topics of forest musk deer conservation and environment value would be propagandized. Through the poster hanging and the explanation of our team member, and the large-scale photo exhibition in local markets which designed by ourselves, flexible and diverse forms, with the topics of economy, education, biodiversity, through to local residents to display photographs, made some good methods for them to get out of poverty (Fig.42 ; Fig.43).

Through our working, the Yi peoples have understood that the endangered wildlife including forest musk deer must be conserved and the poaching is prohibited, at the same time, they understood the place they are living is our country's wildlife nature reserve and the wild animal protecting is theirs responsibility.

Moreover, through the film screening and electrical data such as Powerpoint slides which were related to solid waste, air pollution, flooring, the destruction of biological diversity and other environmental issues, the pupils and the local Yi residents were attracted to learn more about the outside world and aware of their status and their beautiful environment.



(Fig.42, Publicizing at market, Photo by Meng)



(Fig.43, Discussing, photo by Hui)

5.4 Paper publishing and report composing

We collected related data and analysed the information, then we published on paper in an international journals (Meng Xiuxiang, Zhou Caiquan, et al., 2006, The musk deer farming in China. *Animal science*. 82: 1~6), the fund from Rufford Small Grant was acknowledged (Fig.44, Fig.45). Moreover, we composed a analyzing report (in Chinese) and have submitted it to the local managing authority and The State Ethnic Affairs Commission of China.



(Fig.44, First page of published paper)



(Fig.45, Acknowledgement of RSG in paper)

6. Financial report

Detailed financial expending is listed in Tab. 5.

Tab. 5 The Budgeting of the applying project

Items	Expending
Fee for local Guide: 4 £×50×5 guides	£1000.00
Public presentation and Visiting in Yi People household etc.	£500.00
Living provision of team member and equipment such as raincoat, sleeping bag and camp.	£2,000.00
Travel in DNNR	£500.00
Travel from Beijing to DNNR	£1,000.00
Total	£5,700.00

7. Acknowledgement

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8. Main References

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