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Final Report

Submitted by

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Contents

1. Summary

This project was funded by Rufford Small Grant Program (RSG) of the Rufford Maurice Laing Foundation, the title of which was “The nature conservation of Yaluzangbudaxiagu national nature reserve of Tibet, and was conducted from 2005 to 2006 at Yaluzangbudaxiagu National Nature Reserve inTibet of the west China. The aim of this project was to decide the population densities, fauna, distribution and the habitat utilization of endangered landed vertebrate wildlife, and to survey the local socio-economic status to determine the relation between the living system of the local native minorities and the nature conservation of the reserve. Moreover, this project will aim to raise and improve the environment awareness through environment education and publicizing.

Fig.1 PI Zhu Yinjiu

From 2005 to 2006, we conducted extensive field surveying to decide the main endangered landed vertebrate fauna, and studied the population, habitat status and habitat preference and distribution of the flagship species such as Himalaya forest musk deer, red panda etc. In addition, we also conducted interviews through surveying door by door and talking with local households to collect the information on their living, income, production etc. Furthermore, we discussed with local minority communities, authorities and officials about the potential substitute production style that could increase the income of the local communities and how to reduce the pressure upon the wildlife habitat from their conventional production.

Through the extensive surveying, we found that there are large areas of primitive forest and rich biological resources in the YNNR, the natural environment of which is excellent for the wildlife, so the habitat of lots of rare species are abundant in this area, and the fauna and flora are very complex. However, the local agriculture and other production systems are relatively primitive because of the long time sepapration from the outside and modern development, and some of the local living modes have been imposed negative impacts upon the distributive wildlife and the habitats, for example, such the traditional livelihoods as picking-up, hunting and deforesting for planting etc companing with the the population increasing have been effected the wildlife population and habitat, for which, the substitute economic style should be exlored

by local government and authorities. In recent years, the flourishing eco-tourism seems to be a good choice if the influences from the tourists could be avoided.

2. Study area

This project was carried out during 2005 to 2006 in the Yaluzangbudaxiagu national nature reserve (YNNR) of Tibet in the west of China. In YNNR, there is Yalu Zangbu Grand Canyon, which locates at the turning of the lower reaches of the Yalu Zangbo River Grand Canyon in China's Tibet. After the Yalu Zangbo River runs through the Milin Country of Linzhi Prefecture of Tibet, it gathers Palong Zangbu River along the stream flowing to the northeast, and then at 15th summit of the world's INDUS (7782m) it made a sudden change in the near 180-degree turn, where it is form of the "horse shoe-shaped" Grand Canyon as a rare world's geological structure. Grand Canyon average depth is around 5000 m, and limited depth is 6,009 meters. Grand Canyon with the depth and length more than Peru's Colca Canyon and the Colorado Canyon become the best in the world. The Grand Canyon belongs to Linzhi Prefecture, which including the vast areas of the Motuo, Milín, Linzhi, and Bomi. In April 2000, YNNR was established in the region, is located in southeastern Tibet's Linzhi Prefecture, southeastern Himalayas (93 ° 44 '96 ° 08' E, 27 ° 33 'to 29 ° 49' N), in which, the comlpex ecological system and wildlife were protected in an area of 9,168 sq km (Fig. 1).

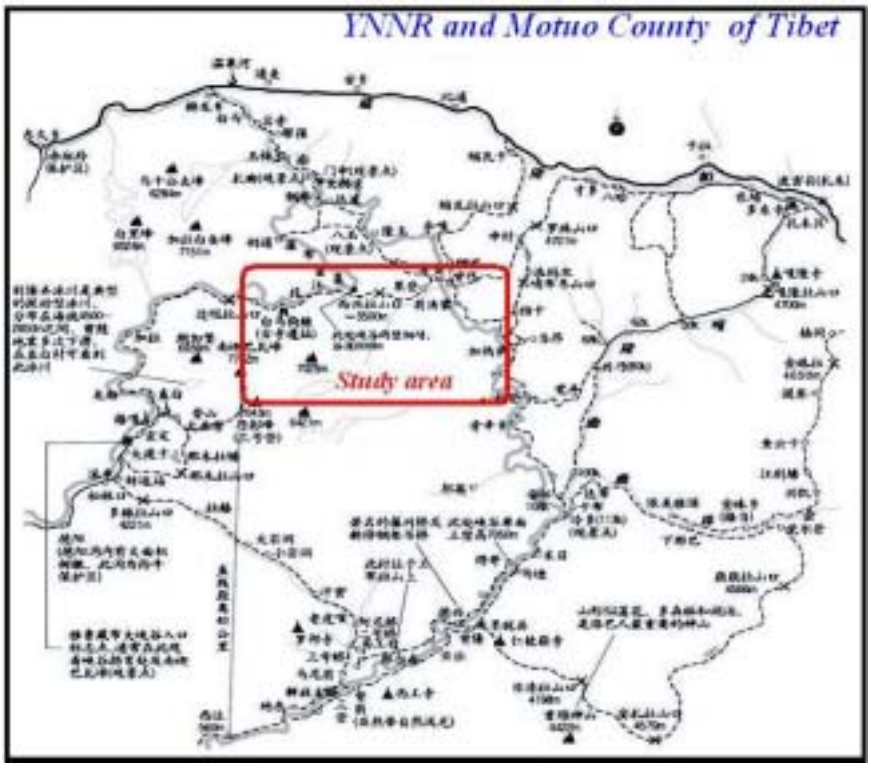

Fig. 2 YNNR and Motuo of Tibet

In YNNR, the yearly mean temperature is 16.0℃, and the mean annual temperature of the coldest month (January) is 8.4℃ comparing 22.2℃ in the hottest month (September) .The lowest temperature is -0.2℃, and the highest temperature is 33.8℃. The annual sunshine hour is about 2,000 hours, and frost-free period is 330 days. The mean annual temperature is above 22℃.The mean annual precipitation is 2259 mm, mainly concentrated in between March to October, which is the peak on May to September, and relative humidity is above 80%. While on the south bordering of Baxica, the precipitation reaches 4494 mm. Excessive rainfall makes the debris flow frequent and the type is viscous heavy rain of debris flow.

3. Methodology

This proposed project will include the surveying of the endangered mammals population and the fauna in YNNR, the habitat assessing of somekey-stone wildlife, the social-economical surveying and the nature awareness raising and environment education.

The surveying of terrestrial vertebrate fauna was conducted in YNNR. Before the project conducting, we plotted out the sampling belts (3,000m long and 40m wide) in the map (1:50,000 scale), then collected related landscape and geographic information and measured the longitude and latitude of the beginning, media and ending location, and the forms for surveying were prepared in advance. When the surveying was carried out in the field, two investigators were directed by global positioning system (GPS) and march ed zigzag through the decided sample belt to conduct line transects survey, and search for indirect and direct signs implied for the animals' presence. The data about the species and density of amphibian, reptile, bird and mammal were recorded in the prepared forms. Some species-specific surveying method have been utilized to explore the habitat status.

At working locations, if we have not spotted the live animal, we didi our best to make sure that certain habitat should be belong to certain wildlife judging by the spotted presence hints as dejecta, feeding cues and nest etc., in which the habitat was sampled and measured as a 20×20 m^2, and the potential variables were quantified (40 variables such as the canopy, slope position etc.). Furthermore, the additional factors including plant biodiversity and the distance from the adjacent village and trails have also been quantified as variables. The quantified habitat data was filled in the prepared "Habitat Forms".

Because minorities households live separately in YNNR, and their communities spread in natural reserve. We organized the talking with the local peoples and government agencies to collect the information on the local conventional production system and the details of the deforestation, picking-up and husbandry etc.

Some gathering of information sharing and environment awareness raising will be carried out in the local minority communities, in which we described the project plan and activities in the area and general information about ecological principles and information about endangered wildlife ecology and biology. Moreover, the team members went to the local school to lecture the wildlife protecting and recovering, and we worked with local teachers to create the educational programs.

4. The social -economic characteristics of the YNNR (Motuo country)

In YNNR range, the Motuo County concluding 7 rural towns and 60 administrative villages are located on both sidesof the river, 34 villages of which are along the banks of the Yalu Zangbo River, and 17 villages in the grips of the West Bank, and others are located in the east coast.

Through our social-economical surveying, in Motuo County, there are 1446 agricultural households, and the agricultural population totals to be 9119 with an average of 6.31 persons per household, moreover, there are 1796 urban populations, so the total of population is 9469, and the population density is 156 persons per square kilometer. The residents are made of several minorities such as Menba, Luoba and Tibetans, and unidentified minority called Deng People. In YNNR, most of the residents is Menba, representing 73.43％, comparing with Luoba (12.74％) and Tibetans (13.47％) (Fig. 3). The former two minorities have been maintaining the conventional living mode, namely Slash-and-burn, but the Tibetans are intented to live for farmland and grazing. There are crops such as corn, rice, wheat and barley etc., are planted at a belt between 700 to 2400 m (Fig. 4).

On the basis of the production efficiency of conventional production systems such as planting, husbandry etc., the local carrying capacity of ecological-social system has been near to be saturated. For a long time, the birthing of local households has been not controlled, however, this policy has been started to be carried out in order that the promotion of local population could be mitigated.

Fig. 3 Minority in YNNR

Fig. 4 Conventional planting in YNNR

Because the main landscape of YNNR is high mountain valley terrain, the arable land occupies only only 0.27% of Mutuo, and the average available farmland is only 0.19 hectares per capita. Moreover, the distribution of farmland is not average, and 71.6% of the farmland in the low elevations locates in the four towns, namely Beibeng, Daxing, Bangxin and Motuo.

In the total cultivated area, the corn crop stands for 45.3％. In YNNR, the corn planting mainly relys on the traditional slash-and-burn mode, and many distributes the sides of the Yalu Zangbo River with the 20-50 degree slope. The rice cultivation only appears just below the altitude of 1600 m in the region, and barley and wheat plant at altitude higher than 1600 m.

Fig. 5 Horse in YNNR

Fig. 6 Livestock transporting in YNNR

Pigs, cows and horses are mainly traditional breeding animals (Fig. 5), which are bred in free range, moreover, the mule were raised gradually to act as the transport facilities from 80K to other towns and villages of Motuo (Fig. 6).

5. Landscape and vegetation

In YNNR, There are 926 species of ferns and seed plants, belonging to 144 families and 423 genera in the reserve, among which ferns have 26 families, 38 genera and 66 species; gymnosperms have 5 families, 16 genera and 19 species; angiosperms have 113 families, 369 genera and 841 species. In the reserve, the percents of seed plants account for 61.78% and 25.63% in total families and genera of Tibet, respectively. The floristic elements of genera are composed of 13 types and 15 subtypes of Chinese seed plants. The temperate distribution element with 181 genera accounting for 51.58% in total genera holds a dominant position. The element of endemic species to China has 11 genera, accounting for 3.13% in total genera. 410 species, accounting for 48.41% in total species, are endemic to China. Moreover, there are 18 rare and endangered species in the reserve, among which 4 species, gingko (*Ginkgo biloba*), yew (*Taxus chinensis*), *Taxus chinensis var. mairei* and dovetree (*Davidia involucrate*) are in national protection categories 1 (NPC1); 6 species, *Libotium barometz*, *Picea brachytyla var. complanata*, *Cercidiphyllum japonicum*, *Magnolia wilsonii*, *Tetracentron sinense* and *Phellodendron chinense*, are in NPC2; the rest, *Ophioglossum thermale*, *Euptelea pleiospermum*, *Eucommia ulmoides*, *Gastrodia elata*, *Corylus chinensis*, *Picea brachytyla*, *Rhododendron rex* and *Stewartia sinensis*, are in NPC3.

The climate layers and vertical layers of YNNR landscapes are observably, in which the biomes climatic zones and forest vegetation in the vertical belts are significant from 500 m to 7,782 m above sea level. From low to high forest, the following vegetation type altered gradually, ie mountain tropical rain forests, subtropical monsoon forest zone (500 m -1100 m), mountain subtropical evergreen broad-leaved forest (1100 m ~ 2400 m), mountain temperate broad-leaved forest zone and sub-alpine temperate cold dark coniferous forest zone (2400 m -4000 m), frigid mountain shrub meadow zone (4000 m ~ 4400 m), periglacial frigid alpine vegetation zone (4400 m ~ 4800 m), the frigid mountains of gravel beach vegetation zone (above 4800 m).

YNNR includes almost all climatic zones of the northern hemisphere in YNNR, of which of the characteristics and types of soil and climate alter from the low latitudes of the northern hemisphere to high latitudes, and vegetation types are so completive that it is difficult to see it in other places.

5.1 Low hill tropical rain forests and subtropical monsoon forest zone

In YNNR, the climate of the belts below 1000 m is characterized by less hot in summer and less frost in winter (Fig. 7). Annual precipitation is about 2000~3000 mm. This layer is tropical monsoon rain forests. Tall lush trees and plant species are very complex, and under woods is wet and dark.

A variety of animals inhabit here with rich tropical colors. Mammals are mainly red-bellied tree squirrel, blue-bellied tree squirrel, orange belly long-nosed squirrels, bats, hamster, Green hairless mice, the sikkim mice, red deer, Serow, wild boar, green minks, leopard cat, golden cat, bifurcates, black bear and tiger, etc.

5.2 Semi-mountainous subtropical evergreen and broad-leaved evergreen forest zone

This layer is at an altitude of between1000~2400 m, with hot weather and the great humidity, and above the belt of clouds of the greatest precipitation (Fig. 8). Many vine trees have roots plate features, bamboo and moss found, and the following log canopy is very rich of ferns, orchid plants and herbaceous plants. There

are the most abundant types of animals in this layer. Many of common species of the monsoons rainforest ecosystem in summer has been found, and some of the mountains in winter have become establishments of wintering habitat types.

Fig. 7 Landscape of 5.1

Fig. 8 Landscape of 5.2

5.3 Mountain temperate broad-leaved forest zone and sub-alpine temperate cold dark coniferous forest zone

This layer is at an altitude of between 2400 ~ 4000 m (Fig. 9), with summer rainfall concentrated, and thick snow cover in winter woods. The forest canopy density is higher, company with a mixed hardwood, such as elliot maples，azaleas. Moss and herbaceous vegetation under forest are dense. Its mainly large animals are tail sikkim shrew, webbed shrews, gray neck Pika, Chinese Ji rats, mice gray belly, sikkim voles, black bear, minks, takin, red goral, and alpine musk deer; etc.

5.4 Frigid mountain shrub meadow zone

This layer is at an altitude of between 4000 ~ 4400m (Fig. 10), with moist winter cold, and even frost in summer. Alpine meadow vegetation grow with the rows gland rhododendrons, azaleas and red stem supine. The wildlife such as alpine musk deer, antelope, minks are common in summer, but insects are very scarce.

Fig. 9 Landscape of 5.3

Fig. 10 Landscape of 5.4

5.5 Periglacial frigid alpine vegetation zone

This layer at an altitude of between 4400 ~ 4800 m (Fig. 11), has snow most of the year. It is covered with lichen, moss and Chrysanthemums, Cruciferae, Saxifrage Branch Caryophyllaceae and Sedum Branch etc. There are several small population species of birds and animals in this band.

Fig. 11 Landscape of 5.5

6. Fauna, key-stone wildlife and habitats

Because of the excellent natural environment of the YNN, there are lots of animal species inhabit in this area, most of which is endemic to China, Tibet, and even to Motou, and most of which has been listed under the state's protection.

6.1 Mammal fauna and key-stone species

In YNNR, the mammal has 81 species (Tab.1), which belong to 8 orders, 27 families. Only 5 species, which account for 6.2% in total species, belong to Palaearctic realm. 61 species, which account for 75.3%, belong to Oriental realm. 15 species, which account for 18.5%, belong to widespread type.

There are 6 species of the national first-grade wildlife of China for protection, which are giant panda (*Ailuopoda melanolcuca*), golden snub-nosed monkey (*Rhinopithecus roxellanae*), leopard (*Panthera pardus*), clouded leopard (*Neofelis nebulosa*), forest musk deer (*Moschus berezovskii*) and takin (*Budorcas taxicolor*).

There are 17 species of national second-grade wildlife of China for protection, which are rhesus macaque (*Macaca mulatta*), Tibetan macaque (*Macaca thibetana*), Chinese pangolinand (*Manis pentadactyla*), black bear (*Selenarctos thibetanus*), red dog (*Cuon alpinus*), red panda (*Ailurus fulgens*), *Martes flavgula*, common otter (*Lutra lutra*), spotted linsang (*Prionodon pardicolor*), large indian civet (*Viverra zibetha*), small indian civet (*Viverricula indica*), Asiatic golden cat (*Felis temmincki*), goral (*Naemorhedus goral*), mainland serow (*Capricornis sumatraensis*), *Elaphodus cephalophus*, sambar (*Cervus unicolor*) and blue sheep (*Pseudois nayaur*).

The endemic species to China are *Talpa longirostris*, *Uropsilus soriciopes*, *Sorex cylindricauda*, *Myotis daubentoni*, golden snub-nosed monkey, Tibetan macaque, red panda, forest musk deer, *Muntiacus crinifrons*, *Apodemus chevrieri*, *Apodemus latraulam*, *Niviventer excelsior*, *Microtus langier*, *Eothenoyms eleusis*, *Eothenoyms miletus*, *Eothenoyms chinensis*, *Trogopterus xanthipes*, *Sciurotamias davidanus* and *Ochotona thibetana*. The relic mammals in the reserve include golden snub-nosed monkey, takin and, etc..

The distribution of small mammals is closely related with the conditions of the habitats. The small mammal diversity indexes in coniferous forest, mid-montane man-made forest, subalpine scrub-meadow, and lower mountain man-made forest are from high to low in order. Some key-stone species and their status are described as following:

Tab.1 The mammals in YNNR

INSECTIVORA: *Erinaceus europaeus; Scaptonyx candatus; Uropsilus soriciopes; Talpa longirostris; Sorex cylindricauda* Milne-Edwards; *Crocidura attenuate; Anourosorex squamipes* Milne-Edwards; *Crocidura Dracula; Soriculus leucops; Blarinella quadraticauda; Chimarrogale himalayica*
CHIROPTERA: *Rhinolophus lepidus*; *Rhinolophus rouxi*; *Rhinolophus pcarsoni*; *Pipstrellus pulveratus; Plecotus austriacus; Murina leucogaster; Ia longimanaMyotis daubentoni*; *Hipposideros pratti* **PRIMATES:** *Macaca mulatta*; *Macaca thibetana*; *Semnopithecus schistaceus* **PHOLIDOTA:** *Manis pentadactyla* **CARNIVORA:** *Canis lupus; Vulpes vulpus; Cuon alpinus; Selenarctos thibetanus; Ailurus fulgens; Arctonyx collaris; Martes flavgula; Melogale moschata; Lutra lutra*; *Mustela kathiah; Mustela sibirica; Prionodon pardicolor; Viverra zibetha; Viverricula indica; Felis bengalensis; Felis temmincki; Neofelis nebulosa; Panthera pardus;* **ARTIODACTYLA:** *Sus scrofa; Moschus berezovskii; Moschus leucogaste; untiacus crinifrons; Elaphodus cephalophus; Cervus unicolor; Capricornis sumatraensis*; *Naemorhedus goral; Pseudois nayaur; Budorcas taxicolor;* **RODENTIA:** *Apodemus chevrieri; Apodemus draco; Apodemus latraulam; Apodemus peninsulae; Mus musculus; Rattus norvegicus; Micromys minutus; Rattus fulvescens; Rattus nitidus; Rattus flavipectus; Niviventer confucianus; Niviventer excelsior; Rattus bowersi; Microtus langier; Eothenoyms eleusis; Eothenoyms miletus; Eothenoyms chinensis; Rhizomys sinensis; Hystrix hodgsoni; Atherurus macrourus; Trogopterus xanthipes; Tamiops swinhoei*; *Sciurotamias davidanus; Dremomys rufigenis; Dremomys pernyi; Callosciurus erythraeus;*
LAGOMORPHA: *Ochotona cansus; Ochotona thibetana; Lepus capensis*

Long-tailed leaf monkey (*Semnopithecus schistaceus)* (Fig.12) of Motuo reserve, locally known as "white monkeys", and the Tibetan called "zha". They only are ooccured in the semi-evergreen rainforest areas of Yalu Zangbo River as one unique Himalayan species. Because its restricted distribution and friendly with people and never ravaging crops, they are seen as auspicious symbols in YNNR.

Fig. 12 Long-tailed leaf monkey (*Semnopithecus schistaceus)*

Long-tailed leaf monkey is as long as 80 cm with a tail of one meter, and with the brown-haired body, face, palm and heel are black. This monkey is the largest leaf monkey category. In YNNR, this animal lives in

the tropic monsoon forest, subtropical evergreen forest, and temperate broad-leaved forest at altitude of below 2,800 m, and often spotted to be on the big steep stones in forest on both sides of the valley, and on trees, but never go down to ground. They feed on various fruits and leaves, shoots sprouting up, and the flowers. At day, companying with bear monkeys but separating mutually, they often group in three-six or ten, even sometimes twenty-forty, led by a strong adult male monkey. Females may have bred all years and young and mother monkeys would give the infants parent caring.

Takin (*Budorcas taxicolo*) (Fig.13) are large mammals and rare species appearing in YNNR, which inhabits in the mountains at an altitude of 2,000 to 4,200 meters. As the seasonal climate changes, their food changes timely, and their activities pattern has also changed. In summer, takin clusteringly moves to the alpine meadow and the lower elevations for feeding and avoiding cold when winter snow closed. In forest days, takin often hide in shelter during the day, but go out to feed only in morning and evening. The food of takin includes tree branch, bark, bamboo leaves, bamboo, grass and all kinds of seeds. Takin likes to drink the water rich of sale, so they are inclined to live around sale water.

Fig. 13 Takin (*Budorcas taxicolo*)

Monkey (*Macaca mulatta*) (Fig.14), the Tibetan saying, "Zhewu," is listed as the national second-grade protected animal, and easily seen in this area. Adult monkey si about 60 cm high and with grayish brown hair. This monkey inhabits in broadleaf and conifers mixed forest with more rocks and cliffs on the mountain. They are often active in daytime to forage and rest, but in the nighttime, they rest in caves or trees. This species moves quickly and is good at climbing. As seasonal climate changes, searchs for food and nesting sites, it moves into the region at altitude of 1,000 to 4,000m and like living in groups.

Fig. 14 T Monkey (*Macaca mulatta*)

Leopard (*Panthera pardus)* inhabits in temperate coniferous forest and the broad leaved-coniferous mixed forest in YNNR, even reachs 3000 m. This leopard is called as Damoser in Tibetan called. Leopard is

typical carniverous animal, which is similar with tiger but smaller, with round head, short ears, about one hundred kg weight, 1.5 m length, and with 70 ~ 80 cm long tail. Body is orange yellow, white belly hair, small and dense blotches on its head, and its limbs lateral is brown, black or brown spots. There are blotches of varying sizes on the tail but its mucro is black. The distributing of this wildlife in reserves is very rare, and have not spoted in surveying, but team memebeers were told by local peoples that this animal is present in YNNR though it is very few.

Alpine musk deeer (*Moschus sifanicus*) was spotted in coniferous forest and forest-shrub of YNNR (Fig 15, Fig. 16). Alpine musk deer is inclined to occur in the mixed coniferous and broad-leaved forest in spring and autumn. The main habitat of musk deer is the dark conifer forest, the coniferous forest and the broad-leaved forests of the sunward area. Musk deer spread mainly above altitude of 2000 m. In the field, musk deer often defecate a heap of black-brown feces along its trsil or leave the scent-marks on the cut breaches, according to which, the gender, age, and activity of the musk deer could be decided. Forest musk deer food on the broad-leafed plants and some shrubs.

Fig. 15 Pellets of musk deer

Fig. 16 Alpine of musk deer

Fig. 17 Looking for the defecating site of red panda

Red pander (*Alurus fulgens*) was present the warm and cool area of YNNR, and mainly in the mountain subtropical evergreen forest, temperate broad-leaved forest and coniferous forest at the altitude of above 2,000m,even nearly 3,960m (Fig.17). In winter, the thick snow makes red panda difficult in feeding, so it is inclined to come to the edge of villages or forest at altitude of more or less 2500 m. Red panda rest during daytime, and feed after sunset, and it is present at altitude of 2300 m to 2900 m in April, then move to coniferous forest at altitude of 3,400 m in May, and in Jun appear at altitude of 3,600 m, so obviously, red pander could behave the seasonally vertical movement. Moreover, red pander could food on the leaves and shoots of bamboo, Niitakayamensis(箭竹) (*Sinarudinaria sp.*), fruits and so on。

6.2 Birds and key-stone species

There are near to 200 species of birds in the reserve, which belong to 16 orders, 47 families, and account for 14.59% in total species of China, 29.93% in total species of Tibet. However, only 108 species of birds, accounting for 65.91% in the total species of birds, have been directly observed in this survey. In the reserve, resident bird, summer migrant, winter migrant, passing migrant have 96, 71, 16, 6 species, and account for 50.79%, 37.56%, 8.46%, and 3.17% in the total species, respectively. The national protected bird and endemic species to China have 14 and 11 species, and account for 7.40% and 5.82% in the total species of reserve, respectively. The breeding birds include 167 species accounting for 88.35% in the total species in the reserve. The fauna of birds bestride the Palaearctic realm, Oriental realm and wide distribution type, in which the Palaearctic realm includes palaearctic type, northeast type, holarctic type, northeast-north China type, and etc., and Oriental realm includes Himalayan-Hengduan Mountains type, oriental type, and south China type. The species belonging to Oriental realm are obvious dominant in the reserve, which sum to 111 species, and account for 58.73% in the total species.

The rare and endemic species are very abundant in YNNR, among which, the national first-grade wildlife of China for protection is black-necked crane (*Grus nigricollis*); the national second-grade wildlife of China for protection are black kite (*Milvus migrans*), northern sparrow hawk (*Accipiter nisus*), besra sparrow hawk (*Accipiter virgatus*), upland buzzard (*Buteo buteo*), eagle owl (*Bubo bubo*), blood pheasant (*Ithaginis cruentus*), red-bellied tragopan (*Tragopan temminckii*), Chinese copper pheasant (*Chrysolophus amherstiae*), Derby's parakeet (*Psittacula derbiana*), silver pheasant (*Lophura nycthemera*), rufous-backed crake (*Porzana bicolor*) and collared scops owl (*Otus bakkamoena*); the wildlife of Sichuan province for protection are little grebe (*Tachybaptus ruficollis*), Indian jungle nightjar (*Caprimulgus indicus*), and white-throated spinetail swift (*Hirundapus caudacutus*); the endemic species to China are Chinese bamboo partridge (*Bambusicola thoracica*), collared finch-billed bullul (*Spizixos semitorques*), rufous-crowned moupina (*Moupinia poecilotis*), bar-backed laughing thrush (*Gatrrulax lunulatus*), Elliot's laughing thrush (*Garrulax elliotii*), hwamei (*Garrulax canorus*), spectacled crowtit (*Paradoxornis conspicillatus*), yellow-bellied tit (*Parus venustulus*), red-bellied tit (*Parus davidi*) and vinaceous rosefinch (*Carpodacus vinaceus*). There are many breeding birds in the reserve, in which 109 species belong to the Oriental realm, and account for 65.66% of the total breeding birds; 57 species belong to the Palaearctic realm, and account for 34.34% of the total breeding birds.

Pheasants (*Tragopan temminckii*) inhabit in red fir forest. In addition to its reproductive stage, pheasants live in 8 ~ 10 pairs or small group. They often hide in the dense rhododendron shrub or trees covered with moss, and berch on the branch at the dawn time. It could run fast on the ground, but only fly short distance owing to its cumbersome body. They mainly live in the leaves and fruit of ferns, and food on the insect in the soil and vegetation.

Fig. 18 Pheasant (*Tragopan temminckii*)

Tibetan Snowcock (*Tetraogallus tibetanus)* and **Ruddy Shelduck (*Tadorna ferruginea*)** are well-known birds of Tibetan plateau (Fig. 19; Fig. 20), which are distributed widely in Tibet with an elevation of 2000 to 4000 meters in the mountains along the bare rock, shrub or semi-desert areas. The former is present above snow line, and so it is named as snowcock, moreover, by the seasonal change of the snow cover in winter, they move to a lower altitude of 3000 meters mountain valleys, but in summer, move to the

mountains near the snow line where food resources are rich and the climate is cooler. The later (Ruddy Shelduck) mainly live in the lake area.

Fig. 19 Tibetan Snowcock (*Tetraogallus tibetanus)*

Fig. 20 Ruddy Shelduck (*Tadorna ferruginea*)

6.3 Amphibians and reptiles

Some specimens of amphibians and reptiles were collected in this survey. Based on the literatures and this survey results, 20 species of amphibians and reptiles distribute in the reserve. There are 10 species of amphibians, which belong to 2 orders, 7 families. There are 10 species of reptiles, which belong to 1 order, 2 suborders, 4 families. The white dragon (*Batrachuperus pinchonii*), mustache toad (*Oreolalax omeimontis*), Japanese woodfrog (*Rana japanica*), *Amphiesma craspedogaster*, transverse-banded racer (*Elaphe perlacea*), Jerdon's pit-viper (*Protobothrops jerdonii*) are occurred.

Spring snake (*Thermophis baileyi*) (Fig.21) is endemic to Tibet Plateau. It is 60-80 cm Length. Back is tan and both sides of body are greenish gray. The spring snake inhabits the hot springs and suurounding regions of Tibet plateau above 4000 m, and it is the only snake species adapt to life at high altitude after the Tibetan Plateau uplift. They usually hide in rock rubble during the day, to be seen swimming in the marshes and small meadow. There may be a lot of local frogs and small fish for food in the mountains. A few scattered populations live rounding the hot springs, but in small quantities.

Fig. 21 Spring snake (*Thermophis baileyi*)

7 The local minority communities and the influences on the nature conservation

7.1 Minorities in YNNR

Menba People was named by Tibetans, which has become named themselves (Fig. 22; Fig.23)). Menba has its own language, and there are two places where Menba live: There is an Menyu Country (located inside Linzhi Prefecture), with an area of about 10,000 square kilometers; another one is Motuo County, which have an area of approximately 10000 square kilometers. In the past, due to the region's complicated geographical conditions, the landscape and blocking traffic difficulties, aliens rarely set foot here. The area

has been regarded as "hidden areas" with many of religious themes and myths. Menba is a mainly engaged in agriculture, animal husbandry, collecting, fishing and hunting. Farmlands include watered lands, dried lands and gardens. Dry land lies on in the mountainside near the main and flood areas.

Fig. 22 Menba people in YNNR

Fig. 23 Self-training

Food crops include rice, buckwheat, barley, corn, Chicken wheat and a small part of the valley and vegetables are hot peppers, carrots, potatoes, trucks quarter beans, pumpkins, cucumbers, melon, and cabbage. As primitive tools, extensive farming, crop yields are low, food production are not enough and have to rely on livestock, hunting and gathering as a supplement. Animal farming is another living way of Menba. There are many different sizes of natural pastures in the north of Menyu area, which are good places to engage in livestock production. Livestock can provide milk, butter, cheese, beef and other foods, ox hair textiles, and leather is the material of national exchange. Pian Cattle (a kind of cattle, whose parents are Yak and normal cattle) and yak as public transports are a major commitment draft animals.

The handicraft industry of Menba has not yet separated from agriculture, while they themselves are engaged in agricultural production. The manufacturers, such as a bamboo, stone and paper crafts, are mainly bamboo manufacturers, such as the most popular bamboo weaving baskets, seats, screens, and the scene boxes, tables, beds, counters and other wood furniture, and Eto stick, Eto caps, etc.

Fig. 24 Gate of a Luoba village

Loba people is isolated with Tibetan and Menba (Fig.24), so socio-economic development level of the Loba people is more low, and agricultural production tools are simple and rough. Except for a small number of iron knife and a long knife, Most areas using wooden tools, such as seeding with a sharp wooden stick, weeding with a wooden spades, wooden hoe. Farming actually uses "slash and burn" approach to growing mainly arid. The grain output is so low that the Loba people have to rely on hunting and gathering activities to maintain the minimum standard of living.

Hunting is another significant economic activity of Loba. Loba man practices to hurt with archers when he is young. Every village has a good group of skill skilful hunters, and bravery and resourceful hunter would get respect of the people. Apart from hunting with ropes and the ferocious animals in the food poisoning, the most common way is using poisonous arrows to shoot to death. Hunting activities offer the Loba people the less meat, but also provide the bags to exchange living necessities. Handicrafts are not separated from agriculture. Bamboo is used in both men and women prepared mat, bamboo cages and other items. These wide variety of precise objects, reflect the Loba people's material and cultural characteristics. In the off-season, they take these items, together with the acquisition of dyes, medicines and other native products, to get near the same town for Tibetan barter exchange, in exchange for Tibetans iron tools, salt, tea and other living necessities. Most women would use simple machines for textile-weaving Tongqun, a kind of women dress, is mostly made of the burlap sewn from the textile.

Deng People live in the southwest of Tibet Autonomous Region, the Chayu River and its tributaries called Xizhi Liuqu (also known as Gongren Gabu River). "Dengren" is in the name of their Chinese collectively after the founding of new China, but they claim to be "Darang" and "Geman". Calling himself "Darang" is in the region of Gequ River; calling himself "Geman" succeeded located in the upper reaches of the Chayu River. Deng people in family economic unit, prevalently exchange, marked polarization between the rich and the poor. Before the founding of new China, they still stayed in the end of primitive society engaging in slash and burn agriculture. Deng people men who will compile bamboo ware and cooperate with each other builders. The framework of houses is made of bamboo, and wood, and mat board used for floors and walls, thatched roofs and wood shop. Large families build a font houses. Women weave clothing with the wild-hemp or hemp planted themselves.

7.2 Human activities

Although there are large area of primitive forest and rich sources, its geographical conditions make ecosystem very weak. The landscape is the result of revolution during the thousand years, and because it has been suffering the destruction, it has been influenced by the local human activities. Therefore, when some steps were made to develop the local technology and socioeconomic structure, it should be very important to improve the protection of this species area.

Generally, local minorities are a mainly engaged in agriculture, animal husbandry, collecting, fishing and hunting. In the off-season, they take items, together with the acquisition of dyes, medicines and other native products, to get near the same town for Tibetan barter exchange, in exchange for Tibetans iron tools, salt, tea and other living necessities.

Farming: This land feed origin minorities generations, which outputs food crops including rice, buckwheat, barley, corn, Chicken wheat and a small part of the valley and vegetables are hot peppers, carrots, potatoes, trucks quarter beans, pumpkins, cucumbers, melon, cabbage. The way of agricultural farming is rude, and, not iron plow, most of production tools is the wooden. Not long ago, they still used a primitive tool called qinggan mucha, which is 170 cm long and diameter of about 10 cm, pointed stick for the dig. There are little iron tools, only with machetes and axes, the duckbill pruning and small sickle for seeding and harvesting. Even at present, they still inherit the primitive cycle of slash-and-burn living ways: burn off forest in winter, next year in spring dig a hole with a wooden stick, seeding, and then wait harvest in autumn. After three or five years, abandon it and change another piece of burned forests for farming, and after three or five years, abandon. Then return to the original burned land that is the new grass on barren land, and then burn again.

Biomass collection (Picking up): Collection of edible plant biomass (herbs, mushrooms, fruits and berries) takes place every year in YNNR, which is the traditional livelihood of local minorities, such as Menba,Luoba. The people involved in this procedure come from the villages nearby; Mostly women and children usual engage gathering. In the gathering season, the villages collect amount plant biomass, especial mushroom and many kinds of rare herbs. In surrounding markets, Cordyceps (a valuable rare Chinese medicine herb, Chinese name is "Dongchongxiasao") is commonly on sale by local residents, mostly Menba and Luoba People. It is said that good mushroom can be sold to 400 yuan per kilometer. And also, as the only area of large primitive forest, this area is mainly supplication of herbs to many pharmaceutical factories in Tibet. So the amount of the total collection is surprising. Due to the exchange of collections is irregular, the data of sum of collection is difficult to get.

Hunting: In local, hunting has been the main source of meat historically. Hunting also offers animal fur, bone and other productions. Their hunting tools are also simple. They often use tools such as bows and arrows, crossbows, and a few self-made guns. The subjects of hunting for food are usually roebuck, bison, wild boar, and goats in summer and winter. Recently, although the establishment of the reserve is limited this activate, the wild animal productions are also found in local and surrounding markets, especial birds and small mammals. Poaching also occurs. Leopard e.g. *Neofelis nebulosa*, *Panthera pardus*, tiger are endanger for their beautiful fur. The poachers kill musk deer for the musk supplied to herbs markets. And it is popular among local young women to own a suit of cloth made of monkey fur.

Fig. 24 Hunted heat

Fig. 25 Huunted skin

Deforestation: Although deforest is forbidden by local government, but the illegal activities of deforest in local is till continuous (Fig.26). Traditionally, the local houses are made of wood (Fig.27). Due to the weather is hot and wet, and the wood in here is easy rotten, so the demand of the wood is large. Nowadays, the secret illegal trade of wood can be found and the effect of it is seriously. Wood cut into pieces to meet the requirement of wood of surrounding areas, such as Lasa. This area is the largest forest of the regions, so wood demand of wide areas must depend on the wood from this area. Although some deforest areas do not belong to the YNNR, the deforest damage the continuity and similarity of wildlife's habitats.

Fig. 26 Wood transportation

Fig. 27 Local wooded house

Ecotourism: The YNNR has rich tourism resources, whose unique cultural landscape, scenery landscape, rich biological resources, religious and cultural prosperity, and a strong favorable culture of Gongbu, attracts a huge tourist (Fig.28; Fig.29). However, some government departments, as the development of tourism resources, blindly and extensively explore, without in-depth study and comprehensive scientific studies, assessment and planning. Attention too much on development, little on the protection, which caused damage to the non-renewable resources and waste valuable tourism. Especially with the construction of the road between Lasa and Linzhi, greatly increased the number of visitors come to protected areas. Nowadays, the loading capacity of tourists during tourism season has created enormous pressure for the protection of the ecological environment, especially in spring.

Fig. 28 The scene gate

Fig. 29 Ecotourism building

Effect on the soil and plants: Too much tourists in the tourist area have a direct impact on the local soil and vegetation. Firstly, the overloading of tourists make soil compacted and then altered the soil structure. Secondly, the lefet materials changed the soil environment of local system, thereby affecting the growth and succession of vegetation. Tourism will affect the ecological environment in a sustainable way in the further. And the destruction of vegetation and soil with the direct relation with the amount of tourists, because vegetation is one of the most important tourist favorers, which is ease to be effected by repeated violations, collecting and pollutions of tourists.

Effect on the wildlife: The reserve is rich of rare wildlife and forest resources. In recent years, due to lack of strict protection and management, and driven by economic interests, some poachers, collecting and abuse sale have occurred, with the result that some valuable animals have been effected and even near to be on the verge of extinction. Besides, the indiscriminate felling of forests, causing serious soil erosion, exacerbated by the destruction of natural resources leading to a decline in the abundance of ecotourism and ecotourism resources to the degradation of the environment is not conducive to the development of ecotourism.

Effect on the environmental quality: Increasing of the flow of tourist in tourism season cause to the increasing of transporting, which, to the area and causing serious air pollution. Tourism also leads to all kinds of waste and sewage such as white garbage, human excreta, automobile exhaust and all kinds of pollutions caused by daily necessities of life carried by tourists, which cause great damage to the local soil, water, forest and other resources. It is difficult to be restored in the near future, even that may no longer be restored to their original state.

Effect on the minorities' culture: In the process of the development of the tourism industry, the local local folk culture often acted as the showcase to attract tourists, tourism in the region is often a subtle process of strengthening or weakening of some of the local folk, and representatives of folk culture to meet the preferences of tourists. In flourish tourism, the local cultural building and religious ancient buildings have been destroyed.

8. Suggestions

It is found that in administration system, management ability of staffs, facilities of the reserve need to be improved. The publicity and executing laws should be enhanced. Moreover, the relative researches should be conducted, and more attentionshould be paid to collect and accumulate the basic data of resource and environment in the reserve.

For local sustainable development: Motuo County is the only mountainous areas in tropical and subtropical environment on the Qinghai-Tibet Plateau. Motuo County is rich of hot water resources and has the geographical advantage to develop the tropical crops, and these advantages make it possible to develop the agricultural complex economic diversification. An independent economic infrastructure as a fundament of eco-tourism would complement and promote mutually, in order to improve the stability of the overall economy, to achieve the goal of sustainable development.

Motuo County is the county with a subtropical climate, growing plantains, bananas, lemons and oranges and other fruits. Because of its altitude fluctuated considerably, growth in some areas of apple, peach, pear and other temperate fruit. Considering too much lengthy and expensive freight transport, regarding areas far around Motuo as the main fruit market is not practical. Before traffic conditions improved, Motuo County would develop a seasonal economy, gathered seasonal tourism industries. In addition, the Motuo County on the county to provide many non-timber forest products. For instance, there are nearly 100 species of edible mushrooms. These products are high economic value, and can be made into dry goods provided surrounding areas.

Only to decrease the primitive cultivation such as "Slash-and-burn" will reduce the acreage of the local residents planted to corn, and other agricultural products. But by raising the level of cultivation techniques to make up for this loss entirely is possible. Moreover, high freight rates make difficult to gain economic income from crops, so they could be planted to other crops to increase the cash income, such as the Chinese prickly ash, Pepper.

The development of handicrafts, such as many kinds of baskets of rattan or bamboo weaving, and locally products a kind of cooking tool called Shiguo.

For forestry policy: Protection of biodiversity and economic development of forestry are closely related to the economic policy. The subjects of the development and management of forestry are forest resources. While renewable forest resources and growth characteristics have a long life cycle. Hence, a long-term stable and sustainable development of forestry needs liberal policy environment. And we need to grant long-term forestry concessions in finance, taxation, banking, and income policy.

The key of biodiversity protection is to conserve the original natural forest. But the daily life of local residents depends on the original natural forests. In view of this situation, we must change the bad forest management to reduce damage to forest ecosystems and environment and promote reforestation programs and regeneration. Adjustment of industrial structure is necessary; the reserve could create animal husbandry, aquaculture, gathering, and eco-tourism industries to protect biodiversity better.

For environmental protection: Protection of biodiversity is linked with social conditions. Therefore, we must gradually improve biodiversity protection of the legislative work in environmental protection. For the protection of the law, according to management, stop illegal destruction of biodiversity such as deforestation, over-hunting, poaching, etc. And enhancing law enforcement is foremost important. The management departments should be in contact with each other and closely cooperation, and shoulders the responsibility to protect biodiversity.

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10. Financial Information

The fund frm RSG is £ 5,000, and the espension is listed in the Tab.2.

Tab. 2 The Ecpension of the project

Items	Money
Fee for local guide: £2 /day/guide×120 days×5 guides	£1,200.00
Map and book purchasing	£300.00
Socio-economic survey, public presentation, talking with local people and environmental education	£800.00
Accommodation of investigators and local guides	£1,000.00
Consumptive materials such as papers and battery	£200.00
Travel among studying sites	£500.00
Travel from Lasa to reserve	£1,000.00
Total	**£ 5,000.00**

11. Outputs

This project conducting has contributed to the local nature conservation as followings:

- **Reports and Papers:** This report in Chinese has submitted to Moto managing government, which will give the information to make more appropriate policy.
- **Benefits to local minority communities:** Through the project conducting and the interviewing eith the local peoples, the environment conservation has been publicized, and some potentiality and managing policy of rational Eco-tourism, Eco-exploring and Mountaineering etc will be decided in the future.
- **Conservation awareness and Education/Training:** In the project conducting, extensive talking and public presentation have been carried out, furthermore, many students of Tibet University and local school have been participated into surveying and been trained, now, they have known how to conduct the field and socio-economical surveying in minority region, and some pics are listed as lollowing:

12. Some pics

13. Acknowledgements

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